香港環境保護

ENVIRONMENT HONG KONG

2022

環境局
Environment Bureau

環境保護署
Environmental Protection Department

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FOREWORD
BY THE SECRETARY FOR THE ENVIRONMENT

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With the imminent threat posed by climate change to the world, actions at both the local and international levels are required to tackle the problem. Hong Kong has been rolling out programmes to reduce our carbon footprint and pollution. However, as extreme weather events have become more frequent and intense, we need to take more aggressive and co-ordinated actions to combat climate change. In 2021, the Government unveiled four policy strategies that aim to set more ambitious targets, actions and timetables in order to lead Hong Kong towards carbon neutrality and sustainable development with firmer strides.

The centrepiece of our new approach is the target announced in the Chief Executive's 2020 Policy Address for Hong Kong to strive to achieve carbon neutrality before 2050, and the target announced in the 2021 Policy Address to reduce Hong Kong's carbon emissions by 50% before 2035 as compared to the 2005 level. To achieve these goals, the Government promulgated Hong Kong's Climate Action Plan 2050 which outlines four major decarbonisation strategies and targets for achieving carbon neutrality, namely net-zero electricity generation, energy saving and green buildings, green transport, and waste reduction. The Government will devote about $240 billion to take forward various measures on climate change mitigation and adaptation over the next 15 to 20 years. The Chief Executive chairs the new Steering Committee on Climate Change and Carbon Neutrality to formulate the overall strategy, while the Environment Bureau will set up a new Office of Climate Change and Carbon Neutrality to strengthen co-ordination and promote deep decarbonisation.

One of our key interim decarbonisation measures is to cease using coal for daily electricity generation by 2035 and replace it with natural gas and zero-carbon energy. Besides, the share of renewable energy in the fuel mix for electricity generation will be increased to 7.5% to 10% by 2035 and to 15% gradually thereafter. While the change in fuel mix will help reduce carbon emissions, we must also adopt a demand management approach, particularly for buildings which account for 90% of electricity consumption in Hong Kong. We have been promoting green buildings, building energy efficiency and low-carbon lifestyles. Our goal is to reduce the electricity consumption of commercial buildings by 30% to 40% and that of residential buildings by 20% to 30% from the 2015 level by 2050; and to achieve half of the above targets by 2035.

We will also focus our work on the transport sector, which constitutes about 18% of total carbon emissions. Our first Hong Kong Roadmap on Popularisation of Electric Vehicles announced in 2021 sets out the target of zero vehicular emissions before 2050. The interim goal is to cease new registrations of fuel-propelled private cars including hybrids in 2035 or earlier. Another policy blueprint, the Clean Air Plan for Hong Kong 2035, tackles air quality challenges with a broader approach. With the vision of "Healthy Living · Low-carbon Transformation · World Class", the Plan outlines measures related to green transport, liveable environment, comprehensive emissions reduction, clean energy, scientific management and regional collaboration to further enhance the air quality.

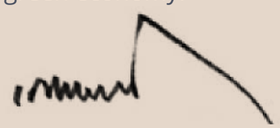
Another major policy document is the Waste Blueprint for Hong Kong 2035 (Waste Blueprint) which announced the medium-term goal of gradually reducing per capita municipal solid waste (MSW) disposal by 40% to 45% and increasing the recovery rate to about 55% through the implementation of MSW charging, together with other policies and legislation, waste reduction and recycling initiatives, as well as publicity and educational campaigns. In 2021, we welcomed the passage of the bill by the Legislative Council to implement MSW charging, and we are engaging in various preparatory work. At the same time, we have stepped up our support for waste reduction at the community level and the development of

the local recycling industry.

Although waste accounts for about 7% of Hong Kong's total carbon emissions, our effort in waste reduction is not only linked to our carbon neutrality commitment, but also closely related to the real situation. Given the severe challenges faced by the global recycling industry and the limited landfill capacity of Hong Kong, we announced in the Waste Blueprint our plan to reduce reliance on landfills for final waste disposal and continue to develop adequate waste-to-energy / waste-to-resources facilities. The work in these areas has been expedited in recent years. If the required waste-to-energy / waste-to-resources facilities can be developed and in place by 2035, we foresee that we will no longer need to rely on landfills for direct disposal of MSW.

These policies have not eclipsed our other ongoing efforts in enhancing Hong Kong's environment. In 2021, the Government announced in the Northern Metropolis Development Strategy the plan to establish a system of Wetland Conservation Parks. In addition, it has implemented a full ban on local ivory trade, expanded the Sham Wan Restricted Area and extended the restriction period to protect the endangered Green Turtles, launched a series of consultations on the management of waste plastics (including the public consultations on the Producer Responsibility Scheme on Plastic Beverage Containers and the Scheme on Regulation of Disposable Plastic Tableware, and inviting the Council for Sustainable Development to conduct a public engagement on control of single-use plastics), implemented a wide array of community environmental awareness programmes, and strengthened the use of new technologies in environmental assessment and enforcement work. Besides, we have been working closely with our partners in other Greater Bay Area cities, which is especially important to our shared and interconnected environment.

Full public participation is required to effectively realise the Government's vision for Hong Kong's environment. Notwithstanding our persistent efforts in promoting environmental protection, we have to keep abreast of the times and gain wider recognition and stronger support from all Government bureaux and departments, businesses, schools, non-government organisations, academia, the public and other sectors of the community to put knowledge into practice in conserving our environment. We are all responsible for Hong Kong's green transformation towards carbon neutrality, as a healthier and more liveable environment will not only benefit the health and well-being of all of us and our future generations, but also create more opportunities for the society through the promotion of a green economy.



Mr. WONG Kam-sing, GBS, JP
Secretary for the Environment

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PERMANENT SECRETARY / DIRECTOR'S MESSAGE

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2021 was a milestone year for the Environment Bureau (ENB) and Environmental Protection Department (EPD) with the announcement of new visionary policies on climate change, clean air, electric vehicles and waste management. The driving force behind these policies was the goal, unveiled in the Chief Executive's 2020 Policy Address, for Hong Kong to strive to achieve carbon neutrality before 2050. We will be introducing new programmes to achieve this goal, leveraging existing platforms that have made good progress during the year.

The Hong Kong's Climate Action Plan 2050 provides the main framework for action. Electricity generation accounts for about two-thirds of Hong Kong's carbon emissions, so we aim to cease the use of coal in daily electricity generation by 2035, increase the share of renewable energy in our fuel mix for electricity generation to 7.5% to 10% by 2035 and 15% subsequently. To lessen the financial burden on the public due to the increased use of clean fuels for electricity generation, we will promote green buildings and improve energy efficiency of buildings. Our goal is to reduce the electricity consumption of commercial buildings by 30% to 40% and that of residential buildings by 20% to 30% from the 2015 level by 2050; and to achieve half of the above targets by 2035.

Transport accounts for about 18% of total carbon emissions. This is being addressed through the Clean Air Plan for Hong Kong 2035 and the Hong Kong Roadmap on Popularisation of Electric Vehicles, which envisions zero emissions from vehicles before 2050, starting with fuel-propelled and hybrid private cars. We are also testing electric ferries and other alternative technologies for transportation. These measures will also help further improve air quality. Levels of most pollutants have fallen steadily since 1999 as a result of local measures and close collaboration with our colleagues in the Greater Bay Area. In 2021, we carried that work forward with the tightening of emission standards for newly registered light buses and buses as well as emission caps for power plants.

Waste is the third major source of carbon emissions in Hong Kong, contributing about 7% of the total emissions. It is also a major issue given our limited landfill capacity and the environmental impacts of the wasteful use of resources. In 2021, we continued to implement a number of waste reduction

measures, such as establishing new outlets for recyclables, expanding community outreach programmes and community recycling network, trialling smart recycling systems and other initiatives. In addition, the Legislative Council passed the bill to implement the municipal solid waste (MSW) charging. We are actively pursuing preparatory work to allow the Government, various stakeholders, and the general public to get prepared for the implementation of MSW charging. We also continued to explore other directions and initiatives, by conducting public consultations on the Producer Responsibility Scheme on Plastic Beverage Containers and the Scheme on Regulation of Disposable Plastic Tableware, and inviting the Council for Sustainable Development to conduct a public engagement on control of single-use plastics. However, we still need to do more.

We have been developing waste treatment facilities to turn different kinds of waste into energy and useful products. The Y·PARK to turn suitable yard waste into useful recyclable products opened in 2021, the O·PARK1 for food waste opened in 2018 and O·PARK2 is scheduled for commissioning in 2024, the T·PARK for sewage sludge celebrated its fifth anniversary in 2021, and the I·PARK1 to treat MSW is under construction and scheduled for commissioning in 2025. Still, we want to go further and develop sufficient waste treatment facilities by 2035 so that we no longer need to rely on landfills for direct disposal of MSW.

Progress has also been chalked up in our other areas of work. For example, in 2020-21 we invested $3 billion in sewerage infrastructure, and rolled out a voluntary scheme to phase out the use of plastic microbeads in personal care and cosmetic products for protection of the marine environment. We celebrated the 10th anniversary of the Hong Kong UNESCO Global Geopark (Hong Kong Geopark) and continued to conserve and revitalise our countryside areas through the Countryside Conservation Funding Scheme, which has granted about $140 million in total since its launch in October 2019. We proceeded with the designation work of the South Lantau Marine Park which will be completed in June 2022. We also continued to bring new technologies into enforcement and assessment work. And we continued to work very closely with our counterparts in the Greater Bay Area on a wide range of shared environmental issues.

Apart from these, the Environmental Impact Assessment Ordinance (EIAO) has been implemented in Hong Kong for over two decades with much experience gained. Although EPD has reviewed and refined the operation of environmental impact assessment (EIA) mechanism from time to time, it is time to conduct a review for further enhancement to the EIA mechanism. We will review the EIAO process with a view to optimising its process, enhancing its operational efficiency and focusing more on environmental outcomes.

With vision, hard work and participation across the community, we are continuing to make progress towards creating a better, healthier environment for everyone in Hong Kong. The future will be bright if we all work together.

Miss TSE Siu-wa, Janice, JP
Permanent Secretary for the Environment /
Director of Environmental Protection

POLLUTION PREVENTION & CONTROL

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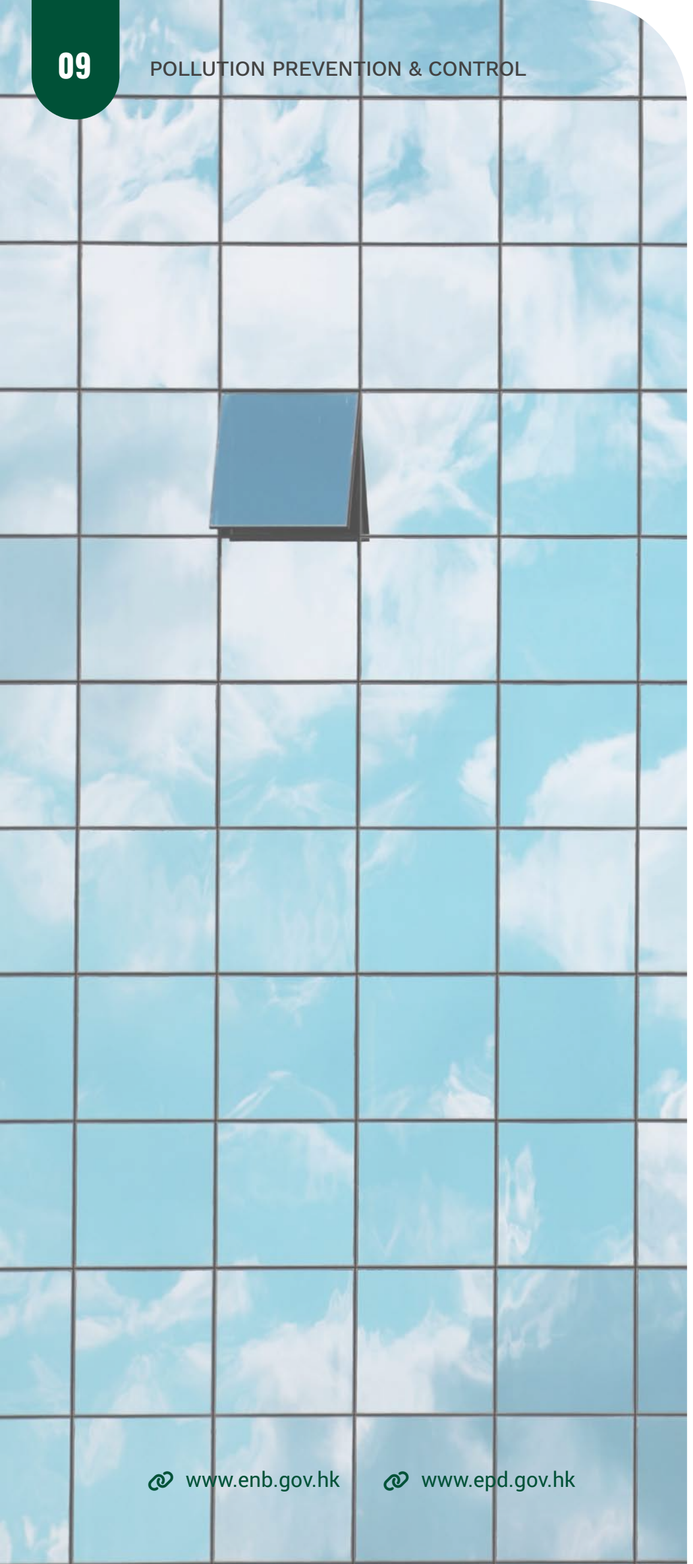

AIR

New Visions for Cleaner Air

Hong Kong has made good progress in improving air quality over the past two decades thanks to efforts both within the city and in collaboration with our regional counterparts. In 2021, we unveiled two new platforms that will build on those achievements to make Hong Kong an even healthier, low-carbon city. The Clean Air Plan for Hong Kong 2035 sets out strategies and targets to achieve air quality on a par with major international cities by 2035, while the Hong Kong Roadmap on Popularisation of Electric Vehicles (EV Roadmap) is aiming for zero vehicular emissions before 2050. These goals will not only improve air quality but also reduce Hong Kong's impacts on climate change.

| Blue skies

Highlights

- ✓ Announced the Clean Air Plan for Hong Kong 2035 outlining the strategies and targets for enhancing air quality in Hong Kong.
- ✓ Announced the first EV Roadmap.
- ✓ Amended legislation to tighten Air Quality Objectives (AQOs) and embarked on a new review of AQOs.
- ✓ Tightened emission standards for designated newly registered light buses and buses.
- ✓ Tightened emission caps for power plants effective from 2026.
- ✓ Signed an agreement with ferry operators on a pilot scheme to test the technical and commercial viability of electric ferries in Hong Kong.

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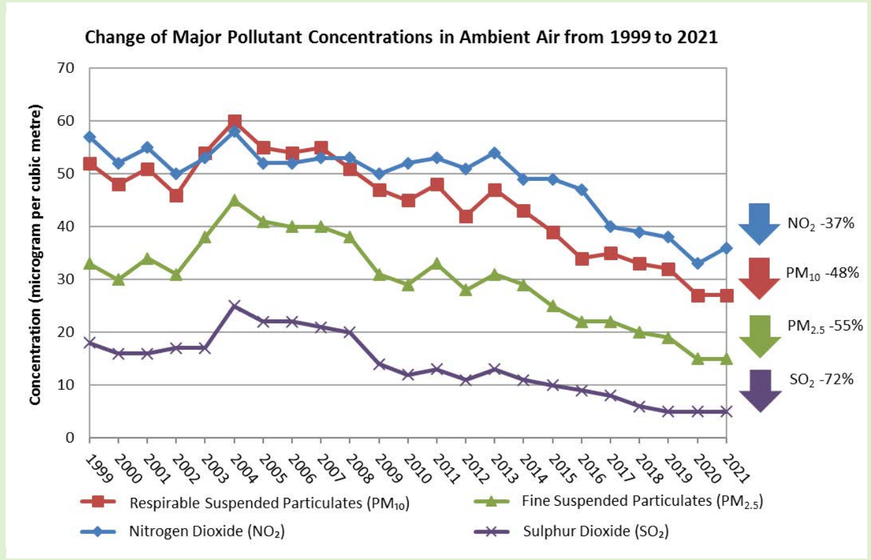
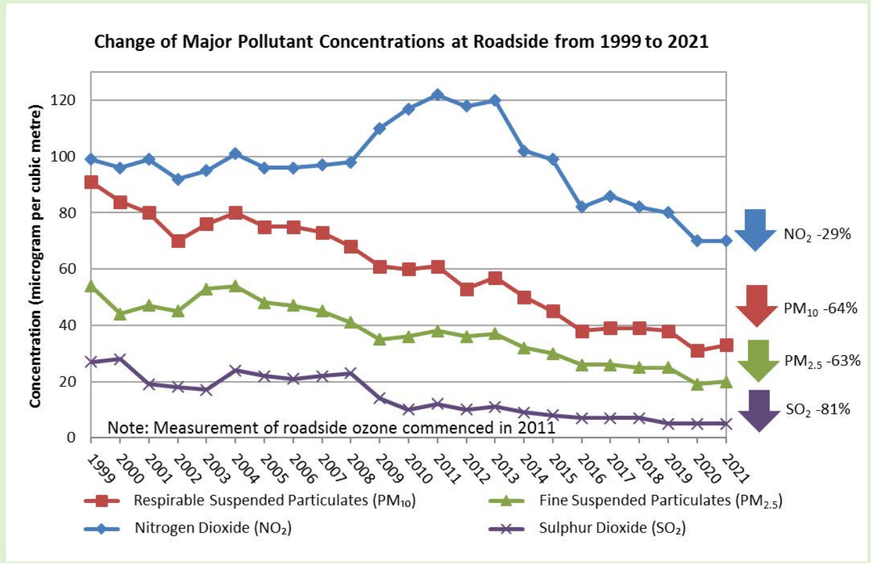
Air Quality in 2021

Air quality generally continued to improve during the year. Locally, levels of most pollutants have fallen steadily since 1999, with ambient levels of sulphur dioxide (SO_2), nitrogen dioxide (NO_2), respirable suspended particulates (RSP) and fine suspended particulates (FSP) dropping between 37% and 72% from 1999 to 2021. Roadside air quality has similarly improved, although NO_2 is a concern because levels still exceed the Air Quality Objectives (AQOs). Most NO_2 emissions come from commercial vehicles, which remain a major focus for Government policy.

Regionally, levels of SO_2, NO_2 and RSP in 2020 have fallen by 43% to 86% since measurements began in 2006 through the Pearl River Delta Regional Air Quality Monitoring Network (PRDAQMN), while FSP levels in 2020 have fallen by 31% since measurements began in 2015.



| Change of Major Pollutant Concentrations in Ambient Air from 1999 to 2021



| Change of Major Pollutant Concentrations at Roadside from 1999 to 2021

New initiatives

AQOs are health-based targets for assessing air quality. In 2021, legislation was amended to tighten AQOs for SO_2 and FSP, effective on 1 January 2022, and a new review of AQOs got underway.

Regional air pollution is being further addressed by Hong Kong and Guangdong through plans and targets that are being prepared for 2025 and 2030. This work follows up on their 2020 regional air pollutant emission reduction targets, which were achieved.

Ozone remains a concern at both the local and regional levels. Ozone is a complicated pollution issue because it is formed by photochemical reactions between nitrogen oxides (NOx) and volatile organic compounds (VOCs) under sunlight. Hong Kong, Guangdong and Macao embarked on a joint study in 2021 on the formation, characteristics and transportation of ozone in the Greater Bay Area. Real-time monitoring of NOx is also being introduced into the PRDAQMN in stages.

Hong Kong's New AQOs and Interim and Ultimate Targets of the World Health Organization (WHO) Global Air Quality Guidelines (AQGs) published in September 2021

Pollutants	Averaging Time	WHO AQGs (μg/m³)					No. of Exceedances Allowed per calendar year in Hong Kong's AQOs
		Interim Target-1	Interim Target-2	Interim Target-3	Interim Target-4	Ultimate Target	
Sulphur Dioxide (SO_2)	10 minutes	-	-	-	-	500	3
	24 hours	125	50	-	-	40	3
Respirable Suspended Particulates (RSP/PM_{10})	annual	70	50	30	20	15	Not applicable
	24 hours	150	100	75	50	45	9
Fine Suspended Particulates ($FSP/PM_{2.5}$)	annual	35	25	15	10	5	Not applicable
	24 hours	75	50	37.5	25	15	35
Nitrogen Dioxide (NO_2)	annual	40	30	20	-	10	Not applicable
	24 hours	120	50	-	-	25	-
	1 hour	-	-	-	-	200	18
Ozone (O_3)	Peak season	100	70	-	-	60	-
	8 hours	160	120	-	-	100	9
Carbon Monoxide (CO)	1 hour	-	-	-	-	35 000 (30 000 as Hong Kong's AQO)	0
	8 hours	-	-	-	-	10 000	0
	24 hours	7 000	-	-	-	4 000	-
Lead (Pb)	annual	-	-	-	-	0.5	Not applicable

Note:
New AQOs effective on 1 January 2022 are indicated in green cells

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Clean Air Plan

The Clean Air Plan for Hong Kong 2035 (CAP) was unveiled in 2021 with the tagline "Healthy Living · Low-carbon Transformation · World Class". The aim is to build on the past record of successes to make Hong Kong a more liveable city with air quality on par with major international cities by 2035. Strides will also be made towards fully meeting the ultimate targets under the World Health Organization's global air quality guidelines in the long run.

The new CAP follows on the 2013 Clean Air Plan and its update in 2017 that focused on reducing emissions from local electricity generation, vehicles, vessels and more, and collaborating with Mainland authorities to reduce regional emissions. The results of these efforts have substantially improved air quality and visibility.

Six major areas will be targeted in the new CAP including:

- **Green transport**. The Government will continue to plan for railway networks and environmentally friendly transport modes in new development areas.
- **Liveable environment**. This will be a focus of city management and planning policies, while a study will also be undertaken on the relationship between air quality and health.
- **Comprehensive emissions reduction**. Efforts will continue on reducing emissions from vehicles and vessels, and controls on VOC emissions will be stepped up.
- **Clean energy**. Measures to reduce emissions from electricity generation will continue to be implemented and new low-carbon energy sources will be explored.
- **Scientific management**. Innovative technology will be adopted to monitor air quality and more detailed information on air quality will be released to the public.
- **Regional collaboration**. Hong Kong will continue to formulate joint regional air pollutant reduction targets and strengthen research and monitoring with Guangdong and Macao authorities.

The success of these efforts will not only benefit air quality, but also help to advance Hong Kong's progress in reducing carbon emissions and climate change impacts.

The Secretary for the Environment, Mr. WONG Kam-sing, chaired a press conference on 29 June 2021 to unveil the Clean Air Plan for Hong Kong 2035

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EV Roadmap

Hong Kong will aim to attain zero emissions from vehicles before 2050 under the EV Roadmap announced in March 2021, which sets out the vision of "Zero Carbon Emissions · Clean Air · Smart City". These efforts will work in concert with other measures to move Hong Kong towards carbon neutrality within the same time frame (see Climate Change and Cross-boundary and International Co-operation).

The EV Roadmap sets out specific targets and detailed plans for achieving its aims. Notably, new registration of fuel-propelled and hybrid private cars will cease by 2035 or earlier. The electric vehicle (EV) charging network will be expanded and its marketisation promoted. Training for EV technical and maintenance practitioners will also be promoted.

The adoption of electric commercial vehicles will be promoted through trials of electric public transport and commercial vehicles with a view to setting out a concrete programme and timetable around 2025. The Government will also aim to create an environment conducive to innovation and popularisation of EVs and will take the lead to use more EVs in its operations.

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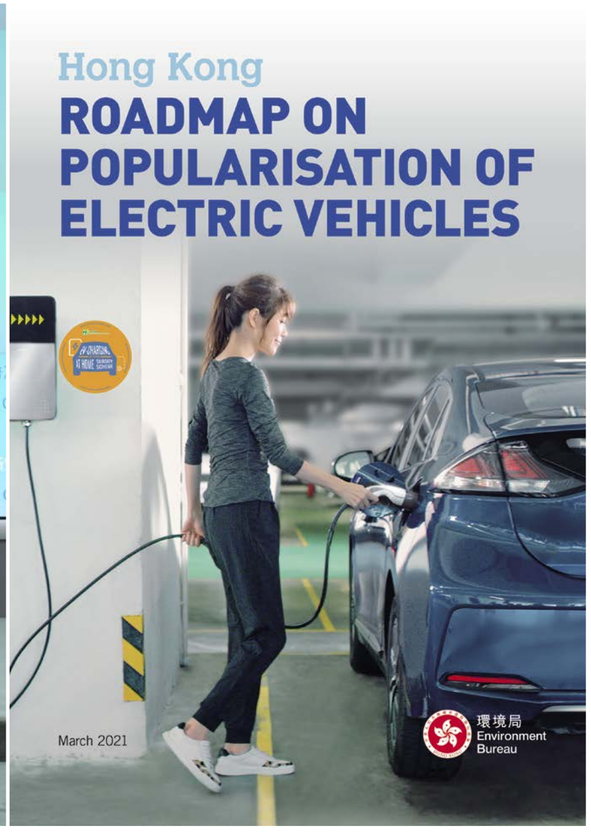


The Secretary for the Environment, Mr. WONG Kam-sing, chaired a press conference on 17 March 2021 to unveil the Hong Kong Roadmap on Popularisation of Electric Vehicles

Current EV initiatives

The EV Roadmap builds on recent efforts to bring more electric vehicles onto Hong Kong's roads. Tax concessions for first registration of electric private cars has proven to be fruitful, with 24.4% of all newly registered private cars in 2021 being electric, up from 12.4% in 2020. The charging network will also expand rapidly, particularly in existing carparks of private residential buildings after the $2 billion EV charging at Home Subsidy Scheme was launched in October 2020 to subsidise the installation of charging-enabling infrastructure in these carparks. The target is to cover roughly 60 000 parking spaces in about three years.

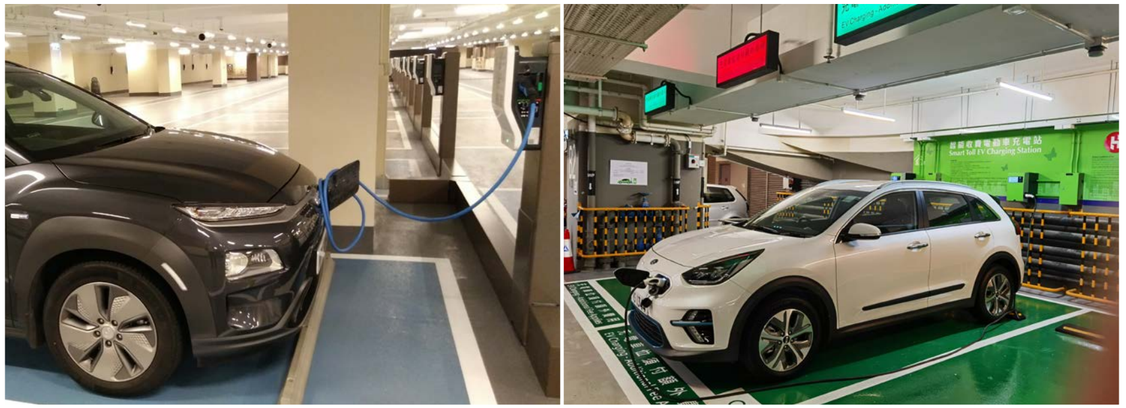
Trials for EVs and other green innovative transport technologies are funded under the New Energy Transport Fund, which has supported about 230 trials since its launch in 2011. These trials have included commercial vehicles, buses and ferries. In 2021, the Government explored the possibility of a trial of electric taxis with the taxi trade, which would be supported under the fund; it also began identifying appropriate locations for quick charging facilities.

Trial of single-deck franchised electric buses

Trial of electric medium goods vehicles (tractors)

Trial of single-deck electric buses

Trial of electric light goods vehicles



Charging of electric vehicles

Existing motor vehicles

While electric vehicles and zero emissions remain the long-term goal, efforts have not let up on controlling emissions from existing and new vehicles that run on fossil fuels. In March 2021, emission standards were tightened for newly registered light buses with a design weight of more than 3.5 tonnes and buses of not more than 9 tonnes. Progress is also being made on phasing out about 40 000 Euro IV diesel commercial vehicles by the end of 2027. Pollution detection using remote sensing also continued, with about 810 000 petrol and liquefied petroleum gas vehicle counts detected in 2021 and 2 956 emission testing notices issued to vehicle owners.

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Other Pollution Targets

Marine vessels

Marine vessels accounted for 28% of total SO_2 emissions in 2019. The Government has required all vessels in Hong Kong waters to use low-sulphur marine fuel since January 2019, which is having a positive impact. The annual average concentration of SO_2 at Kwai Chung air quality monitoring station, which is near the container terminal, fell about 25% in 2021 compared to 2018.

Nonetheless, this is another area where electric power has possibility. In 2021, the Pilot Scheme for Electric Ferries subsidy agreement was signed by the EPD and ferry operators to test the technical and commercial viability of electric ferries in Hong Kong. $350 million has been earmarked to subsidise the construction of electric ferries and charging facilities and operational, maintenance and repair expenditures over 24 months. The trial is expected to begin in 2023.

EPD signed a subsidy agreement for the Pilot Scheme for Electric Ferries with the Sun Ferry Services Company Limited and the Fortune Ferry Company Limited

Power plants

Electricity generation by power plants accounted for 63% of SO_2, 30% of NOx and 16% of RSP in 2019. The power companies have been improving the efficiency of their existing units, introducing new gas-fired generating units and exploring renewable energy. To further reduce emissions from 2026 onwards, the Ninth Technical Memorandum was issued to require power companies to cut SO_2 emissions by 9%, NOx by 10% and RSP by 6% compared with 2024 levels.

Offshore Liquefied Natural Gas (LNG) Terminal under construction (Artist's Impression)

The Hong Kong Electric Company Limited (HEC)'s New Combined Cycle Gas Turbine at Lamma Power Station

CLP Power Hong Kong Limited (CLP)'s New Combined Cycle Gas Turbine at Black Point Power Station

VOCs

Products containing VOCs contribute to ozone formation. To reduce emissions, the Government plans to tighten VOC content limits of regulated architectural paints by 2024 and extend the control to cleaning products.

Hydrofluorocarbons (HFCs)

HFCs are used as coolants in air-conditioners and refrigeration and as fire suppressants, but they have a high global warming potential. They were the target of a 2016 amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, which China accepted in 2021. Following this, the Hong Kong Government is preparing a proposal to control HFCs which will be drafted for trade consultation in 2023.

Looking Ahead

Prepare to launch a trial of electric taxis.

Prepare for a trial of electric public light buses and associated charging facilities in 2023.

Prepare to launch a pilot scheme of electric ferries for in-harbour ferry routes in 2023.

Proceed with a new review of AQOs and aim to complete it in 2023.

Proceed with legislative amendments to tighten VOC content limits of regulated architectural paints and extend the control to cleaning products.

Prepare to consult the trade on a proposal to progressively phase down local use of HFCs.

Prepare to set up a 3-D air pollution monitoring network using light detection and ranging technology.

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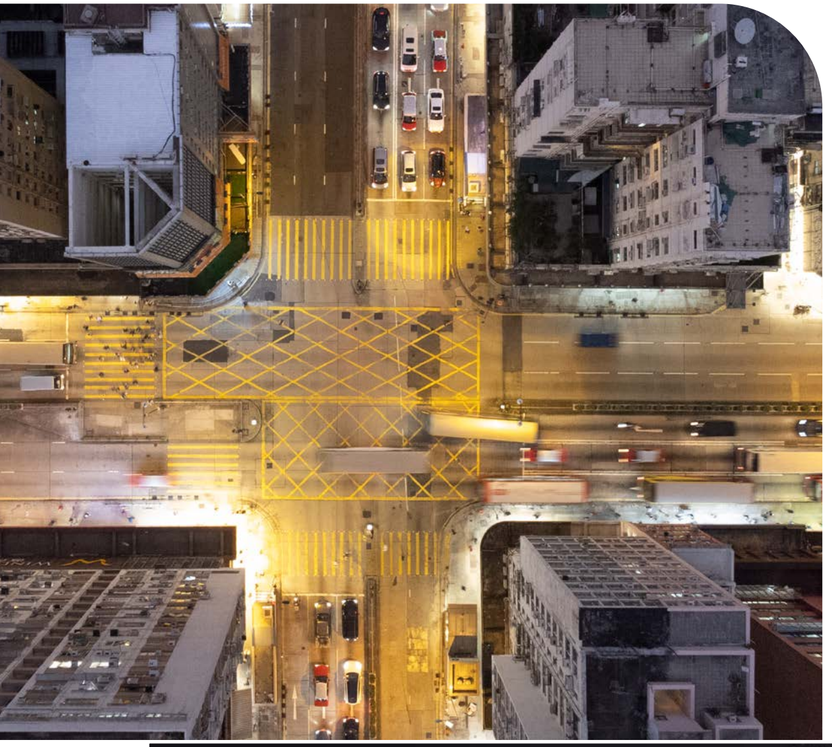

NOISE

Tech Solutions to Noise Pollution

Hong Kong's high urban density has given rise to complex noise problems. Residences are often located near busy roads as well as commercial and industrial operations. While planning, regulatory and other mitigation measures have helped reduce noise, problems still occur. Recently, the EPD has adopted new technologies to provide some relief, including an "acoustic camera" that can quickly identify and visualise fixed sources of excessive commercial and industrial noise for more effective enforcement, and new low-noise road surfacing to muffle the noise from road traffic.

Residential premises situated at proximity to trafficked roads

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Highlights

- ✓ Completed re-surfacing about 109 local road sections with low-noise road surfacing materials, benefiting 150 000 people.
- ✓ Completed retrofitting noise barriers at 19 road sections, benefitting 64 000 people. Noise barriers for four other road sections are under construction.
- ✓ Successfully handled about 90 complaints concerning fixed industrial and commercial noise in 2021 using the "acoustic camera".

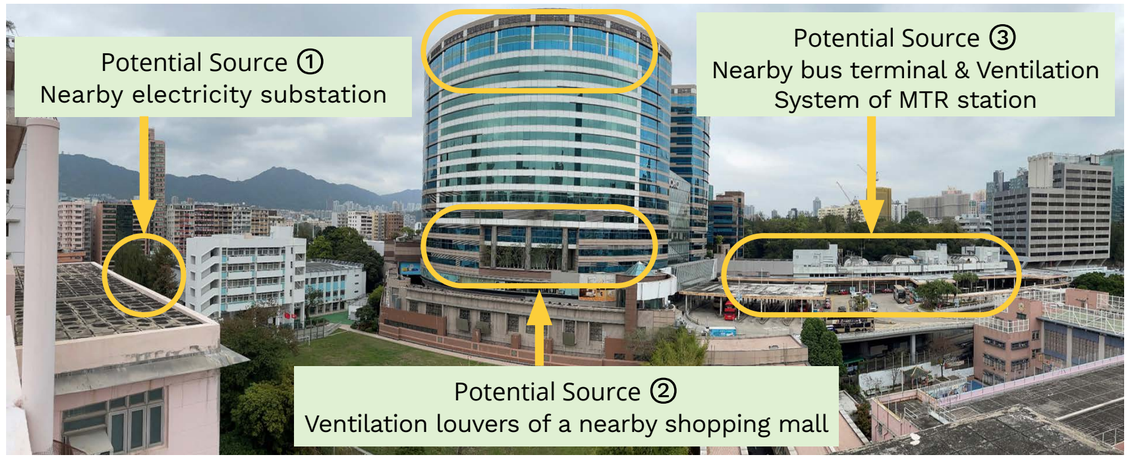
Camera Action

Pictures can be far more revealing than words, as EPD investigators have found with the introduction of a portable "acoustic camera" in mid-2020. The device works like a point-and-shoot camera that is aimed at a fixed noise source and immediately provides an image – in this case, a colour spectrum showing all fixed noise sources in its view based on noise level, with the noisiest source appearing in red. This quick identification has shaved many hours off investigators' work and provided much faster relief for people living nearby.

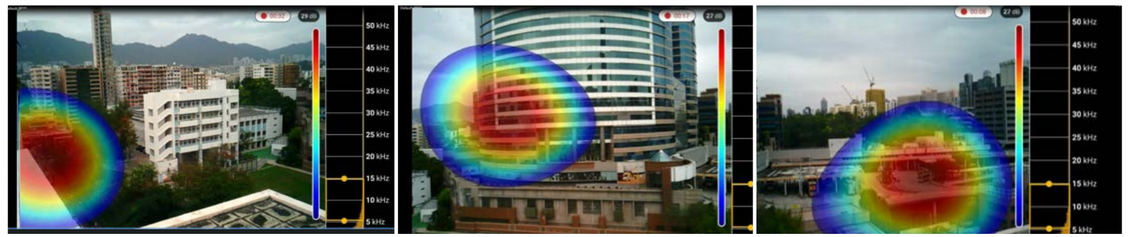
Hong Kong's unique urban landscape makes the device an effective tool for controlling industrial and commercial noise, such as that from fans, chillers or other fixed plants. Previously, investigators might need to spend days working in teams to track down fixed industrial and commercial sources of excessive noise, particularly in cases involving complaints about complicated situations. Shopping malls, restaurants, factories and other similar buildings are often located close to each other and to noise sensitive receivers, and they contain multiple air-conditioning, ventilation, refrigeration and water pump systems, any one of which could be the offending noise source. In recent years, a substantial proportion of noise complaints have involved fixed industrial and commercial noise sources.

The camera can identify the location of the noisiest source at a glance. It is relatively light and easy to operate, and generally requires only two investigators to do the site visit. A prime example of its successful use involved a complaint from a residence that faced a central air-conditioning system, restaurant ventilation systems, power substation and public transport interchange ventilation system located in several buildings. The camera pinpointed the source of excessive noise to an exhaust vent from a restaurant covered by a louver.

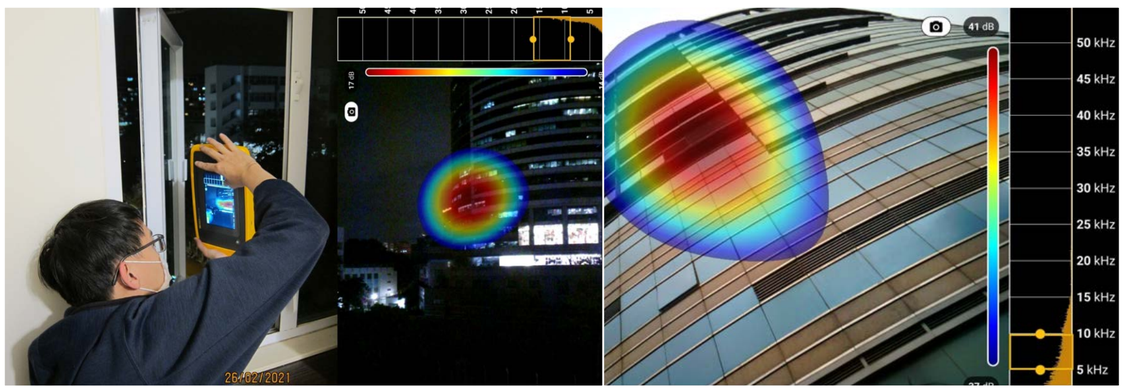
The camera has been successfully used in environments ranging from a factory building with multiple noise sources to dark alleys and night-time noise. All told, in 2021 about 90 complaints cases concerning fixed commercial and industrial noise had been successfully handled using the acoustic camera and about 200 colleagues had been trained in operating the camera.



Possible noise sources far away from sensitive receiver at Mong Kok



Identification of noise sources displayed on the screen of the "acoustic camera"



Dominant noise source identified by the "acoustic camera"

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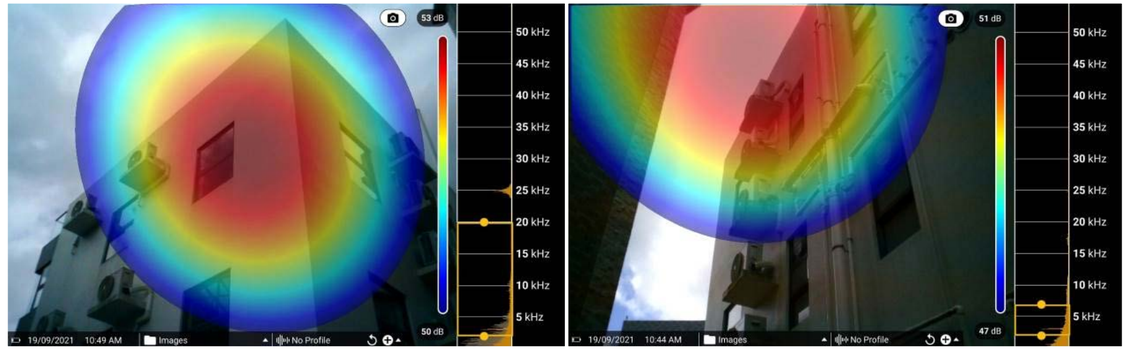
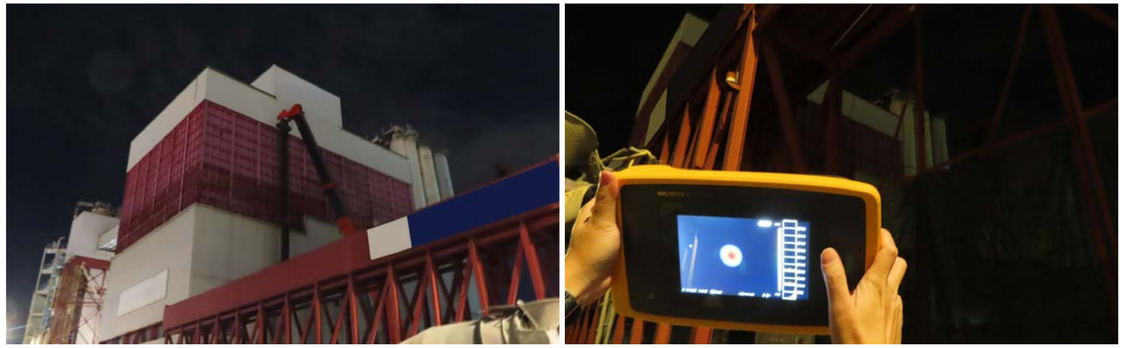
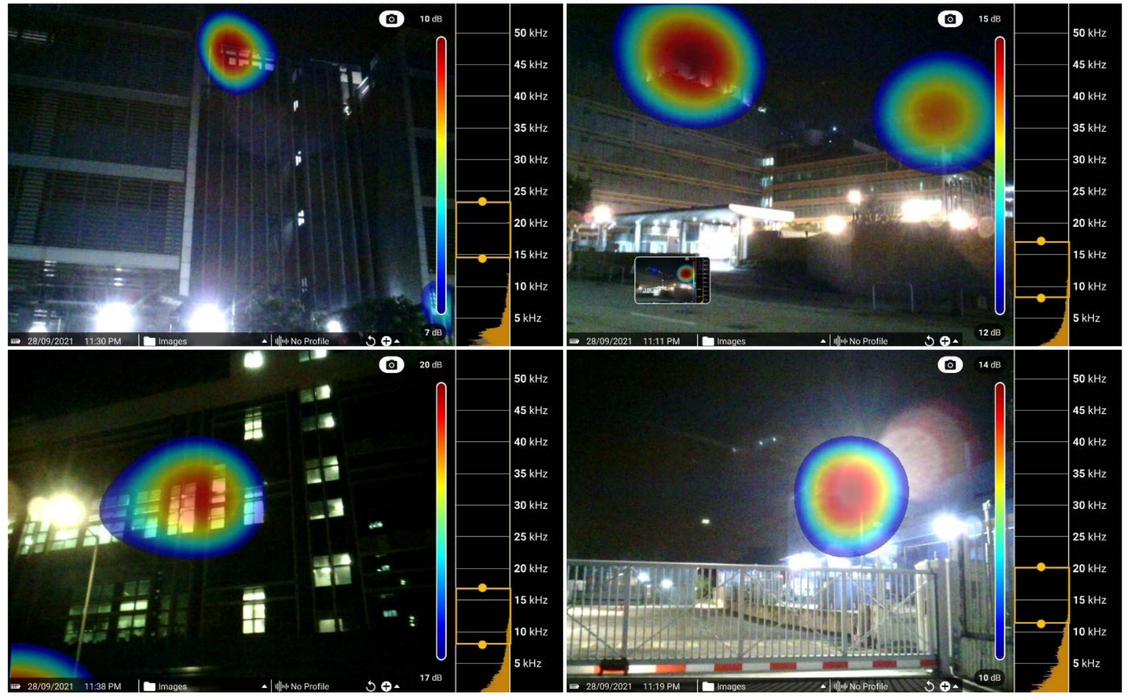
Identification of dominant noise source from multiple noise sources in alley



Identification of noise source from security alarm of a residential village house



Identification of noise emission from part of the concrete batching plant in the dark



Identification of noise sources from ventilation system of data centre and industrial estate in the dark

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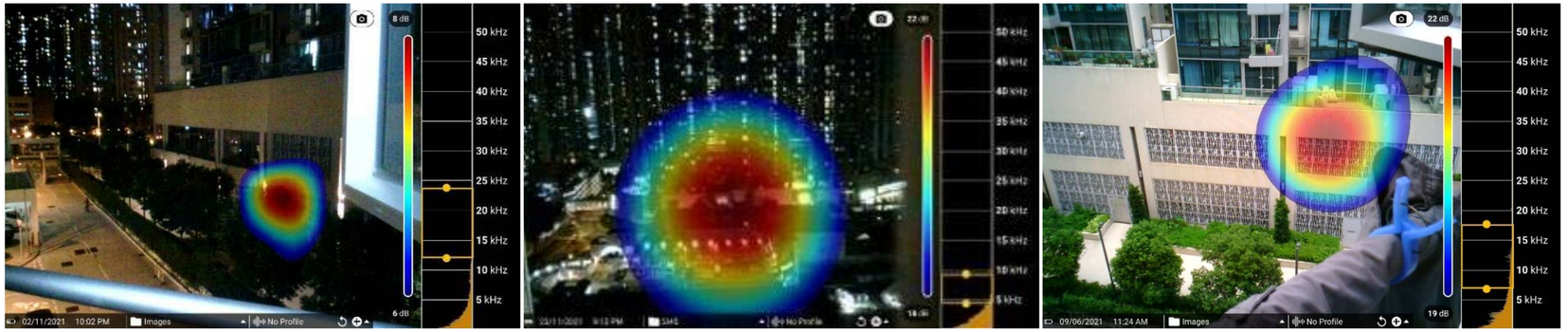
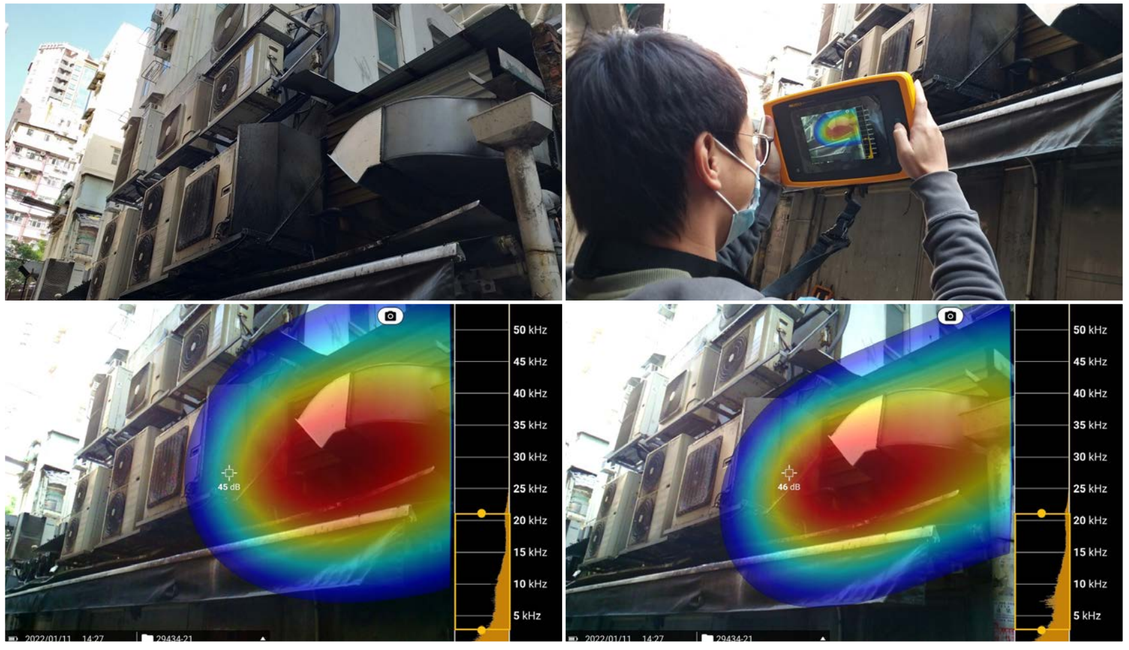


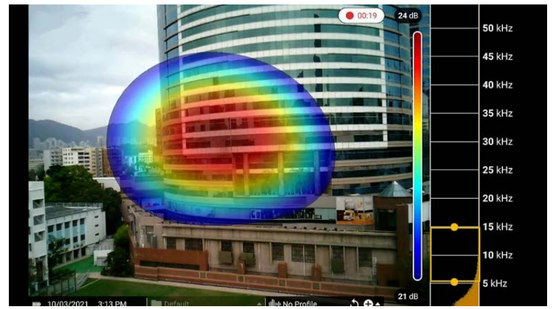
Identification of noise source from ventilation system of shopping mall



Identification of dominant noise source from multiple sources in complicated rear lane leading to successful issuance of Noise Abatement Notice

Innovative portable "acoustic camera" was mainly used in investigating commercial and industrial noise

Since the introduction of the portable "acoustic camera", investigators of the EPD have effectively and successfully handled about 90 cases about commercial and industrial noise in 2021



From the different colours displayed on the screen of the "acoustic camera", investigators of the EPD can "see" the location of the noisiest source at a glance

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Quieter Roads

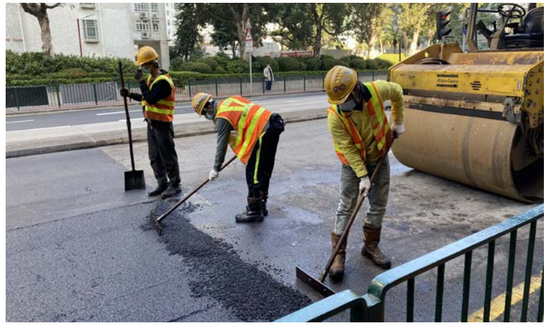
Traffic noise is a persistent problem in Hong Kong given the city's limited options for creating barriers and space between roads and noise sensitive receivers. While those options are pursued where possible, the Government has also been exploring how to minimise noise at source, where the tyre meets the road.

Over the past two decades, suitable road sections have been re-surfaced with low-noise material. In 2018, the EPD and Highways Department (HyD) began collaborating on a trial of a new material called PMSMA6 – for polymer modified stone mastic asphalt, with a maximum aggregate size of six millimetres.

By the end of 2021, 37 local road sections were re-surfaced with PMSMA6. The EPD had collected more than 170 noise measurements while the HyD analysed the material's suitability for local roads. In an interim report issued in June 2021, they reported that the interaction between tyre and road and road traffic noise were both satisfactory with the new material. PMSMA6 was also confirmed to be suitable for asphalt local roads with a parking area, run-in / run-out sections, and gentle or inclined roads with smooth traffic.

Proponents of new town or development areas were advised that they can now apply the surface to suitable road sections as a noise mitigation measure. Re-surfacing work and trials of a total 50 local road sections are planned to be completed in 2022 and EPD and HyD will issue their final report by the end of the year.

Compressing the just-laid PMSMA6 surface at Wu Chui Road, Tuen Mun



Paving PMSMA6 surface at Wu Chui Road, Tuen Mun

Road surfacing works at Wu Chui Road, Tuen Mun

Measuring the engineering performance of PMSMA6 right after the re-surfacing works

PMSMA6 at local road section – Un Chau Street (from Tonkin Street to Wing Lung Street), Sham Shui Po

Close-Proximity (CPX) trailer conducting road-tyre noise measurements

Overview of CPX trailer and towing vehicle

Looking Ahead

Continue to leverage innovative technologies to pre-empt, minimise and resolve noise problems.

Continue to use the environmental impact assessment process to address public concerns and achieve an acceptable noise environment from new infrastructure projects.

Continue to promote quiet construction methods and equipment to reduce noise from domestic renovation.

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WATER

Removing All Traces

Water quality in Hong Kong was once heavily contaminated by human and industrial sewage and floating rubbish. Over the past three decades, great progress has been made to mitigate both problems such that water quality has become cleaner and healthier. That work continued in 2021, when $3 billion was invested in sewerage and, on the back of years re-assuring all gazetted beaches to be clean, an additional beach was added to the gazetted list. The ENB and EPD also continued to work closely with other Government departments and the community to clean up refuse from marine waters and shores. Meanwhile, we unveiled a voluntary charter to phase out microbeads in personal care and cosmetic products (PCCPs), which are harmful to marine life.

Highlights

- ✓ Invested $3 billion in sewerage infrastructure, bringing the total invested since 1990 to $62 billion.
- ✓ Launched the Bye Bye Microbeads Charter, a voluntary scheme for phasing out PCCPs that contain microbeads, following consultation with the trade.
- ✓ Supported sewage surveillance research to monitor the COVID-19 virus and identify sites of infectious cases through the sewerage system.

Water Quality in 2021

Water quality continued to be good across Hong Kong. All 42 gazetted beaches, including the newly designated Tai Po Lung Mei Beach, complied fully with bacteriological water quality objective for the 12th year in a row. Victoria Harbour achieved full compliance of applicable water quality objectives, while rivers and streams reached 86% compliance.

These achievements follow an investment of $62 billion in sewerage infrastructure since 1990, including $3 billion in 2020-21 alone, as well as painstaking work to identify and rectify misconnections of sewers and stormwater drains, install dry-weather flow interceptors, enhance public awareness and divert sewage from village houses to public sewers. By the end of 2021, 16 200 houses in 259 villages had been connected.

Tai Po Lung Mei Beach was open to public for swimming on 23 June 2021

Staff of EPD collecting water samples and measuring field data at a beach

Refuse Removal from Shorelines and Waters

Refuse in and around Hong Kong's waters is unsightly and potentially harmful to local marine life. The Government has targeted this problem through its inter-departmental clean-up operations, support for community clean-ups, awareness-raising activities and regional collaboration.

The Inter-departmental Working Group on Marine Environmental Management plans special clean-up operations under EPD's co-ordination. Several operations were organised in 2021, such as clean-up at Aberdeen Typhoon Shelter where about 17 tonnes of refuse were removed in two operations. The complexity of such clean-ups is evident by the range of participating parties, which included the EPD, Food and Environmental Hygiene Department (FEHD), Marine Department (MD), Lands Department, and Leisure and Cultural Services Department (LCSD). The EPD also co-ordinated the response to a small plastic pellet spill to the west of Hong Kong waters associated with a container overboard incident, in which about 700 kilogrammes of the pellets (mixed with some sand debris) were collected in a timely manner at Po Chu Tam at Tai O and Tsin Yue Wan at Fan Lau. This involved the EPD, FEHD and MD, as well as wardens recruited under the Government's Shoreline Wardenship Scheme who assisted with clean-up operations and conducted marine refuse surveys. From April to December 2021, these wardens conducted a total of 720 clean-up activities and 624 surveys.

Specialised shoreline refuse clean-up at the Government vacant land between shipyards at Aberdeen Typhoon Shelter (left: before; and right: after clean-up operation)

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MD's contractor carried out clean-up along the coast of Po Chu Tam, Tai O right after a container overboard incident in November 2021 (left); and the stretch of shoreline resumed cleanliness afterwards (right)



Refuse collected by shoreline wardens

Community-initiated clean-ups are promoted through the Clean Shorelines Liaison Platform, which supports volunteers who organise socially distanced coastal clean-up activities. Government officials also participated in the kick-off ceremony of the International Coastal Clean-up 2021 Hong Kong in September.

To raise awareness, the Government leveraged social media to bring attention to marine refuse and encourage behavioural change. The EPD has also worked with the Agriculture, Fisheries and Conservation Department (AFCD) on a publicity campaign targeting hikers and visitors to beaches and outlying islands to "Leave No Trace" and practise green etiquette.

Finally, at the regional level the Hong Kong-Guangdong Marine Environmental Management Special Panel has a notification and alert mechanism on surges of water-borne refuse. It was activated seven times in 2021.


Online kick-off ceremony of International Coastal Clean-up 2021 Hong Kong

The Secretary for the Environment, together with several Hong Kong Athletes, pledged the public to "Leave No Trace at Mountain and Sea" whilst having their outing activities in the countryside and on the shorelines. Through this campaign as well as the work of the Clean Shorelines, hikers and other members of the public are urged to take their litter away to protect the countryside scenery and the ecosystem.

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Bye Bye Microbeads Charter

Microbeads are tiny plastic beads less than 5mm in diameter that may pose potential risks to the marine ecosystem. Their presence in some rinse-off PCCPs, to provide functions such as scrubbing, exfoliating and cleansing, are of special concern because they are added intentionally to products that people consume every day. Therefore, PCCPs have been a target for reducing microplastic pollution by changing their formula to replace their microbeads content.

In 2019, the Government announced that it would develop a voluntary scheme for eliminating PCCPs containing microbeads. The Bye Bye Microbeads Charter was drafted, encouraging signatories to phase out products containing PCCPs. Potential signatories include manufacturers, importers, retailers, beauty salons and other handlers of PCCPs. After consulting business advisory committees and trade associations and receiving a positive response, the Government launched the two-year Charter on 1 September 2021.

To support the Charter, the Government has launched a thematic website that promotes the names of signatories and microbead-free brands. Participants can also display logo stickers with a QR code linking to the list of microbead-free brands at their outlets. Participants who actively promote the phase-out scheme will be commended with awards.

QR code logo of Bye Bye Microbeads Charter

Public can play an interesting online game to find out more about microbeads

Following the launch, the Government and five trade associations co-organised three briefing sessions to introduce the Charter to trade members and organised a training workshop to help internal trainers and their frontline staff learn more about microbeads and the Charter and how to answer queries from the public. Through joint efforts with the trade, it is hoped microbeads can be completely phased out soon and this threat to the marine environment eliminated.

Representatives of trade associations show their supports for the Charter in the briefing sessions

Introduced the trade the challenges posed by microbeads through the training workshops

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Sewage Surveillance during the Pandemic

Testing of sewage samples from the foul sewer network has been shown to be an effective screening tool to identify the presence of COVID-19 cases in the community. A novel testing method developed by an interdisciplinary research team from the University of Hong Kong in collaboration with the EPD and the Drainage Services Department was successfully applied in late 2020, progressively developed and widely adopted in a territory-wide sewage surveillance programme that was rolled out in April 2021.

The programme covers a population of five million and 112 stationary sites across Hong Kong for regular testing to search for virus signals in sewage and help identify hidden cases through subsequent public health actions. When positive samples are identified, further sampling and testing is done upstream at sites such as specific street blocks and estates to trace the signal source. By the end of 2021, about 11 300 sewage samples had been tested, with 52 infection cases identified and their associated transmission chains cut off. This included identifying new variants – in June 2021 the team detected the Delta variant in sewage from Tai Po, one day before a confirmed case was reported. This triggered compulsory testing for residents of affected buildings to help stop the spread.

The Secretary for the Environment visited Compulsory Testing Notice (CTN) Operation at Tai Po on 23 June 2021

Planning of Sewage Sample Collection

Looking Ahead

Continue to promote the Bye Bye Microbeads Charter to the trade and public to raise awareness on phasing out microbeads in PCCPs.

Strengthen efforts and engage the public in cleaning up shorelines.

Continue to expand sewerage infrastructure to support new development areas and enhance territorial water quality.

Continue with sewage surveillance for the COVID-19 virus and seek enhancement to fight the pandemic across Hong Kong.

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ENVIRONMENTAL ASSESSMENT

Greener Developments

Environmental impact assessment (EIA) and related tools have long been applied by the Government to evaluate development projects that will meet Hong Kong's future needs. Recently, the EPD worked closely with the Hong Kong Housing Authority (HKHA) to assess land contamination issues associated with redeveloping flatted factories. This resulted in three sites getting the green light to provide public housing. The EPD also deployed small unmanned aircraft (SUA, also known as drones) to improve site inspections of new and ongoing projects. Both cases illustrate a commitment to achieving both environmental protection and improved efficiency in our work.

Highlights

- ✓ Vetted the environmental implications of 265 funding and policy proposals submitted to the Executive Council, Legislative Council and other decision-making bodies.
- ✓ Vetted land contamination assessment submissions for some 40 projects for redeveloping old industrial premises into residential / commercial uses in urban areas.
- ✓ Conducted more than 40 operations using SUA by the end of 2021, after an in-house drone team was established in September 2020.

Old Factory Sites Meet Housing Needs

Like many major cities around the world, Hong Kong is under great pressure to meet demand for more housing. In 2019, the Chief Executive in her Policy Address invited the HKHA to explore the feasibility of redeveloping factory estates under its umbrella into public housing. Given these factories had previous uses that could potentially have contaminated the land, the associated planning process examined the situation and the EPD was called in to provide technical advice on the feasibility of this redevelopment.

The sites in question were six factory estates managed by the HKHA in Kowloon and the New Territories that historically contained facilities such as car repair and maintenance workshops, chemical and dangerous goods storage, fuel storage tanks, and sites for transformers and backup diesel generators. Sometimes these facilities were subject to undesirable or harmful events, such as accidental chemical spills. The respective feasibility study assessed the lingering environmental impacts of these past activities on future redevelopment of the sites.

The EPD also provided technical advice on how to assess land contamination, such as how to identify potential pollution hotspots, conduct soil sampling and laboratory testing, and clean up the sites. The aim was to ensure the exercise met existing standards and guidelines for handling contaminated land and safeguarded future residents.

Potential land contamination hot spot – recycling workshop

Signs of land contamination – leakage from diesel storage and backup generator

Potential land contamination hot spot – metal workshop

Potential land contamination hot spot – place for housing transformer

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In the end, three of the six factory estates were deemed suitable for immediate action to demolish the old buildings and rezone them for residential units. The three sites, at Yip On Factory Estate in Kowloon Bay, Sui Fai Factory Estate in Fo Tan and Wang Cheong Factory Estate in Cheung Sha Wan, have capacity to provide about 4 200 public housing units by 2031. With the land contamination assessment properly conducted, future residents at these sites will not have to worry about environmental issues brought about by their historical use.

Three sites currently occupied by the Yip On Factory Estate, Sui Fai Factory Estate and Wang Cheong Factory Estate will be redeveloped into public housing to meet public demand

Drones Get the Bigger Picture

Remote or water-based projects can be difficult to assess on the ground, both because of accessibility and topographical challenges. Previously, photo- and video-taking from helicopters has provided the bigger picture, but these aircraft have limited availability. With the advent of SUA (or drones), however, that hurdle has been swiftly overcome.

In September 2020 the Environmental Assessment Division (EAD) of EPD formed an in-house drone team to help improve the efficiency and handling of environmental planning projects. With training, our staff have become pilots who can manoeuvre drones to hard-to-reach places to get a bird's eye view of sites and identify potential interactions between a project and nearby sensitive receivers and environments.

Remote area with limited accessibility and topographical challenges – Green Island

Identify potential interactions between Lung Mei Beach and nearby sensitive receivers and environments

Getting prepared – drone team establishment and trainings

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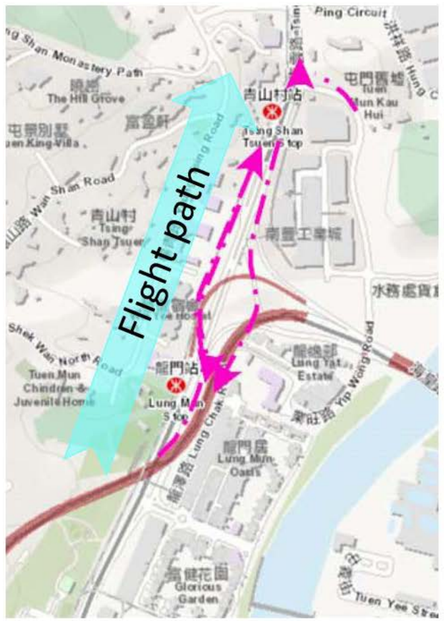

Bird's eye view to identify nearby sensitive receivers and environments along the busy Tsing Wun Road at Tuen Mun

To make further use of this tool, a geographic information system (GIS) platform was developed under EAD's portal to record the date, time, location and path of each flight operation. This will help colleagues in retrieving past flight records. Photos and videos taken by the drones can also be overlaid on mapping documents, such as Outline Zoning Plans and Country Park boundaries, to provide a clearer picture of potential environmental impacts from proposed projects. The EPD is now developing a 3D mapping system to show representations of objects and the ground to further help with assessment and enable colleagues to better understand site conditions.

The drones weigh less than one kilogramme – making it easy for inspectorate staff to carry to sites – and are capable of providing high quality videos and photos. A 360-degree camera can be mounted on the drone and has been used in some operations to give an encircling view of a site. By the end of 2021, 20 pilots had been trained and acquired the SUA Pilot Training – Level 1 qualification.

Drone equipped with 360-degree camera to give encircling view of a site

Looking Ahead

Continue to address potential land contamination issues associated with redevelopment projects at an early planning stage. Demand for such projects is expected to be persistent given pressing housing needs.

Further enhance the drone team by acquiring more advanced equipment and accessories and training more pilots.

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ENVIRONMENTAL COMPLIANCE

Something to Cheer About

Progress was made in 2021 to control two persistent sources of environmental offences: renovation works and peddling noise from shops. A new mobile app, "HoHoSkips", was the centrepiece of a scheme that was launched to support more efficient recycling, collection and disposal of renovation waste, while the EPD also increased inspections and operations against shop noise. The Mercury Control Ordinance also came into effect to regulate activities related to mercury, mercury compounds and mercury-added products in Hong Kong.

Highlights

- ✓ Launched the mobile app "HoHoSkips" to support more efficient handling of renovation waste.
- ✓ Stepped up inspections and enforcement against peddling noise from shops.
- ✓ Implemented the Mercury Control Ordinance.

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New Service for Renovation Waste

Renovation works tend to generate small quantities of construction waste that may be ineffectively disposed of or even illegally disposed of in public places. To reduce these problems, the EPD launched a pilot construction waste collection and recycling service in February 2021 that makes it easier for the trade to connect with recyclers in their district, rather than transporting the waste to landfills in remote areas.

The service uses smart technologies, including smart skips and the mobile app "HoHoSkips", where contractors can book a waste collection time, see the real-time location of recycling vehicles, and contact recyclers. Contractors must pre-sort their inert and non-inert waste and book the service using the app. With funding support from the Recycling Fund and the reduction of transportation and disposal costs due to consolidation of delivery and waste separation, the service providers are able to keep charges to $71 per metric tonne of inert construction waste and $200 per metric tonne of non-inert construction waste.

The "HoHoSkips" booking service was launched in Sham Shui Po district in February and extended to a total 10 districts by the end of the year. The EPD promoted the service through more than 10 000 outreach visits, as well as by contacting more than 1 000 renovation works contractors by phone. In addition, advertisements were placed in Mass Transit Railway trains and concourses and Kowloon Motor Bus buses, and the app was promoted through social media and online advertising.

The value of the service was evident by year's end. In Sham Shui Po, where flytipping activities were serious in the past, the average amount of construction waste cleared per month by the Government fell by 70% in the second half of 2021 compared with the monthly average in 2020 – showing the scheme has effectively improved the problem of illegal construction waste disposal there.

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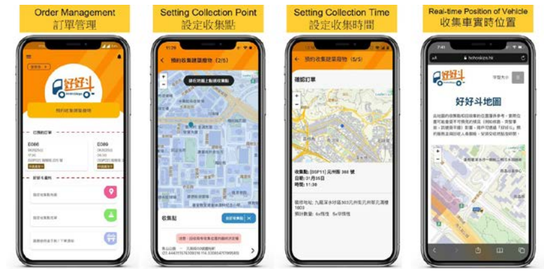

"HoHoSkips" Mobile App

Smart Skip

"HoHoSkips" Leaflet (front)

"HoHoSkips" Leaflet (back)

"HoHoSkips" Promotional Website

"HoHoSkips" Tutorial Video

Turning Down the Volume from Noisy Shops

Shops that use loudhailers and make other noise to attract shoppers' attention to their goods have been a growing source of complaints in recent years from nearby residents and District Council and Legislative Council members. Some shopping streets and markets in densely populated areas are particular hotspots. The EPD has been closely monitoring the situation and stepping up enforcement against offenders at these hotspots, including a major three-month operation in 2021 that also involved the FEHD and the Hong Kong Police Force (HKPF).

Numerous inspections were carried out at targeted shops in Tsuen Wan, Yuen Long, Tai Po, Sham Shui Po, Wong Tai Sin and North Point. The shops mainly sold fresh and frozen meat, fish, fruit, vegetables and telecommunications equipment, and used loudspeakers to cry out to shoppers or broadcast promotions at a high volume.

The operations uncovered 34 suspected violations of the Noise Control Ordinance; prosecutions were initiated against both the shops and directors of shops with repeated offences. By the end of the year, 20 cases had been successfully prosecuted and fines totalling about $100, 000 had been handed down, including one offender who was convicted with the maximum fine of $10, 000.

These operations are a continuation of enforcement measures against peddling noise from shops that was implemented between 2018-20, when the EPD conducted a total of 4 150 inspections and 38 joint operations and instigated 86 successful prosecutions for noise violations including against 14 shop directors. Fines totalling $440, 000 were handed down.

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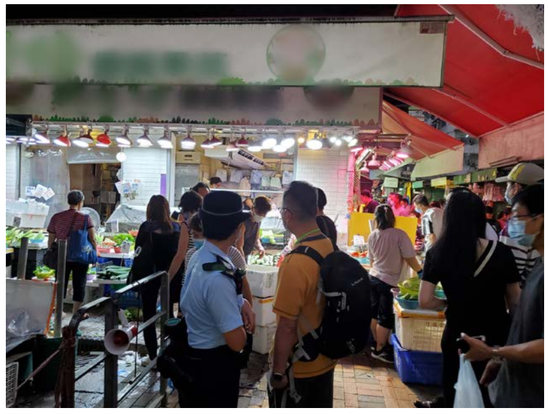
Wireless loudspeakers were used for sales promotion in a fruit shop in Sham Shui Po in August 2021

Joint operation of EPD, FEHD and HKPF in Sham Shui Po in September 2021 against peddling noise from shops

Wireless loudspeaker was used for sales promotion in an Audio & Video accessories shop in Sham Shui Po in August 2021



Joint operation of EPD and HKPF in Sham Shui Po in October 2021

Wireless loudspeaker was used for sales promotion in a frozen meat shop in Tsuen Wan

Joint operation of EPD, FEHD and HKPF in Tsuen Wan in September 2021

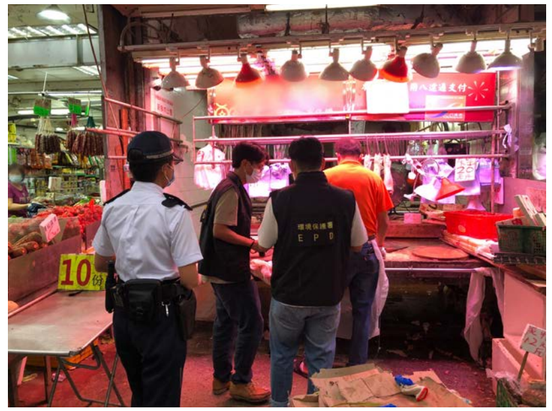
Joint operations of EPD, FEHD and HKPF led by Home Affairs Department (HAD) in Wong Tai Sin during July and August 2021

Stepped-up enforcement operation at North Point by EPD since August 2021

Joint operation of EPD and FEHD in Tai Po in September 2021

Joint operation of EPD and FEHD in Tai Po in September 2021

Joint operation of EPD and HKPF in Yuen Long in October 2021



Joint operation of EPD and HKPF in Yuen Long in October 2021

Mercury Controls

The Mercury Control Ordinance came into operation on 1 December 2021 to control activities related to mercury and mercury compounds, mercury-added products and manufacturing processes that use mercury or mercury compounds (see also Climate Change and Cross-boundary and International Co-operation).

In terms of compliance, the ordinance introduces a permit system for the import, export and possession of mercury, mercury mixtures and certain mercury compounds. This system is applicable to persons, companies and institutions who import, export, keep or use these items, such as local chemical traders, academic institutions, testing and laboratory institutions, importers and exporters, and manufacturers.

The ordinance also prohibits the import, export, manufacture and supply of certain mercury-added products if their mercury contents exceed specified limits. These products include batteries, switches & relays, compact fluorescent lamps for general lighting, linear fluorescent lamps for general lighting, high pressure mercury vapour lamps for general lighting, cold cathode fluorescent lamps & external electrode fluorescent lamps, cosmetics, biocides and topical antiseptics, and certain non-electronic measuring devices (including barometers, hygrometers, manometers, thermometers and sphygmomanometers).

Regulated manufacturing processes that use mercury or mercury compounds in the production of certain chemicals are also banned.

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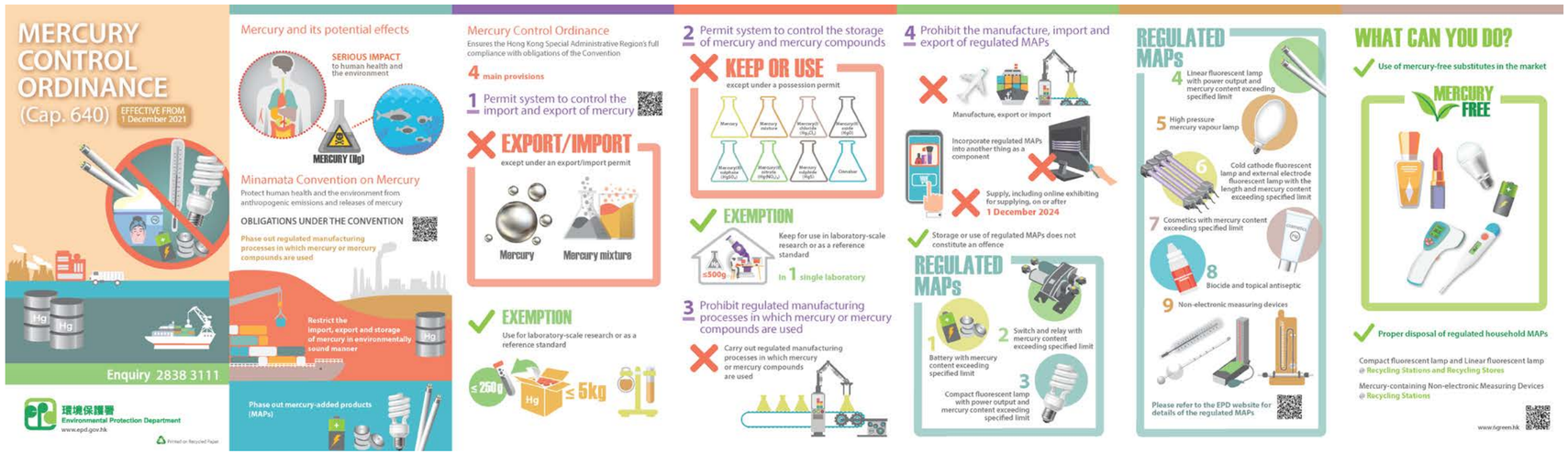
| Poster of the Mercury Control Ordinance



| Leaflet of the Mercury Control Ordinance

Looking Ahead

Continue to promote the pilot construction waste collection and recycling service to reduce fly-tipping.

Continue to arrange special operations against peddling noise from shops.

Continue implementing the Mercury Control Ordinance.

RESOURCE MANAGEMENT

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WASTE REDUCTION

Rising to the Challenges

The complications of waste reduction in Hong Kong are evident by the fact that despite the significant reduction of the overall waste loads over the past decade, the amount of waste ending up at landfills has increased. A main reason is the downturn in the external recycling market. This situation has highlighted the need for Hong Kong to adopt a more proactive and multi-pronged approach for managing waste. In February 2021, the Government announced the Waste Blueprint for Hong Kong 2035 with the vision of "Waste Reduction · Resources Circulation · Zero Landfill". The vision steps up current efforts to incentivise waste reduction through the implementation of municipal solid waste (MSW) charging and other initiatives, promote waste recovery, and move away from reliance on landfills by developing more local recycling capacity and sufficient waste-to-energy (WtE) facilities.

Highlights

- ✓ Unveiled the Waste Blueprint for Hong Kong 2035.
- ✓ Welcomed passage of the bill to implement MSW charging by the Legislative Council.
- ✓ To prepare for MSW charging:
  - Continued to fund community involvement projects that try out MSW charging in different sectors. By the end of 2021, 250 projects had been supported covering 1 200 premises.
  - Continued with Government-led MSW charging trial projects in public rental housing estates, rural villages and government premises.
  - Set up working groups with stakeholders to prepare for implementation of MSW charging.

Our Renewed Vision: Waste Reduction · Resources Circulation · Zero Landfill

Using less, wasting less and facilitating the circulation of our resources form an integral part of waste management. Over the years, the Government has been proactively implementing and promoting various measures to tackle waste problems and keep abreast of the latest situations, including driving behavioural change through policies and legislation, mobilising the community through waste reduction and recycling campaigns, as well as allocating resources to enhance waste management infrastructure. Yet, the waste challenge in Hong Kong is still very acute. MSW disposal has been on the rise as the population and the economy of the city continue to grow, exerting a heavy burden on the landfills.

The Waste Blueprint sets out the vision of "Waste Reduction · Resources Circulation · Zero Landfill", with aggressive new targets to reduce waste loads through various means including MSW charging and an expanded community recycling network and on-site support. In the medium term, it aims to gradually reduce per capita MSW disposal by 40% to 45% and increase the recovery rate by 55%. Experience in many other cities has shown that MSW charging is an effective economic tool for encouraging waste reduction.

In the long term, the aim is to move away from over-reliance on landfills by developing sufficient WtE facilities with a view to converting unavoidable and non-recyclable MSW into resources. Hong Kong has made some significant progress on this in recent years (see Waste Facilities). Moving forward, the Government commits to continue developing sufficient WtE facilities and, coupled with the continued efforts on waste reduction and recycling, strives to achieve "Zero Landfill" by around 2035.

The blueprint will not only help Hong Kong to reduce waste, but also help to promote the gradual development of a circular economy by establishing a more comprehensive recycling chain, making best use of new technologies, and establishing conditions for continuous market demand of renewable resources or energy. It also provides a springboard for engaging with our counterparts in the Greater Bay Area on how to develop a "Zero Waste City" and a regional circular economy.

So long as the Government, members of the public and different sectors of society work together, it will be possible to achieve more sustainable management of our waste, with additional benefits for our local and global environment through reduced carbon emissions.

Waste Blueprint for Hong Kong 2035

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Highlights

- ✓ To promote and support community recycling:
  - Commissioned two new Recycling Stations in Sai Kung and Wan Chai districts.
  - Concluded a one-year technical trial on smart recycling systems and developed a local platform for extended application of different smart recycling hardware and software across Hong Kong.
  - Saw about 120 000 members of the public participate in clean recycling using GREEN$ cards.
  - Extended Green Outreach for waste reduction and recycling to 18 districts.
  - Continued to operate the community recycling network GREEN@COMMUNITY with about 150 collection points. One group of outlets, the 22 Recycling Stores, received an average monthly quantity of clean recyclables that was four times more than in the previous generation of community recycling centres.

MSW CHARGING: Incentive to Reduce Waste

The experience of other cities such as Seoul and Taipei shows that MSW charging is a major driving force behind waste reduction. In August 2021, the Legislative Council passed a bill to enable the implementation of MSW charging in Hong Kong, marking a significant milestone in our waste management.

MSW charging sits at the centre of the city's overall waste management strategy and aims to provide an incentive for enterprises and the public to further reduce waste at source and practise clean recycling. This will in turn support the development of related industries, create job opportunities and take the pressure off landfills.

There will be two kinds of charging modes – by designated garbage bag (mainly applicable to domestic households, street-level shops and public institutions) and by weight (a gate-fee will be charged at landfills or refuse transfer stations, mainly applicable to oversized waste or waste in irregular shape generated from commercial and industrial premises).

A preparatory period of 18 months after the passage of the bill as a basic arrangement has commenced to prepare the public and stakeholders for the implementation of MSW charging. In the meantime, trials have been underway to try out the charging arrangements in real-life settings to familiarise the community with them. The EPD has partnered with about 20 Government departments and organisations to conduct trials in different sectors using dummy designated garbage bags. In 2021, the on-going trials covered about 200 rural villages, 53 blocks in public housing rental estates, three joint-user Government office buildings and one Government clinic. Working groups have also been set up with various trades, such as property management, cleansing services, private waste collectors and recyclers, to draw up best practice guides for different settings.

About 250 Community Involvement Projects have also been funded since 2015, where non-profit organisations and bodies try out MSW charging in different premises and promote waste reduction. By the end of 2021, these projects covered about 1 200 premises and had received funding of about $210 million.

To strengthen support for the community to further practise waste reduction and recycling, Government funding will continue to increase. Once MSW charging is implemented, an additional funding of no less than $800 million to $1 billion per year will be devoted to supporting various waste reduction and recycling initiatives. This will be commensurate with the estimated gross revenue generated from MSW charging in the initial period, thereby achieving the effect of "dedicated-fund-for-dedicated-use".

Community Involvement Projects (2021) – Monitor the trial use of dummy designated garbage bags

Community Involvement Projects (2021) – Provide dummy designated garbage bags to participants for waste disposal

Community Involvement Projects (2021) – Reach out to the community and encourage participants to value resources and reduce waste

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Public Rental Housing Trial Project (Phase 2) (2021) – Conducting in person promotion and setting up dedicated notice boards

Public Rental Housing Trial Project (Phase 2) (2021) – Conducting both onsite and online survey to collect opinion from the residents

Public Rental Housing Trial Project (Phase 2) (2021) – Distributing information leaflet to the mail boxes of the participating households; placing leaflets at the guard counter of all participating blocks for collection

Public Rental Housing Trial Project (Phase 2) (2021) – Setting up dedicated project website


Public Rental Housing Trial Project (Phase 2) (2021) – Providing classroom and on-site training to frontline staff

Public Rental Housing Trial Project (Phase 2) (2021) – Displaying publicity materials such as banners, easy rack, posters at the participating estates




Rural Village Trial Project (2021) – Promotion booths and briefing to the villagers

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Practical Support for Waste Reduction and Recycling

The Government has been striving to strengthen waste reduction and recycling through dedicated facilities, various policy tools and regulations, such as producer responsibility schemes (PRS), and other practical measures. With MSW charging on the horizon, it has stepped up efforts on these fronts.

The community recycling network, which was consolidated and rebranded as GREEN@COMMUNITY in 2020, continued to be expanded and enhanced in 2021 (see also GREEN@COMMUNITY).

Many housing estates have allocated areas for recycling bins and organised collection programmes. However, "three-nil" buildings with no owners' corporation, residents' organisation or property management company lack this provision. The EPD therefore partnered with the Home Affairs Department (HAD) and FEHD in 2021 to take forth a pilot scheme on solar-powered mobile refuse compactors (SMRCs) as well as set up Recycling Spots under the GREEN@COMMUNITY recycling network at "three-nil" buildings in Yau Tsim Mong. The SMRCs facilitate people to dispose of domestic waste properly, while the Recycling Spots operate at designated times and locations to collect recyclables, and encouraging the public to make good use of the GREEN@COMMUNITY network.

Recycling Spots to receive different types of recyclables

SMRCs for collecting waste disposed of by residents of "three-nil" buildings

Recycling bins in public places have also been redesigned and more than 90 sets of the newly designed recycling bins have been deployed for field trials in different venues managed by the LCSD, such as sports centres, town halls, libraries and museums. The trials will continue in 2022. We have also been adjusting the locations of the kerbside recycling bins progressively to enhance support to residential areas.

Field trial of newly designed indoor recycling bins at Ping Shan Tin Shui Wai Public Library

Field trial of newly designed indoor recycling bins at Shek Kip Mei Park Sports Centre

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The collection of recyclables has been strengthened. Waste paper collection and recycling were centralised in 2020. Glass Management Contractors engaged by the EPD have been providing territory-wide collection and treatment service for glass containers since 2018, preparations are being made for the full implementation of the PRS on glass beverage containers. To tackle plastic waste, several initiatives are underway or under planning:

- **PRS on plastic beverage containers**. The Government has proposed to introduce a new PRS premised on the polluter pays principle. A three-month public consultation was conducted in 2021.
- **Regulation of disposable plastic tableware**. The Government has proposed to first ban the sale and catering provision of expanded polystyrene tableware, then introduce controls on other types of disposable tableware in phases. A two-month public consultation on this was conducted in 2021.
- **Pilot scheme on waste plastics collection and recycling**. Pilot scheme on waste plastics collection and recycling will be further extended from three districts (namely Eastern District, Kwun Tong and Sha Tin) to nine districts in 2022, covering about half of the population in Hong Kong.
- **Pilot Scheme on Reverse Vending Machines (RVMs)**. RVMs provide instant rebate via an e-payment platform to encourage people to return used plastic beverage containers for recycling. 60 RVMs were installed under a pilot scheme in 2021 to try out their practical application in Hong Kong, during which more than 16 million containers were collected by the end of the year. Stage 2 of the pilot scheme will be launched in 2022 with the number of RVMs increasing to 120.
- **Public engagement on control of single-use plastics**. At the invitation of the Government, the Council for Sustainable Development (SDC) conducted the public interaction phase of the public engagement on control of single-use plastics in 2021, including specific enhancements of the Plastic Shopping Bag Charging Scheme (see also Sustainable Development).

Members of the public returned used plastic beverage containers via the RVM at GREEN@KWUN TONG

Plastic Recycling Pilot Scheme provides services to collect and recycle all types of waste plastics from non-commercial and non-industrial sources in Eastern District, Kwun Tong and Sha Tin

Poster of the RVM Pilot Scheme

Poster of the Public Consultation on PRS on Plastic Beverage Containers

Public Consultation on Regulation of Disposable Plastic Tableware

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GREEN@COMMUNITY

The community recycling network GREEN@COMMUNITY provides neighbourhood-level facilities for collecting recyclables and conducting trials on new recycling initiatives. It is made up of three levels of facilities, including:

- 11 Recycling Stations, including two new ones added in 2021 in Sai Kung and Wan Chai districts, which provide a variety of recycling options and environmental education programmes. They are also used as testing grounds for new waste reduction ideas. Since mid-2020, a Pilot Scheme on Smart Recycling Systems, which applies Internet of Things technology, has been operating at two Recycling Stations and one Recycling Store (see below) to improve the efficiency of recycling operations and provide a better experience to users. Over one year of operation, the pilot recorded more than 77 000 transactions and collected 55 000 kilogrammes of recyclables. The scheme will be extended to 80-100 application points in 2022.

- 22 Recycling Stores set up in 2020 across Hong Kong. The Stores attracted around three million patrons and collected more than 9 000 tonnes of clean recyclables in 2021. The quantity has increased by more than four times of the previous year. 10 more Stores will be put into operation in 2022.

- More than 100 Recycling Spots set up near single-block and "three-nil" residential buildings and operate at fixed locations on a weekly schedule. To promote the Recycling Spots, the EPD has posted signs on nearby lampposts containing service information about the Spots and a QR code that directs the public to useful information, such as the types of recyclables collected at the Spots.

The Secretary for the Environment, Mr. WONG Kam-sing (centre), introduced the new community recycling network at "GREEN@WALLED CITY". Mr. WONG was shown demonstrating the GREEN$ smart card under the GREEN$ electronic Participation Incentive Scheme (ePIS).

Two new Recycling Stations, GREEN@SAI KUNG (left) and GREEN@WAN CHAI (right), had commenced operation in October 2021, further expanding the Community Recycling Network

22 Recycling Stores were put into service across the territory from end of 2020 to early 2021. The network receives at least eight types of common recyclables and is conveniently accessible by residents in the neighbourhood.

Recycling Stores adopt a simple and neat design with facilities including sorting tables, sinks and water dispensers to encourage members of the public to sort and prepare the resources for clean recycling properly. It further broadens the age group of participants gaining enjoyable recycling experience.

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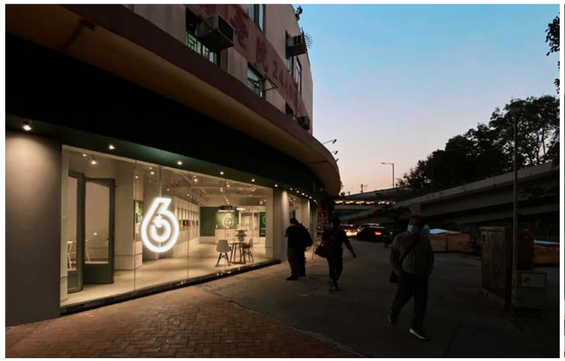
Recycling Spot with operation information on nearby lamppost signage attracts members of the public to participate in recycling

The public could scan the QR code to obtain the details of nearby Recycling Spot

A Community Smart Recycling Vehicle tours around the territory to promote Smart Recycling System, and let the public experience the operation

Much effort has been devoted to ensuring that these community recycling facilities are user-friendly, reliable and environmentally sound. As a recognition, the Recycling Stores have won several design awards – the Grand Award of the DFA Design for Asia Awards 2021, and three awards at the Hong Kong Designers Association Global Design Awards 2021 (including Impact Award-Gold, Hong Kong Best, and Judge's Choice). The GREEN@WAN CHAI Recycling Station also won two awards – a Merit Award in the Architectural Services Department's Annual Award 2021, and a Good Design Award 2021 in Japan.



Recycling Stores won the top accolade of the DFA Design for Asia Awards organised by the Hong Kong Design Centre in December 2021 in recognition of their excellent design

Incentive to recycle is provided through awarding GREEN$, which members of the public can earn when submitting recyclables to Smart Recycling Bins or GREEN@COMMUNITY collection points. The GREEN$ awarded can be accumulated for redeeming gift items. About 120 000 GREEN$ cards had been issued by the end of 2021 and a new mobile app was under preparation.

Public can take part in clean recycling through electronic Participation Incentive Scheme (ePIS) and earn GREEN$ to redeem gifts, including various types of daily necessities, oil and dry goods as well as limited products of Big Waster and Greeny

Members of the public can earn GREEN$ (greeny coins) for redemption of gifts using the GREEN$ mobile app or smart card when they do recycling

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Getting the Message Across

Public education, publicity and stakeholder engagement are being stepped up to prepare the public for MSW charging and encourage them to take action to reduce and recycle their waste. A major promotion campaign launched in 2020, Reduce and Recycle 2.0, was continued in 2021 (see Community Awareness).

Green Outreach has also been set up in all 18 districts to work with community partners, advise housing estates and residential buildings on proper outlets for recyclables, and assist the public in establishing good practice in waste separation at source and clean recycling. Green Outreach organised a series of events, billed as GREEN@District 2021, which attracted more than 17 000 participants. In addition, a pilot Green Outreach Volunteer Programme was launched in Tai Po in 2021 to train volunteers in waste reduction and clean recycling and to provide support at collection points and community events.

Participants practised recycling at GREEN@District 2021 (Rhythm Garden in Wong Tai Sin)

Thousands of visitors joined GREEN@District 2021 (Lei Tung Street in Wan Chai)

Green Outreach promoted waste reduction, source separation of waste and clean recycling through interactive games at GREEN@District 2021 (Sun Yuen Long Centre in Yuen Long)

GREEN@District 2021 promoted waste reduction and second-hand exchange (Hang Fa Chuen in Eastern District)

Looking Ahead

Continue with preparatory work to implement MSW charging.

Continue to expand and upgrade the community recycling network by setting up more collection points and strengthening residential collection services, such as adding 10 more Recycling Stores and dozens more Recycling Spots and launching a one-stop collection service for low-value recyclables.

Extend the pilot scheme on waste plastics collection and recycling to nine districts progressively.

Promote wider application of smart recycling systems.

Map out the regulatory framework and way forward for the PRS on Plastic Beverage Containers.

Expand the pilot scheme on RVMs by increasing the number of units to 120.

Examine the recommendations on control of single-use plastics to be made by the SDC and take appropriate follow-up actions.

Continue the Green Outreach service to promote city-wide participation in clean recycling.

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WASTE FACILITIES

Reducing Our Reliance on Landfills

The Waste Blueprint for Hong Kong 2035, unveiled in 2021, envisions a major reduction in Hong Kong's reliance on landfills. Alongside MSW charging and waste reduction and recycling measures (outlined in the Waste Reduction chapter), we aim to significantly reduce the bulk of waste through treatment. Hong Kong has already built or is in the process of developing WtE infrastructure, such as food waste and MSW treatment facilities, and will continue to expand that capacity with a view to moving away from reliance on landfills by around 2035. In the meantime, landfills are being extended as a stopgap measure to meet Hong Kong's waste management needs in the short and medium term.

Highlights

- ✓ Commenced operation of the Y·PARK to turn suitable yard waste into recyclable products.
- ✓ Awarded a contract to set up and operate a Pilot Biochar Production Plant.
- ✓ Continued to develop O·PARK2 to increase capacity for handling food waste, with commissioning expected in 2024.
- ✓ Continued to develop a trial scheme for co-digestion of food waste and sewage sludge at the Sha Tin Sewage Treatment Works, to be commissioned in 2023.
- ✓ Continued with design and construction works of I·PARK1, to be commissioned in 2025.
- ✓ Completed basic extension works of Southeast New Territories (SENT) Landfill, enabling the intake of construction waste from November 2021.
- ✓ Completed the tender assessment of the Northeast New Territories (NENT) Landfill extension project.
- ✓ Continued with preparations to extend West New Territories (WENT) Landfill.

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Waste Arisings

In 2020, the most recent year for figures, MSW and construction waste disposed of at landfills both dropped, possibly due to the threat of the COVID-19 pandemic and an increase in construction waste charges from 2017. Total waste disposed of at landfills fell 5.7% compared with 2019, to 14 739 tonnes per day. MSW disposed of at landfills fell 2.2% to 10 809 tonnes per day, and the per capita rate fell to 1.44 kilogrammes per day from 1.47 kilogrammes per day. Construction waste disposed of at landfills fell 13.4%.

Yet, given the challenging external market for recyclables and stricter import controls in external markets (see Waste Reduction), the MSW recovery rate fell 1% to 28% in 2020. The EPD has been promoting and strengthening waste recovery for local recycling. As a result, the quantity of MSW recovered for local recycling rose 11% to 230 000 tonnes in 2020. In particular, the quantities of locally recycled plastics and food waste increased by about 27% and 19%, respectively.

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Treating Different Types of Waste

Waste that cannot be recycled or reused can be treated to transform it into energy and other useful products. The Government has been progressively introducing various treatment facilities for targeted wastes and is building a facility to treat general MSW waste. Developments in 2021 included:

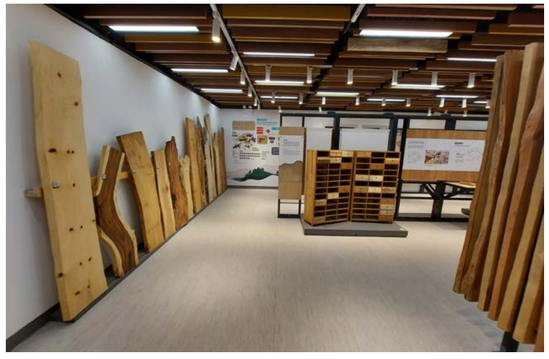
Yard waste

A temporary yard waste recycling centre, Y·PARK, opened in June 2021 at Tsang Tsui in Tuen Mun. It turns suitable yard waste into various recyclable materials, such as wood chips and wood boards that can be used in gardening and planting, biochar production, furniture manufacturing, etc. Its capacity in its first year was 11 000 tonnes, which will gradually increase in time.

Y·PARK

Y·PARK Touchwood·Leisure Zone

Y·PARK Production and Reception Area



Y·PARK Resources Centre

Biochar has many applications, such as soil conditioner, adsorption material for filtering pollutants, compost enhancer and building material additive. It can also retain carbon molecules in woody waste, thus reducing carbon emissions. To develop this capacity in Hong Kong, a Pilot Biochar Production Plant is being built at EcoPark. It will have capacity to process about 6 000 tonnes of local woody waste each year and produce about 1 200 tonnes of biochar.

Food waste

O·PARK1 at Siu Ho Wan on North Lantau is able to treat 200 tonnes of food waste per day; in 2021, it recycled about 45 000 tonnes of food waste into 10.9 million kilowatt hours of electricity and 2 600 tonnes of compost. It has also opened a Visitor Centre for the public that features a dome theatre where computer animations illustrate advanced food waste treatment processes and benefits, an "O·WELL" for photo-taking, a walkway featuring actual-size equipment and tour guides, and a sky garden with shrubs that are grown from compost produced at the facility. O·PARK2 is under construction at Sha Ling in North District, with a target commissioning date of 2024. It will be able to treat 300 tonnes of food waste per day.

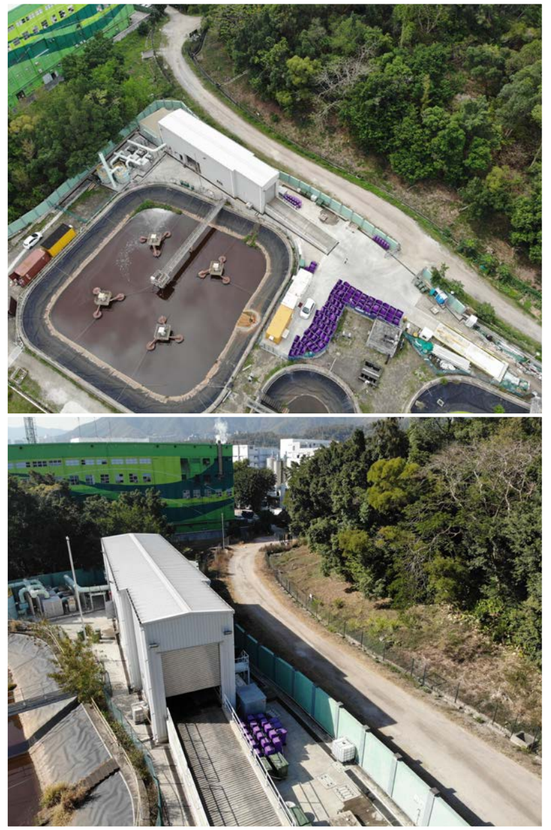
O·PARK1 Front Photograph

Photomontage of O·PARK2

Construction in progress at O·PARK2 (December 2021)

Opening of Visitor Centre

A trial scheme to pre-treat food waste and mix it with sewage sludge for anaerobic co-digestion is also underway at Tai Po Sewage Treatment Works and will be extended to Sha Tin Sewage Treatment Works in 2023.



Food Waste Pre-treatment Facilities for food waste / sewage sludge anaerobic co-digestion trial scheme at Tai Po Sewage Treatment Works

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Sewage sludge

T·PARK treats about 1 100 tonnes of sewage sludge per day with incineration to reduce its bulk by 90%. Since its commissioning in April 2015, it has generated about 310 million kilowatt hours of electricity and reduced greenhouse gas emissions by about 860 000 tonnes.

T·GARDEN at the Environmental Education Centre of T·PARK

Waste electrical and electronic equipment (WEEE)

The WEEE·PARK treats regulated waste electrical and electronic equipment, using advanced technologies and equipment to recover reusable materials. In 2021, it processed 23 971 tonnes of WEEE.

WEEE Processing Line

WEEE·PARK

Paper waste

The Government will facilitate the development of a paper pulping facility at EcoPark to turn waste paper into resources and provide more diversified outlets for local waste paper. Tenders were invited in 2021, with the facility expected to commence operation by 2024 to 2025.

MSW

The I·PARK1 is being built on an artificial island near Shek Kwu Chau to treat up to 3 000 tonnes per day of MSW with advanced incineration technology and energy recovery. It is scheduled for commissioning in 2025.

Site formation and pilling works at the artificial island in progress at I·PARK1 (December 2021)

Steel structure erection for prefabricated electrical and mechanical units at I·PARK1's Prefabrication Yard in Zhuhai (December 2021)

While these sizeable facilities are an important step forward in sustainable waste management for Hong Kong, we will continue to develop sufficient WtE infrastructure to meet our needs, and strives to achieve the vision of "Zero Landfill" by around 2035.

Landfills

Landfills will remain a necessary part of Hong Kong's waste management strategy until we have sufficient treatment facilities and higher waste recovery and recycling rates in the community. To ensure the city has capacity for its foreseeable landfilling needs, the capacities of the three strategic landfills, namely SENT Landfill, NENT Landfill and WENT Landfill, are being extended.

In late 2021, basic extension works at SENT Landfill were completed and the facility started to receive construction waste; the remaining extension works there will continue until around mid-2022. At NENT Landfill, tenders for extension works were invited and a contract is expected to be awarded in 2022. Tender preparation work for the extension of the WENT Landfill was also underway.

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NENT Landfill and its Extension

WENT Landfill and its Extension

SENT Landfill extension (first operation day on 21 November 2021)

The first construction waste collection vehicle using the waste disposal service of the extended SENT Landfill

WENT Landfill Gas Utilisation Facility

SENT Landfill – Landfill Gas Utilisation Facility

Value is being derived from the SENT and NENT Landfills through the recovery of landfill gas, with the surplus exported to produce towngas; a landfill gas utilisation facility has also been in partial operation at WENT Landfill since 2020. SENT Landfill is also the site of a pilot solar farm project, which is expected to be commissioned in 2022.

Closed landfills are a valuable land resource. Hong Kong has restored 13 closed landfills, many of which have been converted to such uses as a golf driving range, recreational grounds, parks and other community amenities. In 2021, the Finance Committee of the Legislative Council approved funding for the Tung Wah Group of Hospitals to develop E-Co Village, a camping ground and green education centre, at the restored Tseung Kwan O Stage 1 Landfill. This is expected to be commissioned in 2023.

Looking Ahead

On yard waste, continue to operate Y·PARK, to build and commission the Pilot Biochar Production Plant, and to work with relevant departments in identifying suitable land for developing a large-scale and permanent yard waste recycling facility in the long run.

Continue with design and construction of the extension works at NENT Landfill.

Continue preparations to extend WENT Landfill.

Complete development works for a pilot solar farm project at SENT Landfill for commissioning in 2022.

On food waste, continue to develop O·PARK2 and extend the trial scheme of food waste and sewage sludge co-digestion at Sha Tin Sewage Treatment Works. Start planning for permanent co-digestion facilities.

Continue with the design and construction of I·PARK1.

ENERGY

Prioritising Clean Energy

Electricity generation is the largest source of carbon emissions in Hong Kong and a major contributor to air pollution. While progress has been made to reduce emissions in recent years, there is still much scope for improvement. In 2021, the Government released the Hong Kong's Climate Action Plan 2050 (CAP 2050 – see Climate Change and Cross-boundary and International Co-operation), which sets a target of net-zero electricity generation before 2050. Clean energy and energy-saving programmes are being stepped up to achieve that goal, including ceasing the use of coal for daily electricity generation by 2035 and significantly reducing electricity consumption by buildings.

Highlights

- ✓ Pledged to cease using coal for daily electricity generation by 2035.
- ✓ Announced Hong Kong's first renewable energy (RE) target to increase its share in the fuel mix to 7.5% to 10% by 2035, and subsequently increase to 15%.
- ✓ Announced the targets of reducing electricity consumption of commercial buildings by 30% to 40% and that of residential buildings by 20% to 30% by 2050, and achieving half of the above targets by 2035.
- ✓ Approved more than 17 000 applications under the Feed-in Tariff Scheme by the end of 2021 since its launch in 2018.

Moving Away from Coal

Hong Kong stopped building new coal plants in 1997 and has gradually been replacing them with cleaner alternatives so that in 2021, coal accounted for only about a quarter of the fuel mix for electricity generation. However, the Government wants to do better and transform the city to net-zero electricity generation before 2050. To expedite that aim, the CAP 2050 pledges to cease using coal for power generation by 2035 and replace it with natural gas with lower carbon emissions and zero-carbon energy.

At the same time, the share of RE will increase to 7.5% to 10% by 2035, from about 1% currently, and subsequently be raised to 15%. To support that shift, the Government is developing more WtE facilities and larger-scale RE projects in suitable reservoirs, restored landfills and water channels. $3 billion has also been earmarked for installing small-scale RE systems in government premises – with more than $1.5 billion approved since 2017-18 for about 130 projects that can generate about 21 million kilowatt-hours (kWh) of electricity annually.

The private sector is also being encouraged to develop RE. The Feed-in Tariff (FiT) Scheme invites the community to invest in distributed RE. From its launch in 2018 to the end of 2021, more than 17 000 applications had been approved by the two power companies and can generate enough RE to meet the electricity demand of more than 80 000 households. Other measures to support RE in the private sector include relaxing restrictions on installing solar energy generation systems in New Territories Exempted Houses and introducing Solar Harvest, which by the end of 2021 had installed solar energy systems in more than 260 schools and non-governmental welfare organisations.

New gas-fired generation unit at Black Point Power Station

The FiT Scheme has encouraged the private sector to develop RE. The Kowloon Motor Bus Company (1933) Limited and Long Win Bus Company Limited have installed solar panels on bus shelters to supply electricity for lighting at bus stops.

Solar Harvest assists schools and non-governmental welfare organisations to install solar energy generation systems at their premises free of charge

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Greening Buildings

Buildings account for about 90% of electricity consumption in Hong Kong. Promoting green buildings, energy efficiency and low-carbon lifestyles can all help reduce this demand and contribute to lower carbon emissions. The CAP 2050 sets a target of reducing electricity consumption of commercial buildings by 30% to 40% and that of residential buildings by 20% to 30% from the 2015 level by 2050; and to achieve half of the above targets by 2035.

The city has been moving steadily towards greening buildings in recent years and these measures are being stepped up. They include the following:

Setting higher standards. The statutory Building Energy Code (BEC) requires building services installations in prescribed new buildings and existing buildings undergoing major renovation to meet minimum energy efficiency standards. The Energy Audit Code also requires certain buildings to undergo energy audits every 10 years. On 31 December 2021, the 2021 edition of the BEC was gazetted, raising energy efficiency standards with an improvement of more than 15% as compared with the 2015 edition.

Setting an example. The Government's Green Energy Target aims to improve its energy performance by 6% in the five years ending 2024-25. This follows the achievement of its target to reduce electricity consumption by 5% in the five years from 2015-16 to 2019-20 (in fact, the reduction was 7.8%, exceeding the target). The recent Green Energy Target covers not only government buildings and infrastructure, but for the first time requires savings in other forms of energy in addition to electricity and takes into account energy generated by RE projects. The Government is also leading by example to enhance energy efficiency in existing government buildings by retro-commissioning (RCx). More than 200 major government buildings have been identified for RCx implementation by phases.

Energy-saving pledges. The "Energy Saving for All 2021" Campaign promotes energy saving through the Energy Saving Charter in which signatories pledge to take specific measures to reduce energy consumption. Webinars were held to promote energy saving and more than 2 200 premises signed up during the year. In addition, more than 600 premises joined the 4T Charter by setting an energy saving target with an action timeline, enhancing transparency of reporting of energy saving results and building energy efficiency data, and encouraging stakeholders to work together on the formulation and implementation of energy saving measures.

Mandatory Energy Efficiency Labelling Scheme (MEELS). The new energy efficiency grading standards for single package type room air-conditioners, dehumidifiers and compact fluorescent lamps under the scheme were fully implemented as of 31 December 2021. These standards are expected to bring an energy saving of about 300 million kWh per year.

The new revision raised the energy efficiency grading standards for single package type room air-conditioners, dehumidifiers and compact fluorescent lamps under the MEELS by about 35%

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Green Infrastructure

A District Cooling System (DCS) can centralise cooling services and save energy. In 2021, two DCSs were approved in new development areas – $3.9 billion for a DCS at Tung Chung New Town Extension (East) and $5.8 billion for a DCS at Kwu Tung North New Development Area. Once these are fully operational, they will save a total of about 73 million kWh in electricity consumption each year. The design of a DCS at Hung Shui Kiu / Ha Tsuen New Development Area is in progress. Planning is also underway for DCSs at Artificial Islands in the Central Waters. The first DCS at Kai Tak Development, which has commenced operation in phases since 2013, saw $4.3 billion in funding approved in 2020 for an additional DCS there. Once the DCSs at Kai Tak Development come into full operation, they will save a total of about 138 million kWh in electricity consumption each year.

Community Initiatives

Systems and support are being provided at the community level to advance our energy reduction agenda.

Schools and non-governmental welfare organisations are being supported to improve their energy performance through two programmes. Under "Green Schools 2.0 – Energy Smart", more energy-efficient variable frequency air-conditioners and light-emitting diode (LED) lighting, as well as real-time energy monitoring systems, are installed free of charge for non-governmental and non-profit making secondary and primary schools to promote energy saving. By the end of 2021, about 300 schools had applied.

The "Green Welfare NGOs" was launched in November 2021. For a period of five years starting 2022-23, the Government will conduct energy audits and install energy-efficient devices (including variable frequency air-conditioners and LED lighting) for eligible non-governmental welfare organisations free of charge to enhance the energy performance of their premises and promote energy saving and decarbonisation.

Experts exchanged views on the themes of "green transformation" and "low-carbon city" at the event

Looking Ahead

Continue to reduce the use of coal in electricity generation and replace it with natural gas and zero-carbon energy.

Continue to encourage the development of RE in both the public and private sectors.

Continue to conduct energy audits for identifying energy management opportunities and implement energy-saving projects, RCx projects, housekeeping measures and best practices for energy saving, and small-scale RE projects at government premises, with a view to achieving our Green Energy Target by 2024-25.

Work towards achieving electricity consumption reduction targets for commercial and residential buildings.

Expand the MEELS coverage to include gas cookers, gas instantaneous water heaters and LED lamps under Phase IV.

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NATURE CONSERVATION
Natural Priorities

For a small city, Hong Kong has a good variety of natural resources, from mangroves to mountains to valleys abundant with flora and fauna. The Government has implemented a variety of measures to protect these areas and strike a balance with development – work that continued to expand in 2021. The Chief Executive proposed a Wetland Conservation Park (WCP) system be established in Deep Bay under the Northern Metropolis Development Strategy (the Development Strategy). The Government also announced measures to enhance the Public Private Partnership (PPP) Scheme under the New Nature Conservation Policy (NNCP) to promote conservation, approved new projects under the Countryside Conservation Funding Scheme (CCFS) and committed $500 million to enrich visitors' experiences in country parks. In terms of our international commitments, we enhanced protection for the globally endangered Green Turtle and fully implemented a ban on the local ivory trade.

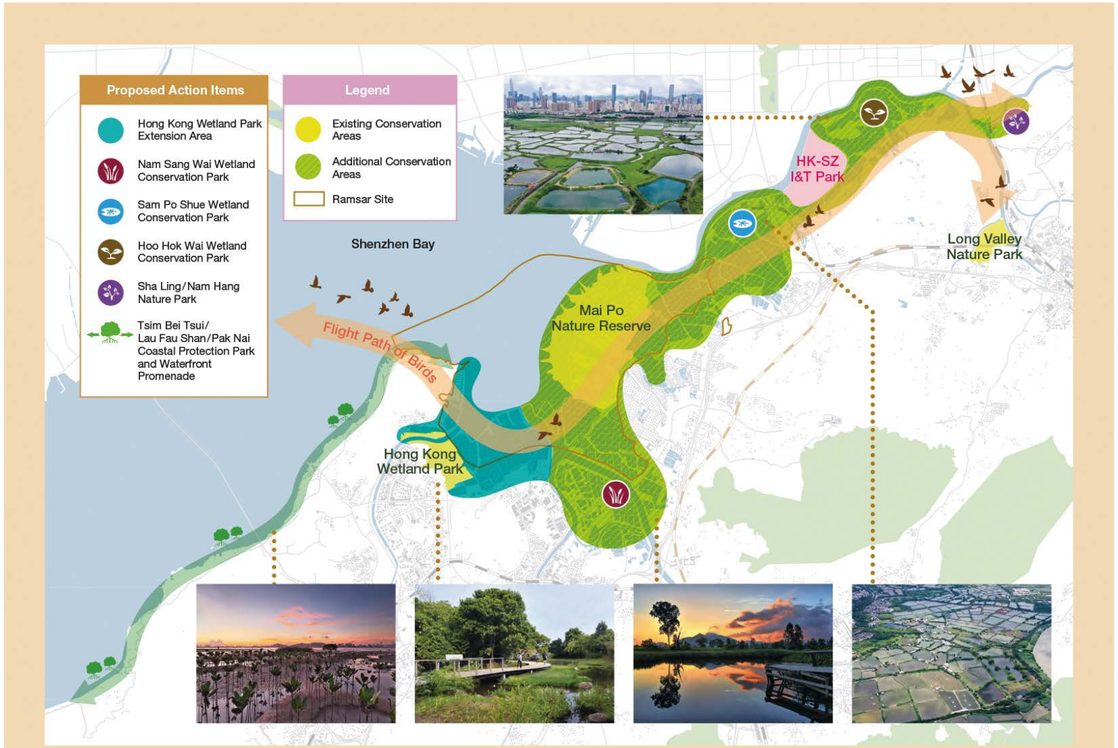
Overlooking the scenery of Shing Mun Country Park at Grassy Hill

Highlights

- ✓ Proposed that a WCP system be established around Deep Bay.
- ✓ Enhanced the PPP Scheme to facilitate conservation of ecologically important sites while also unleashing development potential.
- ✓ Approved 17 countryside conservation and revitalisation projects under the CCFS and facilitated guesthouse licence application at Lai Chi Wo.
- ✓ Opened the Hoi Ha Visitor Centre.
- ✓ Expanded the Sham Wan Restricted Area and extended its restricted period to enhance protection of the endangered Green Turtles.
- ✓ Implemented fully a ban on the local ivory trade to protect endangered elephants.
- ✓ Celebrated the 10th Anniversary of the Hong Kong Geopark.

Expanding Protected Areas

To ensure protection of the natural environment, the Government has kept an eye on opportunities to implement new initiatives or enhance existing ones. In 2021, the Chief Executive proposed to establish a WCP system of about 2 000 hectares in Deep Bay. This would be developed through a proactive conservation policy and the resumption of private fishponds and wetlands with conservation value in Deep Bay. The new wetland conservation parks would offer enhanced protection for an internationally and regionally important foraging ground and habitat for migratory waterbirds, while striking a balance between conservation and development.



The Development Strategy announced the implementation of a proactive conservation policy through the gradual resumption of private wetlands and fishponds, together with the adjoining Government land, to establish a comprehensive WCP system

At the same time, the Government announced enhancements to the PPP Scheme under the NNCP, under which landowners in 12 priority sites can develop the ecologically less sensitive areas of their land if they conserve those ecologically more sensitive areas (the Conservation Portion) of the site in the long term. Previously, developers could only opt to appoint a conservation agent to do the latter work. Now, they can opt to surrender the Conservation Portion of their land to the Government for better long-term management. In both cases, the landowner needs to pay a lump sum towards the long-term conservation work, while being allowed to unleash the development potential of their land.

Marine resources are also being managed and enhanced. Work to establish the proposed South Lantau Marine Park is well underway and should be completed in mid-2022. The park is an important habitat for the Chinese White Dolphin, Finless Porpoise and other animals and the marine park designation will enable the Government to limit certain activities there to protect marine life and habitats.

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Countryside Conservation

The CCFS provides funding for environmental conservation and revitalisation projects in the remote countryside by non-profit organisations. In 2021, it was enhanced by raising the maximum funding for specific types of projects from $2 million each to $3 million, and by increasing the number of rounds of application invitations each year. 17 projects were approved during the year, receiving a total of about $80 million in funding, covering diverse activities ranging from ecologically friendly farming and maintenance of habitat diversity to conservation of architecture and Hakka living culture, theatrical performances with themes on countryside culture, and the design of walking trails that take in historic churches and village culture. Since its launch in 2019, the CCFS has supported a total of 27 projects with about $140 million in funding.

The CCFS is administered by the Countryside Conservation Office (CCO), which has also been co-ordinating improvement works in two pilot areas, at Lai Chi Wo and Sha Lo Tung, to enhance facilities such as environmentally friendly public toilets and trails using handwork (without the use of machines). In November 2021, following co-ordination by the CCO with various Government departments, guesthouse licenses were also issued for five village houses in Lai Chi Wo, opening a business opportunity for the area.

Revitalised farmland at Lai Chi Wo with various crops such as rice and seasonal vegetables

The well-managed eco-pond at Sha Lo Tung continues to be an important habitat for dragonflies and amphibians

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Enhancing the Visitor Experience

Hong Kong's countryside is highly popular for outings among local residents. To enrich this experience, the Government set aside $500 million in its 2021 Budget to carry out enhancement works on various facilities. Works initiated in 2021 included improving and building public toilets at various sites and setting up a new viewing platform overlooking Po Pin Chau in Sai Kung East Country Park. A competition to design the viewing platform was held in late 2021.

Hong Kong's first marine park visitor centre, the Hoi Ha Visitor Centre, was officially opened by the AFCD in June 2021, to showcase marine ecological resources and the history of Hoi Ha. The design has won several architectural awards, and adopts a number of green features, such as solar photovoltaic panels, a rainwater collection system and a bio-treatment plant.

Located in a sheltered bay north of Sai Kung West Country Park, Hoi Ha Wan is home to a vast array of intertidal and subtidal organisms as well as three-quarters of hard coral species recorded in Hong Kong. It was designated as Hoi Ha Wan Marine Park in 1996 for the protection and conservation of these important marine habitats.

Being the first marine park's visitor centre in Hong Kong, Hoi Ha Visitor Centre aims at raising public awareness and understanding of the function and management of marine parks, and to gather public support and action for marine conservation

Other enhancements relate to health and safety. In light of the COVID-19 pandemic, manpower has been deployed to step up inspections and cleaning and repair work at country park facilities, patrols and enforcement have been increased at popular locations, and publicity and education efforts have been strengthened relating to caring for the natural environment and adhering to anti-epidemic measures. A pilot project on fire lookouts was also held at Tai Lam Country Park in 2021 using robotics and artificial intelligence technology to enhance the existing hill fire detection system.

The AFCD stepped up law enforcement against illegal camping and other irregularities in country parks

Protecting Endangered Species and Promoting Biodiversity

Hong Kong took steps to further protect two endangered species in 2021 – the Green Turtle and endangered elephants. Sham Wan on Lamma is one of the few regular nesting sites of the Green Turtle in the South China Sea. On 1 April 2021, the Government expanded the Sham Wan Restricted Area to include the sea inlet adjoining the beach and extended the annual period of restriction to minimise human disturbance. It also increased patrols, monitoring and public education in the area.

To contribute to conservation of endangered elephants, a legislative amendment to prohibit the local ivory trade was fully implemented from 31 December 2021, which bans the import, re-export and commercial possession of ivory except antique ivory.

The Government is also continuing work to mainstream biodiversity and promote public awareness. For example, a territory-wide terrestrial habitat map is being compiled; the online platform "Connecting with Nature" was launched with more than 25 partners featuring a wide variety of programmes such as online events, guided tours and workshops; and the International Day of Biological Diversity was promoted on 22 May through Facebook posts and promotional events that highlighted innovative solutions to nature conservation by non-government organisations (NGOs).

The Government conducts regular inspections at the Sham Wan Restricted Area to remove abandoned fishing nets, refuse and unwanted vegetation to maintain suitable habitats for breeding Green Turtles

To enhance protection of Green Turtles, the Sham Wan Restricted Area has been expanded to include the sea inlet adjoining the beach since April 2021. The Government has increased patrolling and monitoring of the area.

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Hong Kong Geopark's 10th Anniversary

Hong Kong Geopark marked the 10th year since its accession to the Global Geoparks Network with a series of events organised by the AFCD and local and international partners. These included public talks, roving exhibitions, community fairs, a Geopark stamp collection activity, photo and video competitions, production of 10 promotional videos and a photo album, and the opening of the Kat O Heritage Trail.

Accepted as a member of the Global Geoparks Network in 2011, Hong Kong UNESCO Global Geopark is a valuable natural heritage of Hong Kong. It showcases magnificent hexagonal volcanic rock columns which are considered world-class in terms of size and composition. Together with sedimentary rocks formed over different periods, Hong Kong Geopark is high in both geological and education values.

Hong Kong Geopark 10th Anniversary logo

To celebrate the 10th anniversary since the geopark's accession to the Global Geoparks Network, the AFCD organised a series of celebration events in 2021

Looking Ahead

Continue designation work for the South Lantau Marine Park and North Lantau Marine Park.

Conduct a strategic feasibility study on the WCPs proposed in the Development Strategy.

Carry out design, planning and construction work for various enhancements in country parks.

Carry out preparation work for the designation of the proposed Robin's Nest Country Park.

Continue to promote biodiversity through various long-term conservation projects and promotion campaigns.

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STAKEHOLDER ENGAGEMENT

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BUILDING PARTNERSHIPS

Creative Collaborations

Partnerships with polluters have been an effective way to facilitate compliance by helping polluters better understand their obligations and assisting them where possible. In 2021, this took a creative turn with the production of short, animated videos to illustrate the common environmental problems and solutions for vehicle repair workshops. The EPD also introduced a subsidy scheme for retrofitting roadside skips and undertook other outreach with the construction and restaurant trades.

Highlights

- ✓ Produced five short, animated videos to promote good practices and green messages to vehicle repair workshops.
- ✓ Collaborated with the Hong Kong Construction Association and Development Bureau to promote environmental best practices in the construction industry.
- ✓ Held talks with potential restaurant license applicants on equipment to control cooking fumes.
- ✓ Launched the Subsidy Scheme for Retrofitting Roadside Skips 2021-22.

Video Messaging

Vehicle repair workshops can give rise to noise, odour and other environmental problems if operated improperly. To raise awareness of the problems and solutions, the EPD collaborated with the Hong Kong Vehicle Repair Merchants Association and the Environmental Vehicle Repairers Association to produce five animated videos that combine internet memes and content based on the actual working environment in garages.

The videos run less than two minutes each and provide an easy-to-understand overview of how to avoid pollution violations and control impacts in five areas – noise, odour from paint spraying, wastewater, chemical waste and refrigerants. The videos were uploaded to the EPD's Green Garage website in September 2021 and have received a favourable response from the trade.

Other partnership initiatives related to the vehicle repair trade were also undertaken during the year. The EPD collaborated with the Electrical and Mechanical Services Department (EMSD) to provide short articles on green garage practices for its Registered Vehicle Mechanics Newsletter and prepared to take part in its Saturday night webinars to provide continuous professional development for the trade. The EPD also visited an advanced paint spraying booth in Yuen Long that is equipped with multiple particulate filters and activated carbon filters to reduce dust and VOC emissions, and visited about 400 vehicle repair workshops on Hong Kong Island and in the Islands District to promote good environmental practices and enhance awareness.

| Visit to vehicle repair workshops for promotion of green practice

| Publicity videos of green garage

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Green messages in the RVM newsletters of EMSD

Visit to an advanced paint spraying room and keep abreast of trade development

Exchange with the trade

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Builders Going Green

More builders are adopting greener practices, as evidenced by participants in the Hong Kong Construction Association's Environmental Awards 2021, which is co-organised with the EPD. The EPD and Development Bureau both served on the judging panel of the awards. The awards recognise good performers who demonstrate a high level of compliance with environmental laws and regulations and outstanding achievements in environmental performance. There have been notable improvements recently.

Many of the 41 awardees in 2021 had implemented an environmental management system and energy management system at the corporate level and exceeded their environmental targets for the year. Some went even further by adopting a carbon management plan and measures to improve their performance, introducing innovative green measures such as Building Information Modelling and Modular Integrated Construction to optimise resources and reduce waste, using solar panels at site facilities, and providing a RVM onsite to recycle plastic bottles.

Separately, the EPD continued to collaborate with the Civil Engineering and Development Department to organise holistic training courses on major environmental laws. Two online training sessions were organised in 2021, benefiting about 150 participants.

Airing Matters with Restaurants

Public talks on air pollution control were offered during the year for potential restaurant licence applicants. The talks focused on legislative requirements and air pollution control equipment (APCE) to minimise cooking fume emissions. Applicants were advised to install high efficiency APCE, such as an electrostatic precipitator, at the outset to avoid causing pollution and incurring the high remedy cost of retrofitting such equipment later on.

Subsidy to Retrofit Roadside Skips

Roadside skips that provide temporary storage for construction waste, especially from building and renovation works, can be unsafe, especially if they block roads and sight paths. The EPD therefore launched the Subsidy Scheme for Retrofitting Roadside Skips 2021-22 to retrofit roadside skips with safety features.

Funding was available to retrofit about 300 in-use skips with yellow flashing lights, red and white reflective strips, hooks for mounting a cover, display of the skip certification number, bright yellow paint at both ends of the skip, and inscription of the name and telephone number of the skip company concerned.

Operators could apply for a subsidy of up to $22,000 per skip, with the retrofit work done at any of 20 or so approved workshops. Applications for the voluntary scheme were open from 24 May to 30 September 2021, and about 60 skip operators submitted applications before the deadline.

Pre-retrofitting

Post-retrofitting

Looking Ahead

Continue to collaborate with the construction trade and stakeholders by organising seminars and other activities to promote good environmental practices.

Continue to provide support to the vehicle repair trade and collaborate with the EMSD on enhancing the environmental awareness and performance of the industry.

Subsidise the retrofitting of about 300 roadside skips in the 2022-23 financial year.

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COMMUNITY AWARENESS

Promoting Behavioural Change

The Government's programmes to reduce and recycle waste require participation by everyone in every sector of society to succeed. To support that goal, the EPD and Environmental Campaign Committee (ECC) have been rolling out major community-wide promotional campaigns, organising capacity-building programmes in schools, recognising high achievers, funding community projects and testing new initiatives. Many of these are ongoing and attracting growing numbers of participants. In 2021, new measures to expand our impact included a pilot scheme to lend reusable metal food containers, a Green Prefect Programme to cultivate young leaders in schools, a campaign targeting foreign domestic helpers, and lunch talks on green issues.

Highlights

- ✓ Promoted plastic-free takeaway through the pilot scheme "ben don go!" to lend out reusable meal containers.
- ✓ Launched the IN-NO Plastics Challenge to attract innovative proposals from tertiary students on reducing disposable plastics.
- ✓ Launched the "Eco-trendsetter Campaign" to promote green lifestyles among foreign domestic helpers in Hong Kong.
- ✓ Launched the online "ECC Low Carbon Lunch x Talk" which attracted more than 213 000 views.
- ✓ Continued the Reduce and Recycle 2.0 Campaign.
- ✓ Approved 238 community-initiated projects through the Environment and Conservation Fund (ECF), providing a total grant of about $193.3 million.
- ✓ Received a record 3 137 entries to the 2021 Hong Kong Awards for Environmental Excellence (HKAEE) and 94 entries for the 2021 Hong Kong Green Innovations Awards (HKGIA).
- ✓ Engaged more than 10 500 students through the Student Environmental Protection Ambassador Scheme and Green Prefect Programme.

Reduce and Recycle 2.0: The Campaign Continues

The Reduce and Recycle 2.0 Campaign was launched in 2020 to promote waste recycling and reduction, particularly the GREEN@COMMUNITY recycling network, and introduce new programmes for reducing waste at source. That mission remains as important as ever and it was carried forward in 2021.

The Campaign put a particular focus on promoting public consultations on regulating disposable plastic tableware (see Waste Reduction) and controlling single-use plastics (see Sustainable Development). Two Announcements in the Public Interest (API) on the consultations were launched as well as thematic websites, MTR advertisements, an online platform, social media content, and a cross-over of Government mascots to help raise awareness of the consultations – the EPD's Big Waster and the FEHD's Ah Tak.

More generally, the Campaign also launched a television API to further promote the eight types of recyclables and GREEN@COMMUNITY recycling network, as well as expanded online channels to promote green living and waste reduction and recycling. For example, key opinion leaders (KOL) were invited to create video blogs on forming a green habit, eight one-minute videos were produced educating the public on the proper handling of recyclables, and a video was produced for domestic helpers on the Government's Plastic Recycling Pilot Scheme.

Two APIs were rolled out to tie in with the launch of the public consultation on regulation of disposable plastic tableware and control of single-use plastics in July and September respectively

KOLs were invited to film a series of online visual in video blog style on how they formed a new green habit to drive conversations online

In autumn 2021, the GREEN@District 2021 initiative was held on weekends in different parts of Hong Kong, made possible by a reprieve in the COVID-19 pandemic. Upcycling workshops, second-hand exchange markets and other activities introduced green living to the community. The events were promoted through banners, posters, Facebook and Instagram stories.

To appeal to young people, an influencer was invited to act as a "One-day Store Manager" at a Recycling Store and promote the green living concept through social media. A family board game on recycling was also produced and available through redemption at GREEN@COMMUNITY outlets.

Looking forward, the Reduce and Recycle 2.0 Campaign will step up promotion of food waste recycling and the Government's progress in converting food waste into energy and useful materials.

The Campaign organised regional activities, GREEN@District 2021, during weekend from October to November to introduce green living to the community through various activities

A family board game was produced for redemption at the EPD's recycling network to promote eight types of recyclables and recycling messages for all ages

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Promoting Plastic-free Takeaway

Anti-pandemic measures have led to an increase in waste, particularly as people order more takeaway meals. To provide an alternative to throw-away food containers, the EPD and ECC launched a two-month Pilot Scheme for Lending Reusable Containers in summer 2021, called "ben don go!".

A free one-stop service was offered at Revenue Tower in Wan Chai and D·PARK in Tsuen Wan where people could borrow clean, sterilised meal containers at designated places for use when buying takeaway meals. Users made a deposit via their Octopus card and were fully refunded when the containers were returned.

The scheme was promoted through multiple online and offline channels and attracted support not only from members of the public but also nearby eateries at both locations. Other NGOs and tertiary institutions have expressed interest in exploring further ways to develop the scheme.

During the Pilot Scheme, an accumulated number of nearly 4 000 meal containers was lent out while around 13 000 members of the public were approached

Green Business Champions

Businesses that demonstrate good green management and initiatives are honoured each year through the Hong Kong Awards for Environmental Excellence (HKAEE) and Hong Kong Green Innovations Awards (HKGIA).

In October 2021, a hybrid online and offline ceremony was held for winners of the 2020 HKAEE and HKGIA. These included 47 companies that received Gold, Silver or Bronze HKAEE awards and 159 companies that received Certificates of Merit. Five companies were honoured with HKGIA awards. The winners were selected from record 2 785 entries in 2020 – an achievement that has been overtaken by the 3 137 entries received in 2021, with winners to be awarded in 2022.

The October ceremony also awarded five individuals with the Outstanding Green Achiever Commendation for their exceptional efforts to improve their companies as employees, and 38 companies with Outstanding Promotional Partner Commendation for promoting the HKAEE to their business partners.

In addition, 786 firms were given the title "Hong Kong Green Organisation" (HKGO) for achieving multiple verifiable environmental benchmarks, such as ISO14001 certification and certificates in waste reduction, energy saving, carbon reduction and indoor air quality. To date, more than 2 800 companies in 15 sectors have attained HKGO status.

To encourage more companies to go green, two virtual company visits were held in March 2021 during which seven HKAEE winners shared their stories of success. In the autumn, four HKAEE webinars and one HKGIA webinar were also held, featuring 19 HKAEE winners sharing their insights and four HKGIA winners showcasing their green innovations. More than 1 600 company representatives attended these sessions, nearly three times the attendance of past in-person events.

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The 2020 HKAEE Presentation Ceremony was graced by the Secretary for the Environment, Mr. WONG Kam-sing, GBS, JP, the Chairman of ECF, Mr. WOO Chun-kuen, Douglas, BBS, JP, the Chairman of ECC, Mr. WONG Kit-lung, Simon, BBS, JP, and the Chairman of the Awards Committee on HKAEE, Ir. Dr. Conrad WONG Tin-cheung, BBS, JP

School Work

Programmes for schools are an essential component of community awareness-raising. These include training young people, encouraging innovation and recognising good performance.

The Green Prefect Programme was launched in the 2020-21 school year to help primary and secondary schools train young green leaders and provide them with a deeper understanding of environmental issues. The intention is that they will go on to raise awareness among their peers and support environmental efforts on campus. A new round of recruitment in 2021-22 attracted about 4 900 students from 147 schools to become Green Prefects. More than 5 500 students also joined the ongoing Student Environmental Protection Ambassador Scheme.

Students in tertiary institutions were encouraged to devise innovative and practicable solutions to reduce use of disposable plastics in the IN-NO Plastics Challenge. Ten finalists from among 57 entries were invited to a one-day innovation bootcamp. The winners were awarded in November 2021, including Champion, 1st and 2nd Runners-up, Best Presentation and Best Application of Design Thinking Techniques.

The Hong Kong Green School Award, which held its 18th award presentation in February 2021, honours schools that incorporate environmental considerations into their campuses and education programmes. Some 72 primary and secondary schools received Green School Awards and 12 pre-schools were honoured in the pre-school category. 39 schools also won the NO Disposable Campus Award. These school awards will be incorporated into the HKAEE in 2022.

Prizes were presented at the Award Presentation cum Sharing Session on 27 November 2021 during which the Secretary for the Environment, Mr. WONG Kam-sing, GBS, JP, the Chairman of ECC, Mr. WONG Kit-lung, Simon, BBS, JP and members of the Final Adjudicating Panel exchanged views with winning teams

The Award Presentation Ceremony of the 18th Hong Kong Green School Award

Green Events and Promotions

Activities for specific celebrations and groups were held in 2021 to deliver more targeted services and messages. In July, the Eco-trendsetter Campaign was launched for foreign domestic helpers. Five promotional videos on green household tips were produced, attracting more than 60 000 views; an online prize quiz organised that attracted more than 750 participants; and a Go Green Go Health at Home Short Video Competition held that attracted 85 submissions. The eight winners of the latter were honoured at a presentation ceremony in October.

The Award Presentation Ceremony of the "Go Green Go Healthy at Home" Short Video Competition was held on 31 October 2021 at CIC-Zero Carbon Park to recognise the achievements of the winning domestic helpers and their efforts in promoting green living in their community

The ECC Low Carbon Lunch x Talk series was launched in September to disseminate green messages with a light touch. Hosted on the ECC's Facebook platform, the series consisted of four episodes with prominent guests from diverse backgrounds who shared tips on green parenting, green start-ups, green buildings and wellness, and green influencers. ECC Chairman Mr. Simon WONG hosted the talks, which attracted a total of more than 213 000 views.

Hosted by the ECC Chairman, "ECC Low Carbon Lunch x Talk" was launched in September 2021 to promote green messages to the public in a light-hearted manner through ECC's Facebook platform

Green Groups and NGOs were engaged to facilitate stall operators in reducing waste at source and practising proper recycling

The Green Lunar New Year Fair, while constrained due to the COVID-19 pandemic, was held at 13 points of sale of New Year flowers at fair sites. Green groups and NGOs were engaged to help stall operators reduce waste at source and practise proper recycling. A mobile Green Team also circulated to provide additional support, while a Resources Recovery Corner collected unsold, spent and non-perishable materials for redistribution.

The EPD also continued to promote the Green Event Pledge, which was signed by about 265 organisations by the end of 2021.

Looking Ahead

Continue to encourage the public to reduce waste, particularly by avoiding disposable plastics and by recycling properly, and to practise low-carbon living.

Continue to promote the Government's new environmental initiatives to the community.

Continue to organise environmental commendation schemes and other activities targeting different sectors of the community.

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SUSTAINABLE DEVELOPMENT

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SUSTAINABLE DEVELOPMENT

Engaging the Public on the Control of Single-use Plastics

The impact of plastic wastes on the environment cannot be underestimated. The Government has been promoting a plastic-free culture and enhancing recycling measures on all fronts. In 2021, it put forth proposals and consulted the public on a producer responsibility scheme on plastic beverage containers and regulation of disposable plastic tableware (see Waste Reduction). However, a comprehensive plastic strategy should cover much more than that. At the invitation of the Government, the Council for Sustainable Development (SDC) organised a public engagement exercise on control of single-use plastics in 2021. It also continued to promote long-term decarbonisation – the subject of an SDC report in 2020 – through its school and publicity activities.

Highlights

- ✓ Launched a public engagement exercise on control of single-use plastics.
- ✓ Welcomed participation by about 31 000 teachers and students in the 2020-21 Sustainable Development School Outreach Programme and the Programme was extended to primary schools.
- ✓ Launched the 14th round of applications for the Sustainable Development Fund (SDF).
- ✓ Launched the Long-term Decarbonisation E-Learning Platform.

Single-Use Plastics in the Spotlight

Many single-use plastics, such as plastic shopping bags, toiletries distributed by hotels and celebratory items such as inflatable cheer sticks, are provided to consumers at low or no cost. Yet, they also pose a heavy burden to our landfills and the natural environment. The popularisation of these items also encourages a wasteful lifestyle. On the other hand, there are sustainable alternatives that conserve natural resources and cause less impact on our environment, such as reusable cotton bags. Given that single-use plastics now appear in every part of our daily lives, the SDC sought public input in 2021 on how to control the problem.

A public engagement document and a pamphlet were released asking people for their views on what to reduce, by how much, and when to reduce. Key issues include whether to ban or restrict certain single-use plastic products, given many are non-essential and some are hard-to-recycle; whether regulatory measures should be brought in, such as charging for single-use plastics or producer responsibility schemes; public acceptance of go-green measures, such as using alternatives; and views on choosing greener products, such as those with re-use potential and green packaging.

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Press conference to launch the Public Engagement on Control of Single-use Plastics

Cover of the public engagement document

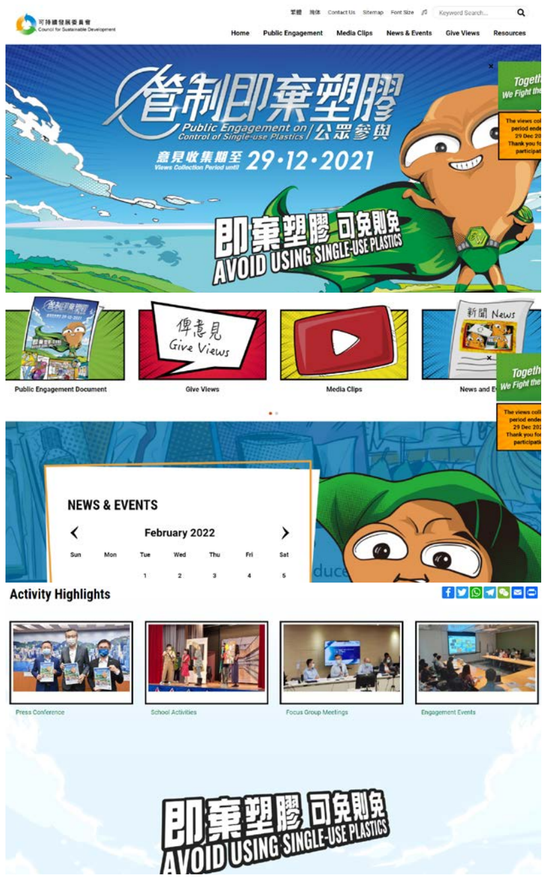
The public interaction phase of the engagement, which involved a bottom-up and stakeholder oriented approach, ran for three months from 30 September – 29 December 2021. A total of 35 activities were organised in the community, such as town hall meetings, forums for youths and the elderly, school activities and briefing sessions.

Interactive drama on control of single-use plastics

A senior citizen actively participated in a public interaction activity

Interactive drama and forum on control of single-use plastics organised for the elderly

The feedback from these sessions and other channels, such as the views collection forms attached to the public engagement document, will assist the SDC in making recommendations on single-use plastic controls. This in turn will help the Government formulate an overall plastic waste management plan for Hong Kong. One message underscores this effort: the plastic problem will be dealt with most effectively if society as a whole works together to come up with solutions and takes concerted action.



Public engagement dedicated website

Engaging Schools on Sustainable Development

Young people are tomorrow's leaders, so it is important that they understand the concept and significance of sustainable development. The Sustainable Development School Outreach Programme has been reaching out through interactive dramas, seminars and workshops led by key stakeholders. In 2020-21, these activities had to go online, yet participation increased threefold over the previous year, to around 31 000 teachers and students. In 2021, the programme was formally extended to primary schools (Grade 4 and up) so younger students could also reap the benefits of this programme.

Schools that participate and organise sustainability activities for their members, as well as the community, are honoured through the Sustainable Development School Award Programme. The latest round covers 2020-22 and 54 schools have enrolled.

Interactive drama under the Sustainable Development School Outreach Programme to arouse students' interest in low-carbon living practices

School Outreach Programme was extended to primary schools

School exhibition on organic gardening at home under the Sustainable Development School Award Programme

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Promoting Long-term Decarbonisation

In 2020, the SDC presented a report to the Government on long-term decarbonisation, which proposed a vision for progressively advancing Hong Kong to net-zero carbon emissions by 2050. In 2021, the Government announced the Hong Kong's Climate Action Plan 2050 (see Climate Change and Cross-boundary and International Co-operation). In support of the carbon neutral goal, low-carbon lifestyles have been accorded priority in the SDC's schools programmes, as well as the 14th round of the Sustainable Development Fund (SDF), which closed to applications in December 2021.

An event organised by a SDF grantee to enhance public awareness of the sustainable development concept

A publicity and education event organised by a SDF grantee for the public (including the elderly, youngsters and ethnic groups)

The SDC also worked with the ENB and Education Bureau to develop the E-Learning Platform on Long-term Decarbonisation for senior secondary students, which was launched in April 2021 and received more than 31 000 visitors by the end of the year. The platform provides learning and teaching plans for three lessons, multimedia resources, reference materials, teaching materials, and interactive games and challenges.

A Low-Carbon Living Online Q&A Competition was also launched in July for secondary school students and members of the public by testing their knowledge of decarbonisation and low-carbon living. Awards were given to schools with the highest participation rate among their students, best scores on the quiz, and highest rate of community engagement. A total of 138 secondary schools had participated in the competition, involving more than 10 000 students and members of the public. The prize presentation ceremony of the Low-Carbon Living Online Quiz was held in December 2021.

Long-term Decarbonisation E-Learning Platform

Prize ceremony for low-carbon living online Q&A competition

Looking Ahead

Receive a report from the SDC on the findings and recommendations arising from its public engagement on control of single-use plastics.

Announce recipients of the Sustainable Development School Award Programme for 2020-22.

Update the E-Learning Platform with reference to Hong Kong's Climate Action Plan 2050 and extend the Platform to junior secondary students.

Announce projects approved for funding under the 14th round of the SDF.

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CLIMATE CHANGE AND CROSS-BOUNDARY AND INTERNATIONAL CO-OPERATION

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CLIMATE CHANGE AND CROSS-BOUNDARY AND INTERNATIONAL CO-OPERATION

Our Path to Carbon Neutrality

The threats posed by climate change are becoming more apparent every year, manifesting in extreme weather events and rising temperatures. More proactive strategies and actions are required. In 2021, the Chief Executive in her Policy Address announced that Hong Kong aims to reduce carbon emissions by 50% before 2035 and work towards the goal of carbon neutrality before 2050. A plan for achieving those targets was also unveiled, called "Hong Kong's Climate Action Plan 2050", which identifies four major decarbonisation strategies: net-zero electricity generation; energy saving and green buildings; green transport; and waste reduction. Hong Kong also continued to work with its partners in the Greater Bay Area on combating climate change and other shared environmental issues.

Highlights

Climate change

- ✓ Announced an interim target to reduce Hong Kong's carbon emissions by 50% before 2035, as compared to the 2005 level, and be carbon neutral before 2050.
- ✓ Released "Hong Kong's Climate Action Plan 2050" mapping strategies and actions to achieve carbon neutrality.
- ✓ Approved 14 applications under the $200 million Green Tech Fund.

Hong Kong's Climate Action Plan 2050

Hong Kong's Climate Action Plan 2050 is a culmination of recent efforts to move Hong Kong towards decarbonisation. In 2017, the Government pledged to reduce carbon intensity by 65% to 70% by 2030 using 2005 as a base, equivalent to reducing total carbon emissions by 26% to 36%, in Hong Kong's Climate Action Plan 2030+. While the city has moved steadily towards that target and saw carbon intensity fall by 35% below 2005 levels in 2019, we need to do more. Lowering carbon intensity is not sufficient on its own to address the climate change challenge.

The 2020 Policy Address announced that the Hong Kong Special Administrative Region (HKSAR) would strive to achieve carbon neutrality before 2050. In 2021, a roadmap was set out for that goal in the Chief Executive's Policy Address and the new Hong Kong's Climate Action Plan 2050, which has the theme "Zero-carbon Emissions · Liveable City · Sustainable Development".

The first milestone will be to reduce carbon emissions by 50% before 2035 as compared to 2005, by targeting the key sources of Hong Kong's carbon emissions. Electricity generation accounted for 66% of emissions in 2019, followed by transport (18%) and waste (7%). Decarbonisation actions to reduce these emissions will be pursued in four areas:

- **Net-zero electricity generation**. Hong Kong will cease using coal for daily electricity generation by 2035, increase the share of renewable energy (RE) in the fuel mix, and test out new energy and strengthen co-operation with neighbouring regions on carbon neutrality (details in Energy).
- **Energy saving and green buildings**. Existing efforts will be strengthened and new measures will be introduced to lower electricity consumption of commercial and residential buildings (details in Energy).
- **Green transport**. Hong Kong will aim for zero emissions from vehicles before 2050 through electrification, new-energy transport and improved traffic management, and cease the new registration of fuel-propelled private cars by 2035 (details in Air).
- **Waste reduction**. The Government will develop an adequate provision of waste-to-energy facilities by 2035, and further promote waste reduction and recycling, including implementing MSW charging (details in Waste Facilities and Waste Reduction).

About $240 billion will be allocated over the next 15-20 years to take forward climate mitigation and adaptation measures, coming on top of the $47 billion that the Government has spent over the last decade. The carbon neutrality drive is also being supported at the highest level. The Steering Committee on Climate Change and Carbon Neutrality, set up in 2021, is chaired by the Chief Executive. The ENB will set up a new Office of Climate Change and Carbon Neutrality to co-ordinate and promote decarbonisation measures and also leads an inter-departmental Carbon Neutrality Task Force. In addition, a dedicated advisory committee on combating climate change will be formed to actively engage different sectors of the community in climate actions. Hong Kong's Climate Action Plan 2050 will be reviewed every five years or so to update strategies and targets for decarbonisation and consider other actions to combat climate change.

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Highlights

Cross-boundary and International Co-operation

- ✓ Held the 3rd meeting of the Hong Kong-Guangdong Joint Working Group on Environmental Protection and Combating Climate Change (JWGEPCCC) to review progress of collaboration in 2021 and agree on a work plan for 2022.
- ✓ Held the 32nd Hong Kong-Shenzhen Environmental Co-operation Forum to review progress of collaboration in 2021 and agree on a work plan for 2022.
- ✓ Launched a joint study with Guangdong and Macao on the formation, characteristics and transportation of ozone in the Greater Bay Area.
- ✓ Approved 330 projects in the latest phase of the Cleaner Production Partnership Programme, which commenced in June 2020, involving total funding of over $60 million.
- ✓ Implemented the Mercury Control Ordinance to ensure Hong Kong's full compliance with its obligations under the Minamata Convention on Mercury.
- ✓ Held Eco Expo Asia 2021, organised by Hong Kong Trade Development Council and co-organised by the ENB, on the theme "Promoting Green Recovery for Carbon Neutrality".

The Secretary for the Environment and the Under Secretary for the Environment attended the press conference on promulgation of Hong Kong's Climate Action Plan 2050 in October 2021

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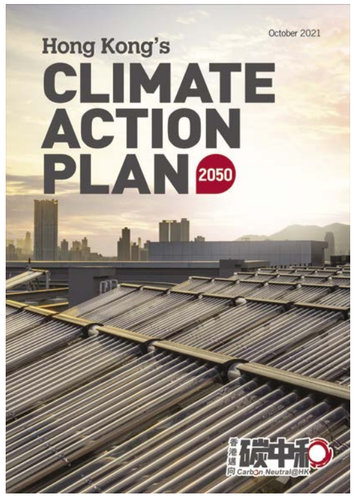

Hong Kong's Climate Action Plan 2050

Green Tech support

Apart from its own programmes for energy, air and waste, the Government is encouraging local public research institutes and the private sector to identify and test solutions for decarbonisation and environmental protection through the $200 million Green Tech Fund.

The Green Tech fund was launched in December 2020 to support research and development projects. In the first round, more than 190 applications were received, and 14 projects were approved with total funding of about $70 million. The latter included initiatives to promote new energy and RE, transport electrification, a circular economy and turning waste into resources, low-carbon and smart waste management technologies, real-time air quality monitoring, etc. The second round was open to applications in December 2021.

Green Tech Fund

Energy Saving and Green Buildings – District Cooling System at Kai Tak Development

Waste Reduction – T·Park

Net-zero Electricity Generation – Floating Solar Generation System at Plover Cove Reservoir

Green Transport – New Energy Vehicle

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Carbon Neutrality partners from sectors including property development, public utilities, finance and professional bodies attended the ceremony, pledging support for Hong Kong's goal of achieving carbon neutrality before 2050

Community outreach

Everyone needs to be part of the solution when it comes to decarbonisaton. In October 2021, the Carbon Neutrality Partnership was launched to encourage partners to set targets and timetables for decarbonisation. The Government has also earmarked $5 million to the ECF to help non-profit organisations carry out public education activities and demonstration projects on combatting climate change, and continued to promote the online Low-carbon Living Calculator, which has had more than 46 400 users since its launch in 2018.

International and regional exchanges

Hong Kong continues to work closely with the international community on climate change, including Parties to the United Nations' Framework Convention on Climate Change and the C40 Cities Climate Leadership Group, on the objectives of the Paris Agreement. Regionally, Hong Kong and Guangdong have been promoting and deepening exchanges and co-operation on climate change mitigation, adaptation and resilience, such as plans for achieving decarbonisation and carbon neutrality, RE technologies, retro-commissioning technologies for existing buildings, and the development of new energy vehicles. These exchanges are arranged under the Special Panel on Combatting Climate Change of the JWGEPCCC (see below).

Regional Collaboration

The Hong Kong Government meets regularly with its counterparts in the region to co-ordinate actions, share experiences, and develop programmes related to environmental protection and climate change. The key meetings in 2021 included:

- The 3rd meeting of the JWGEPCCC, which is a major platform for regional exchanges. Good progress was reported on various fronts, including improving regional air and water quality, conserving forestry and marine resources, and combating climate change.
- The 32nd meeting of the Hong Kong-Shenzhen Environmental Co-operation Forum, where co-operation continued to deepen on air quality, water quality, nature conservation, and technical exchanges on new energy vehicles, green ferries and the use of drones to monitor emissions, etc.
- The 13th Hong Kong-Macao Environmental Protection Liaison Meeting, where recent policy developments such as single-use plastics and the popularisation of electric vehicles were shared.
- The 17th Pan-Pearl River Delta Regional Environmental Co-operation Joint Conference, in which Hong Kong joined environmental authorities from nine Pan-PRD provinces and Macao.

The Secretary for the Environment, Mr. WONG Kam-sing, and the Director-General of the Department of Ecology and Environment of Guangdong Province, Mr. LU Xiulu, co-chaired the third meeting of the Hong Kong-Guangdong JWGEPCCC by video conference on 16 December 2021

The third meeting of the Hong Kong-Guangdong JWGEPCCC was held via video conference on 16 December 2021. Photo shows the Secretary for the Environment, Mr. WONG Kam-sing (second right), together with the members of the Hong Kong Special Administrative Region Government delegation.

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Acting Permanent Secretary for the Environment / Director of Environmental Protection, Mr. Owin FUNG Ho-yin, co-chaired the 32nd Hong Kong-Shenzhen Environmental Co-operation Forum with the Director of the Ecology Environment Bureau of Shenzhen Municipality, Mr. LI Shuisheng, by video conference on 8 December 2021

Controlling regional pollution

Hong Kong also collaborates with its regional partners to develop programmes targeting specific pollution issues. The Guangdong-Hong Kong-Macao Regional PRDAQMN has measured air pollutants since 2006 and, in 2021, reported that the average annual concentration levels of SO_2, NO_2 and RSP fell by 43% to 86% between 2006 and 2020, while FSP fell by 31% since measurements began in 2015. However, ozone levels have increased by 27% since 2006 (see also Air).

To continue to reduce emissions of all air pollutants, Hong Kong and Guangdong have embarked on a study on post-2020 regional air pollutant emission reduction targets and concentration levels, with a view to formulating reduction targets in 2025 and 2030. Guangdong, Hong Kong and Macao also launched a three-year study in 2021 on photochemical ozone formation to better understand its precursors, formation mechanism and transportation characteristics across the Greater Bay Area.

Marine refuse recognises no boundary and needs regional collaboration to manage. The trial Notification and Alert System on Marine Refuse has been functioning well since it was launched in 2017 with Guangdong and 2021 with Shenzhen in response to heavy rainfall and other major environmental incidents. By the end of 2021, the alert system was activated 29 times with Guangdong and once with Shenzhen.

Cleaner Production

Since 2008, the Hong Kong and Guangdong Governments have jointly implemented the Cleaner Production Partnership Programme, which encourages and funds Hong Kong-owned factories in the region to adopt cleaner production techniques and practices. More than 3 600 funding applications have been approved since 2008, and more than 710 technology promotion activities organised. The current phase, funded with $311 million, runs from 2020-2025.

Good performers are commended through the Hong Kong-Guangdong Cleaner Production Partners Recognition Scheme, which in 2021 commended 174 enterprises including 30 Hong Kong-owned manufacturers named Excellent Partners and 115 named Partners. One sourcing enterprise and 28 environmental technology service providers were also recognised.

The Secretary for the Environment, Mr. WONG Kam-sing (second left), and the Director-General of the Department of Industry and Information Technology of Guangdong Province, Mr. TU Gaokun, co-chaired the eighth meeting of the Hong Kong-Guangdong Joint Working Group on Cleaner Production via video conference on 16 December 2021

The eighth meeting of the Hong Kong-Guangdong Joint Working Group on Cleaner Production was held via video conferencing on 16 December 2021. Photo shows the Secretary for the Environment, Mr. WONG Kam-sing (centre), together with members of the Hong Kong Special Administrative Region Government delegation.

A combination of activated carbon concentrator and catalytic oxidation technology to remove VOCs in exhaust gas from printing process

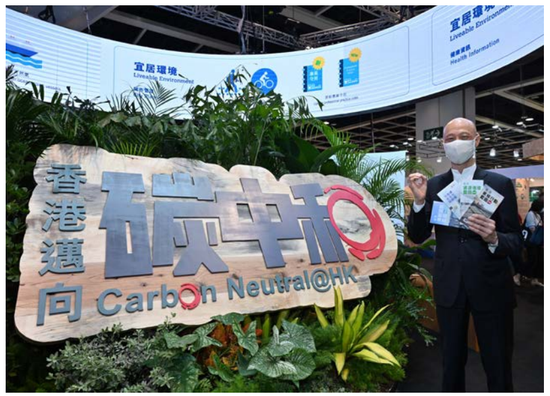
Mercury Controls

Mercury is a highly toxic, naturally occurring heavy metal that can pose a serious cumulative threat to human health and the environment. The Minamata Convention on Mercury is an international treaty to control anthropogenic emissions and releases of mercury and mercury compounds and is applicable to Hong Kong. In 2021, the Mercury Control Ordinance was enacted to ensure Hong Kong's full compliance with its obligations under the Convention. The ordinance regulates the import, export, storage and use of mercury, mercury mixtures and mercury compounds, as well as the import, export, manufacture and supply of mercury-added products.

Eco Expo Asia

The 16th Eco Expo Asia 2021 was held in October, in both in-person and online formats, on the theme "Promoting Green Recovery for Carbon Neutrality". More than 200 exhibitors from nine countries participated, more than 16 000 industry buyers attended in person and more than 20 000 buyers joined online.

The Secretary for the Environment, Mr. WONG Kam-sing (front row, fourth left), officiated the opening of the 16th Eco Expo Asia with the Executive Director of the Hong Kong Trade Development Council, Ms. Margaret FONG (front row, fifth left) and other guests



With the theme of "Promoting Green Recovery for Carbon Neutrality", the Eco Expo Asia 2021 provides a quality platform for the trades to showcasing their latest environmental protection and decarbonisation technologies and products

Looking Ahead

Climate change

Take forward the four major decarbonisation strategies that will lead Hong Kong towards carbon neutrality before 2050, as outlined in Hong Kong's Climate Action Plan 2050.

Cross-boundary and International Co-operation

Continue to implement control measures under the Pearl River Delta (PRD) Regional Air Quality Management Plan and prepare to incorporate monitoring of VOCs in the PRDAQMN.

Continue with joint studies on post-2020 regional air pollutant emission reduction targets and concentration levels and on photochemical ozone in the Greater Bay Area.

Continue to collaborate with Guangdong's Department of Ecology and Environment to enhance co-operation on various fronts.

Continue to collaborate with Shenzhen's Ecology Environment Bureau to strengthen environmental co-operation.

Continue to implement the Cleaner Production Partnership Programme.

Continue to support the organisation of Eco Expo Asia to provide green business opportunities for local, Mainland and overseas stakeholders and entrepreneurs.

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