

COUNCIL FOR SUSTAINABLE DEVELOPMENT

Public Engagement on Hong Kong's Long-term Climate Mitigation Strategy

Purpose

This paper seeks Members' views on the proposal to proceed with a public engagement ("PE") exercise on Hong Kong's long-term climate mitigation strategy.

Background

The Problem of Climate Change

2. The United Nations' Intergovernmental Panel on Climate Change has found that the Earth's atmospheric carbon dioxide concentration, the main driver of global climate change in the last century, has increased by over 40% since pre-industrial times, which is the highest in the last 800,000 years. It has also confirmed that human influence has led to the warming of the atmosphere and the ocean, changes in the global water cycle, reduction in snow and ice, rise of global mean sea level and more frequent extreme weather.

3. The effects of climate change have already emerged with Hong Kong experiencing raised temperatures, more frequent extreme rainfall and rising sea-level. The possible changes in Hong Kong's climate in the 21st century may be summarised as follows:

- (a) the number of very hot days and hot nights is projected to increase;
- (b) the number of rain days is projected to decrease while the average rainfall intensity would increase;

- (c) there would be more extremely wet years but the risk of extremely dry years would remain;
- (d) global sea level rise would lead to coastal changes all over the world, including in Hong Kong;
- (e) the threat of storm surges associated with tropical cyclones would increase; and
- (f) the chance of extreme weather events occurring such as extreme heat, extreme rainfall and extreme sea level would increase.

Paris Agreement

4. Paris Agreement, an agreement within the United Nations Framework Convention on Climate Change dealing with greenhouse gas (“GHG”) emissions¹, is a crucial step in forging global efforts in combating climate change. In December 2015, 195 countries including China adopted the Paris Agreement (“PA”) with a view to holding the increase in global average temperature to well below 2.0 degrees Celsius above pre-industrial levels, while pursuing efforts to limit it to 1.5 degree Celsius. The PA in particular emphasises the principles of equity and common but differentiated responsibilities for and respective capabilities by the participating parties, so that they could take into account the different national circumstances in mapping out their individual approach and pace in achieving the PA goals. Accordingly, the PA has not made any specification or set any rigid requirement as to how each Party shall set its mid-century carbon reduction target. Other key points of the PA include:

- (a) Each party to prepare, communicate and maintain successive nationally determined contributions that it intends to achieve;
- (b) to reach global peaking of GHG emissions as soon as possible and undertake rapid reductions thereafter; and

¹ Human activities such as electricity generation, transport operation, waste disposal, industrial processes, etc. produce GHG emissions. These gases act like a blanket in the atmosphere, trapping heat and keeping our planet warm. However, excessive ambient concentration of GHG causes climate change, which is disrupting national economies and affecting lives given the significant impacts arising from changing weather patterns, rising sea level, and more extreme weather events. Among the different types of GHG, carbon dioxide is the most common type released to the atmosphere. For simplicity, the term “carbon emissions” is sometimes used to represent all kinds of GHG emissions, where GHG other than carbon dioxide are translated into carbon dioxide equivalent based on their individual global warming potentials.

(c) to achieve carbon-neutrality (i.e. net-zero GHG emissions) globally in the second half of this century.

5. The PA, which came into force on 4 November 2016, applies to the Hong Kong Special Administrative Region (“HKSAR”) as well. As part of China, the HKSAR has the duty to make its contribution in order to achieve the goals of the PA.

Hong Kong’s Climate Action Plan 2030+

6. The HKSAR Government is fully committed to joining hands with the international community in combating climate change, and has adopted a series of key measures on mitigation, adaptation and resilience as set out in Hong Kong’s Climate Action Plan 2030+² released in January 2017. *Mitigation* refers to efforts to reduce or prevent emission of GHG. *Adaptation* refers to efforts to anticipate the adverse effects of climate change and take appropriate actions to prevent or minimise the damage. Meanwhile, *resilience* refers to efforts to cope and absorb climate change related stresses and maintain the functional operation of public services, and economic and social activities.

7. On mitigation, a target has been set to reduce our carbon intensity by between 65% and 70% by 2030 compared with the 2005 level, which is equivalent to an absolute reduction of 26-36%, or reduction in per capita emissions from about 5.7 tonnes in 2015 to about 3.3-3.8 tonnes in 2030.

8. Electricity generation is our single largest source of carbon emissions³, constituting about 67% of Hong Kong’s total carbon emissions in 2015. Meanwhile, about 90% of our electricity is consumed in buildings. In order to achieve our 2030 carbon reduction target, we will gradually phase down coal-fired electricity generation, i.e. replace the majority of the coal-fired generation units which are due to retire by cleaner energy sources by 2030. We will also actively promote the development of renewable energy (“RE”) as well as energy efficiency and conservation.

² https://www.climate.gov.hk/files/report/en/HK_Climate_Action_Plan_2030+_booklet_En.pdf

³ By means of carbon emissions, GHG other than carbon dioxide are translated into carbon dioxide equivalent based on their individual global warming potentials.

9. Our second largest source of carbon emissions is transport, which made up about 18% of the total carbon emissions in Hong Kong in 2015. The Government has been mitigating carbon emissions from transport through various means, a key element of which is the expansion of the railway network. We are also promoting use of electric vehicles which can help improve roadside air quality and reduce carbon emissions. Going forward, we will continue to promote “Walk in HK” and encourage people to walk more so as to reduce the use of mechanised transport for short-distance commuting, alleviate traffic congestion and improve air quality. At the same time, we will continue to foster a “bicycle-friendly” environment in new towns and new development areas and promote cycling as a green mode for short-distance commuting in these areas.

10. Although carbon emissions from waste constitute a relatively small proportion of our carbon emissions (accounting for some 5.9% in 2015), active measures are being taken to reduce waste on the one hand, and exploit possible waste to energy opportunities on the other hand⁴. Meanwhile, carbon emissions arising from industrial activities as well as from “agriculture, forestry and other land use” (“AFOLU”)⁵ constituted about 4.1% and 0.1% of our carbon emissions in 2015 respectively.

11. To enhance public understanding, we have released a leaflet (at **Annex I**), an Announcement in the Public’s Interest, short videos, a poster and a new climate change website (<https://www.climate-ready.gov.hk>) to raise public awareness of the importance of combating climate change.

⁴ Some examples of waste to energy projects are:

- T-PARK, a waste-to-energy facility, is built to generate electricity through sludge incineration.
- Food waste is recycled into RE (e.g. the Organic Resources Recovery Centre at Siu Ho Wan).
- Landfill gas is put into beneficial use for electricity and heat generation to support the daily operation of our landfills. Besides, after treatment, surplus landfill gas is utilised by exporting to a town gas production plant for use as alternative energy source as well as converting into synthetic natural gas for injection to the town gas supply grid for off-site use.

⁵ AFOLU includes GHG emissions and removal on land use and change in major ecosystem stocks and processes of ecosystem components, i.e. i) biomass; ii) dead organic matter; iii) soils; and iv) livestock.

Long-term Climate Mitigation Strategy

12. Pursuant to Article 4(19) of the PA⁶, all parties to the PA should strive to formulate and communicate long-term low GHG emission development strategies by 2020, mindful of the objective of the PA⁷, and taking into account their common but differentiated responsibilities and respective capabilities, in the light of different national circumstances. As part of China as well as a responsible member of the global community, there is a need for Hong Kong to draw up our own mid-century long-term low GHG emission development strategy (“the long-term climate mitigation strategy”).

13. At the international level, the US, Canada, Germany, France and Mexico have already drawn up their long-term climate mitigation strategies and submitted the same to the secretariat of the United Nations Framework Convention on Climate Change (“UNFCCC”) pursuant to the requirement of the PA⁸. At the city level, under the auspices of the Deadline 2020 Programme of the C40 Cities Climate Leadership Group⁹, New York City also published in October 2017 a 1.5 degree Celsius climate action plan¹⁰, which seeks to align local climate actions with a goal to limit global warming to 1.5 degrees Celsius. It is noted that ambitious carbon reduction targets by 2050 have generally been adopted by the following countries/cities:

⁶ Read in conjunction with paragraph 35 of Decision 1/CP.21.

⁷ The objective of PA is to contain global temperature rise to well below 2.0 degrees Celsius compared with pre-industrial times, while striving to limit it even to 1.5 degrees Celsius.

⁸ http://unfccc.int/focus/long-term_strategies/items/9971.php

⁹ C40 was an international platform formed in 2005 for cities to take action and to cooperate on reducing GHG emissions and enhancing energy efficiency. As at December 2017, C40 had 92 member cities across the globe, including 13 member cities in the steering committee (“SC”), which is responsible for driving C40’s governance and collective vision. Hong Kong joined C40 in October 2007 and further joined its SC in 2011. The Deadline 2020 programme seeks to offer a routemap for C40 member cities to achieve the goal of PA by outlining the pace, scale and prioritization of action needed by the cities over the next 4 years and beyond. Under the programme, C40 requires all member cities to devise and promulgate a climate action plan consistent with the goal of PA by 2020.

¹⁰ <http://www1.nyc.gov/site/sustainability/codes/1.5-climate-action-plan.page>

Country/City	Mid-century (2050) carbon reduction target
The US ¹¹	80% cut from 2005 levels
Canada	80% cut from 2005 levels
Germany	80-95% cut from 1990 levels
France	75% cut from 1990 levels
Mexico	50% cut from 2000 levels
New York	80% cut from 2005 levels

14. China has not yet set any carbon reduction target beyond 2030¹². But according to the 13th Five-Year work plan for greenhouse gas emission control (《“十三五”控制溫室氣體排放工作方案》) promulgated by the State Council in October 2016, the Central People’s Government (“CPG”) is studying China’s mid-century long-term low GHG emission development strategy and plans to submit the same to the UNFCCC secretariat in good time¹³.

15. Despite the different geographical and economic situations of the above countries and city, a crude analysis shows that there are some common elements in the various long-term climate mitigation strategies, such as deep decarbonisation of the energy sector, improvement in energy efficiency of buildings, promotion of green transport, active waste management, etc. All these elements are designed to work together generally to help achieve substantial carbon reduction in the long term, usually up to around 2050, thus supporting the climate mitigation objective of the PA. A summary of these major elements is at **Annex II**.

16. As can be seen from the examples in other jurisdictions, substantial carbon reductions in the long term will require a paradigm shift, meaning that businesses will need to change the way they produce

¹¹ The long-term climate mitigation strategy of the US was submitted while the former President Barrack Obama was in office. The US subsequently notified the United Nations on 1 June 2017 of its intention to withdraw from PA.

¹² China’s current pledge as contained in its Intended Nationally Determined Contribution submitted in 2015 is to achieve the peaking of carbon dioxide emissions around 2030 and lower carbon dioxide emissions per unit of GDP by 60% to 65% from the 2005 level then.

¹³ According to 《“十三五”控制溫室氣體排放工作方案》 promulgated by the State Council in October 2016, under item 9 on 廣泛開展國際合作, it is stated that –
 (三) 加強履約工作。做好《巴黎協定》國內履約準備工作。按時編制和提交國家信息通報和兩年更新報, 參與《聯合國氣候變化框架公約》下的國際磋商和分析進程。加強對國家自主貢獻的評估, 積極參與 2018 年促進性對話。研究並向聯合國通報我國本世紀中葉長期溫室氣體低排放發展戰略。

products and provide services, while citizens will also have to change the way they live and consume. Massive investment and early planning are required. Technological advancement will also play a key role.

17. Although the Mainland and overseas models may not be directly applicable to Hong Kong, it is envisaged that the long-term climate mitigation strategy for Hong Kong may cover the following key elements:

- (a) decarbonisation of the electricity generating sector (e.g. wide adoption of RE, including the possibility of large-scale power import);
- (b) enhancing energy efficiency and conservation especially for buildings;
- (c) greater use of public transport and promotion of walking and cycling;
- (d) wider use of electric vehicles;
- (e) enhancing city planning; and
- (f) enhancing waste reduction and further exploitation of waste to energy opportunities.

Proposed Public Engagement

18. Climate change is one the greatest challenges to achieving sustainable development. According to United Nations Development Programme, implementation of the PA is essential for the achievement of the Sustainable Development Goals (“SDGs”)¹⁴. Actions on climate change will drive sustainable development. Tackling climate change and fostering sustainable development are two mutually reinforcing sides of the same coin. Sustainable development cannot be achieved without climate actions. Conversely, many of the SDGs are addressing the core drivers of climate change.

¹⁴ The SDGs are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. One of the SDGs is to take urgent action to combat climate change and its impacts. The goals are interconnected – often the key to success on one will involve tackling issues more commonly associated with another.

19. While climate change is a major challenge for the world, there are many opportunities for co-benefits to be captured alongside climate actions. We can reap many qualitative benefits, including liveability improvements, cleaner environment and better health, less waste, low carbon transport, efficient homes and productive offices, more leisure space, green lifestyle, richer biodiversity, etc.

20. For the strategy to succeed, public participation is of paramount importance. In order to build consensus among members of the public, there are merits to tap and gauge public views on our city's climate mitigation strategy for deeper decarbonisation beyond 2030. In this respect, the Government proposed to invite the Council for Sustainable Development ("SDC") to conduct a PE exercise for the following reasons:

- (a) there is a direct relationship between sustainable development and climate change. On the one hand, climate change influences the living conditions for human beings and the basis for social and economic development; on the other hand, society's priorities and resources allocation on sustainable development influence the GHG emissions that lead to climate change with impacts;
- (b) public awareness on and knowledge about the need for deep carbon reduction in the long term is not high. There is a need to enhance work in this respect; and
- (c) with the well-established bottom-up and stakeholder-led approach in its PE exercise, the SDC is well placed to gauge the views of the community and help develop strategies that could foster effective actions in combating climate change. In connection with this, it is noteworthy that the SDC had conducted a PE in 2011 on "Combating Climate Change: Energy Saving and Carbon Emission Reduction in Buildings" (see summary at **Annex III**).

21. There is a need to liaise with the CPG over the development of Hong Kong's long-term climate mitigation strategy and submission of the same to the UNFCCC secretariat by 2020. As such, it is essential to conclude by end 2019 or early 2020 the development of Hong Kong's long-term climate mitigation strategy beyond 2030.

22. As long-term climate mitigation strategy may cover a very wide range of issues and there is a need to complete the PE exercise in about 18 months, we consider it more effective for the SDC to focus on the following key issues:

(a) Target to be set

Implementation of the PA is guided by the principles of equity and common but differentiated responsibilities and respective capabilities, taking into account the different national circumstances. Following these principles, the PA has not made any specification or set any rigid requirement as to how each Party shall set its mid-century carbon reduction target.

Notwithstanding the above, previous studies by the Intergovernmental Panel on Climate Change (“IPCC”) suggests that, in order to contain global temperature rise to within 2 degrees Celsius, countries should reach global peaking of carbon emissions as soon as possible, and undertake rapid reductions thereafter, with a view to achieving “carbon neutrality” (i.e. zero net emissions) in the second half of the century.

Against the above background, some groups have suggested that developed countries should cut their emissions by at least 80% by 2050 (compared with 2005 levels). Some other groups further argue that, in order to reach the more ambitious target of 1.5 degrees Celsius contained in the PA, countries and cities should aim at reaching net zero emissions by 2050.

During the PE exercise, we should tap the public’s views on whether a target should be set for Hong Kong, and if so, the appropriate target, having regard to our unique circumstances and constraints (e.g. limited geographical size, population density, economic structure, and sources for electricity generation) and the global target to achieve “carbon neutrality” (i.e. zero net emissions) in the second half of the century.

(b) Decarbonisation of the electricity generating sector

Decarbonising the electricity generating sector is at the core of every long-term climate strategy, and Hong Kong is clearly no exception. The real issue is how. In order to achieve our 2030 carbon reduction target, we will gradually phase down

coal-fired electricity generation, i.e. replace the majority of the coal-fired generation units which are due to retire by cleaner energy sources (e.g. natural gas which is much more costly than coal). While one way to achieve the 2030 carbon reduction target is to have more natural gas units to replace coal plants, we cannot solely rely on natural gas if we need to achieve higher carbon reduction target in the longer term since burning natural gas would still result in the generation of a substantial amount of carbon emissions¹⁵. We need to explore other options to help us reduce carbon emissions. One possible option is the importation of more power from the Mainland and if so, the source(s) of imported power (e.g. one single source or a combination of sources of energy including grid purchase, RE, nuclear, etc.). However, this option was not favoured by the public when we conducted a public consultation on fuel mix in 2014; and it remains to be seen whether the community has changed its majority preference towards local power generation rather than imported power. We may also explore whether there is scope to develop more RE locally although our current estimate is that we may only have the potential to generate about 3% to 4% of our electricity through RE by 2030 based on currently mature RE technology. While noting the decreasing trend of RE cost globally, the cost of local RE production is still much higher than conventional fuel and thus there will be significant tariff implication if the potential to develop more cost-effective RE could not be achieved in the longer term. In addition, the community may be concerned about safety, reliability, affordability (i.e. electricity tariff), environmental performance, etc. of the fuel mix option to be adopted. Community consensus will be required on which approach we should adopt and the trade-offs involved.

(c) Energy saving and conservation for buildings

Notwithstanding the substantial work done in recent years to enhance the energy efficiency of our buildings¹⁶ and their

¹⁵ Different fuels emit different amounts of carbon dioxide (CO₂) in relation to the energy they produce when burned. According to the U.S. Energy Information Administration, the pounds of CO₂ emitted per million British thermal units (Btu) of energy for coal is about 214 to 229, whereas that for natural gas is 117.

¹⁶ Details can be found in “Energy Saving Plan for Hong Kong’s Built Environment 2015-2025+” (<http://www.enb.gov.hk/sites/default/files/pdf/EnergySavingPlanEn.pdf>) and “Deepening Energy

continuation in the years to come, the rapidly ageing built environment of Hong Kong will pose great challenges to further efforts to enhance our energy efficiency. Experience in other jurisdictions suggest that more may need to be done in terms of the tightening of the relevant standards and in retrofitting¹⁷ / retro-commissioning¹⁸. We may take the opportunity to gauge stakeholders' views on further efforts in the long term.

(d) Wider use of electric vehicles

Electric vehicles (“EVs”) have no tailpipe emissions. Replacing conventional vehicles, particularly commercial and public transport vehicles which are contributing about 95% of the total vehicular emissions of respirable suspended particulates and nitrogen oxides, by EVs, can help improve roadside air quality and reduce GHG emissions. A wider use of EVs also contributes to the development of environmental industries. The Financial Secretary chairs a Steering Committee on the Promotion of EVs with members drawn from various sectors to recommend a strategy complementary with specific measures to promote the use of EVs in Hong Kong, having regard to the resulting energy efficiency, environmental benefits and the creation of business opportunities.

Bearing in mind commercial and public transportation vehicles are major contributors of roadside air pollution, the Government has also set up the \$300 million Pilot Green Transport Fund in 2011 to encourage the public transport sectors, goods vehicle operators and non-profit making organisations to try out green innovative transport technologies (including electric commercial vehicles (“e-CVs”)). The Government has also separately offered full subsidy to the franchised bus companies to purchase 36 single-deck electric buses and related charging facilities for

Saving In Existing Buildings In Hong Kong Through ‘4Ts’ Partnership” (http://www.enb.gov.hk/sites/default/files/pdf/EnergySaving_EB_EN.pdf).

¹⁷ “Retrofitting” refers to addition or replacement of a building services installation (e.g. chillers) or a component of the building services installation (e.g. valve, motor).

¹⁸ Retro-commissioning is a systematic and cost-effective process to periodically check an existing building’s energy and other performances such as equipment conditions, how equipment and systems function together, the effectiveness of operation and maintenance strategies, etc. The process identifies operational improvements that can save energy. The process can be performed alone or with a retrofit project, such as replacing less energy efficient appliances with more efficient ones.

trial on a number of routes. The technology of e-CVs however is still under development. High production cost, limited service life, long charging time and low energy density of EV batteries remain at present the key constraints for e-CVs to take up more widely commercial transportation duties. Most of the e-CV models available in Hong Kong cannot yet meet the local demanding conditions (e.g. provision of air-conditioning during long summer months, hilly topography) and operational needs (e.g. long driving hours on roads without breaks for top-up charging of EV batteries) of the transport trade in Hong Kong.

As for private cars, the Government's transport policy has been "underpinned by public transport services with railways as its backbone". Therefore, we encourage the public to use public transport as far as possible, and should they need to acquire private cars, they are encouraged to procure EVs.

To curb carbon emissions from vehicles, some jurisdictions have announced plans to phase out all fossil fuel vehicles by certain years though details remain to be mapped out, while some others have set aggressive targets or measures to introduce wider use of EVs though they have yet to map out the means to achieve such targets. We may seek the public's views on whether Hong Kong should likewise include wider use of EVs as a key element in our long-term climate strategy.

(e) Public Education

While various efforts have been made to spread the message of combating climate change and various campaigns and activities are organised to promote energy saving, water conservation, waste reduction and carbon reduction, there is still room to further enhance public awareness and to promote community actions including changes in lifestyle and consumption behaviour to combat climate change. We would like to invite the SDC to advise us on the appropriate long term communication and public education strategy.

23. In proposing the above issues for the PE exercise, we have taken into account the relative importance of various carbon emissions sources in Hong Kong (as described in paragraphs 8 to 10) as well as the more important issues highlighted in relevant strategies of other jurisdictions. Moreover, we are mindful to avoid duplication of efforts with other

on-going studies such as the Hong Kong 2030+ Study championed by the Planning Department.

24. For adaptation and resilience measures, we do not propose to include them in the PE exercise given the tight timetable to complete the exercise and many of the measures are relatively technical and involve operational details. Besides, an interdepartmental Climate Change Working Group on Infrastructure has been formed to review the design standards and examine necessary measures for strengthening our infrastructure. The Contingency Plan on Natural Disasters is also being reviewed by Security Bureau.

Way Forward

25. Subject to Members' endorsement of the proposed topic, the following will be pursued:

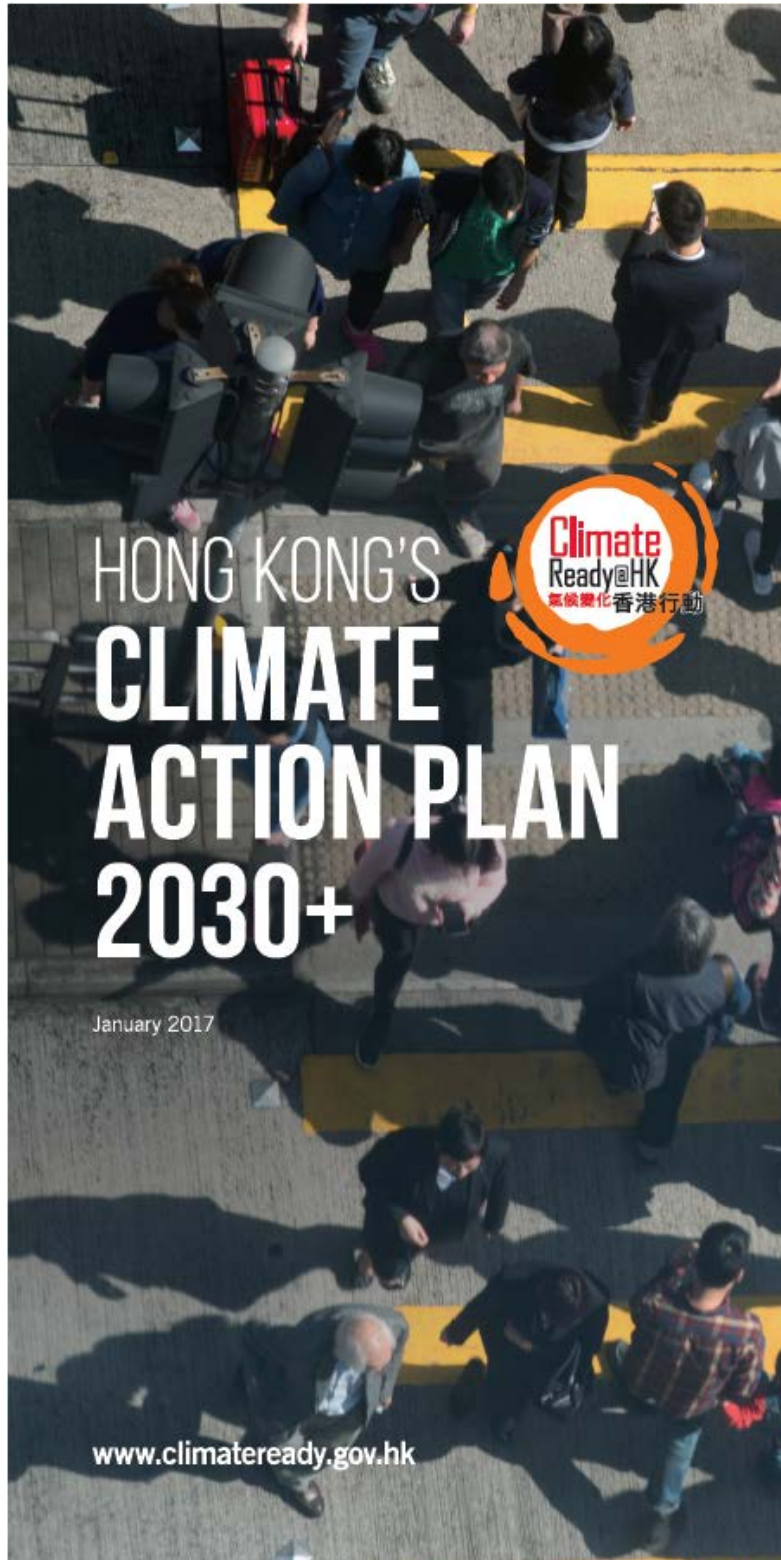
- (a) a Programme Director will be appointed to assist the SDC in overseeing the entire PE process, and an Independent Analysis and Reporting Agency will be engaged for collation and analysis of views received during the PE process;
- (b) a Support Group ("SG") involving non-officials and Government representatives will be formed to advise on the formulation of a PE document, which would set out pertinent issues to facilitate public discussion and serve as an education kit on combating against climate change; and
- (c) a publicity and public education plan will be formulated to supplement the PE exercise.

26. Subject to Members' views, preparations for the PE exercise will commence in February 2018. SDC members will be invited to join the SG and stakeholders from relevant sectors will be approached to join as well to widen the input in the identification of issues and pertinent perspectives for the PE. In addition, the SG will hold focus group meetings so the bottom-up engagement process commences with the preparation of the PE document. Steer of the Strategy Sub-committee and the SDC will be sought in the process. The entire PE exercise is expected to be completed in about 18 months.

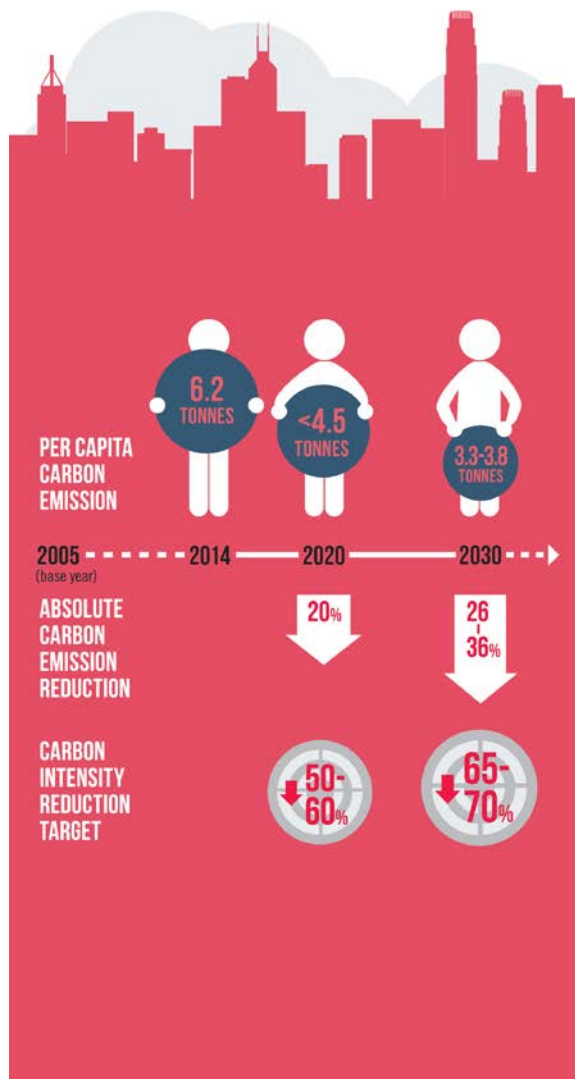
Advice sought

27. Members are invited to consider and comment on the PE proposal as set out above.

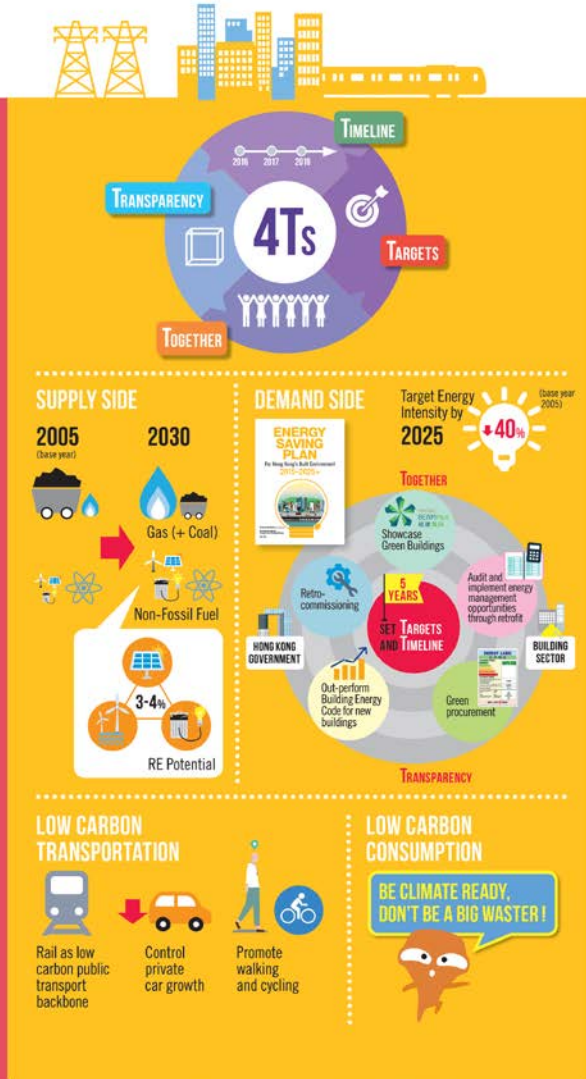
Environment Bureau
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TARGET



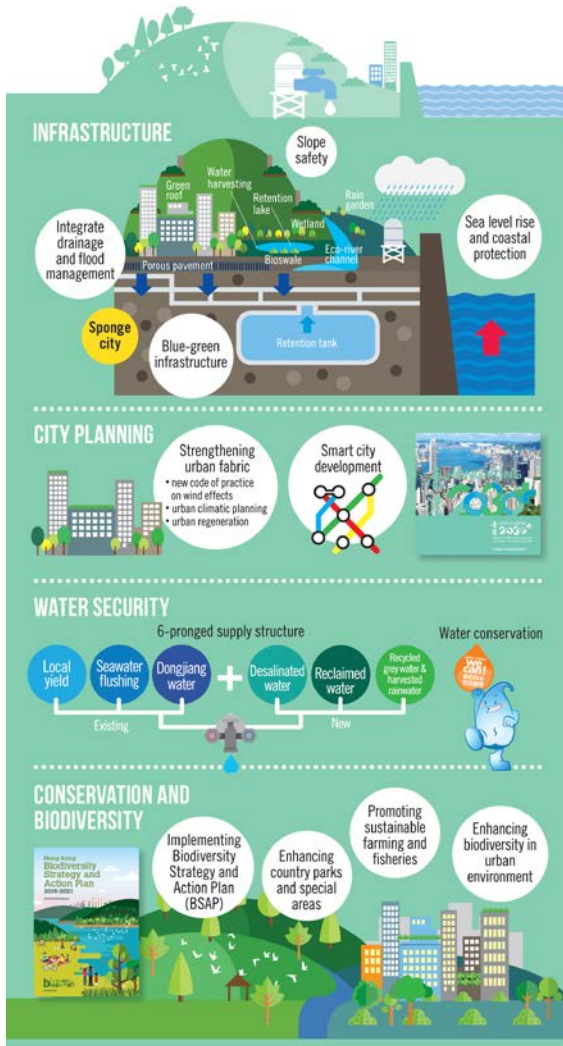
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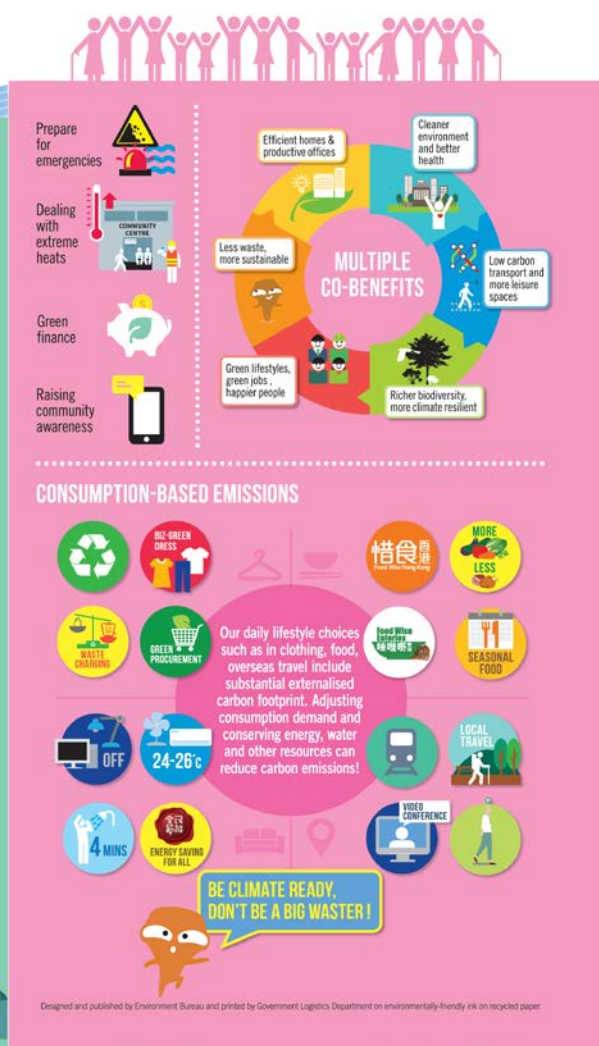
EXAMPLES OF CLIMATE ACTIONS



ADAPTATION



RESILIENCE



Summary of strategies commonly found in various long-term climate mitigation strategies

Energy

- Use of RE and nuclear power as the major sources of energy, supplemented by gas fired power plants with carbon capture and storage
- Imported electricity / regional grid connection
- Adopt carbon pricing and emission trading to affect energy consumption behaviour and provide incentives for development of clean energy

Buildings

- Energy efficiency improvement in space cooling/heating, lighting, building envelope and other building energy system
- Refurbish/retrofit existing old buildings and equipment to make them more energy efficient; retro-commissioning for existing buildings
- Promotion of green building
- District cooling/heating for commercial, institutional and residential buildings
- Electric heat pump, combined heat and power system (cogeneration), and trigeneration
- On site RE

Transportation

- Greater uptake and broad use of electric vehicles, some to the extent of setting a target year for completely phasing out fossil fuel vehicles
- Continuously improve vehicle efficiency
- Promotion of use of biofuel for heavy good vehicles
- Tighten emission standard for vehicles
- Create walkable and bikeable neighbourhoods
- Smart urban planning (e.g. compact, walkable cities)

Industry

- Low-carbon material and production method
- Fuel switch and alternative feedstock

- Process optimisation

Waste management

- Waste reduction
- Turn waste into energy
- Beneficial use of landfill gas

Carbon storage

- Carbon capture and storage
- Reforestation and afforestation
- Urban / vertical greening
- Improve forest management

SDC's Public Engagement
on Combating Climate Change: Energy Saving and
Carbon Emission Reduction in Buildings

Noting that climate change was one of the major sustainability challenges, that it was beginning to transform the way people live, that many had felt the impact but few were able to relate it to climate change, that it could not be tackled by the efforts of one country alone nor could the challenges it presents be overcome by the actions of just a few in the community, the SDC conducted a public engagement on combating climate change: energy saving and carbon emission reduction in buildings in 2011-12. The exercise sought to engage the public for views on ways to achieve energy saving and enhance energy efficiency in buildings with a view to combating climate change. The PE focused on demand side management under two broad areas – systemic enhancement and facilitation of behaviour change.

2. Six possible actions under systemic enhancement were identified and on which further discussion was invited. The six possible actions were:

- to consider tightening the Building Energy Code;
- to consider providing recognition for buildings achieving high energy efficiency;
- to explore extension of the application of the Mandatory Energy Efficiency Labelling Scheme (“MEELS”);
- to consider tightening up the energy efficiency grading levels for room air conditioners and refrigerators under the MEELS;
- to explore phasing out energy-inefficient incandescent light bulbs; and
- to explore phasing out energy-inefficient electrical installations / appliances.

3. As regards facilitation of behaviour change, five proposed areas of actions were set out in the PE document for public discussion. The five areas of action were:

- to introduce energy/carbon audit;
- to facilitate building users to better understanding their energy consumption;

- to promote greater use of energy efficiency management systems;
- to promote adoption of energy-efficient electricity appliances among the trades; and
- to review the electricity tariff structure.

4. Following identification of pertinent areas at five focus group meetings with the target building user groups (i.e. household, office, retail and catering) and relevant stakeholders (including professional organisations and green groups), a PE document was formulated and issued in August 2011.

5. During the public involvement stage which ran from 5 August to 4 December 2011, about 1 300 members of the public and stakeholders participated in 28 engagement events (including five regional forums) organised by the SDC and the 67 Supporting Organisations. In addition, written submissions were received from over 40 organisations and some 1 700 individuals.

6. In the light of the public discussion, the SDC put forward 30 recommendations to the Government in March 2012, summarised as follows:

Recommendations		Latest Development
Systemic Enhancement		
<i>To Consider Tightening The Building Energy Code (“BEC”)</i>	In order to enhance the energy efficiency performance in buildings, the Government should continuously tighten the statutory minimum energy efficiency standards for major building services installations as provided under the BEC with reference to latest international standards.	The Electrical and Mechanical Services Department (“EMSD”) reviews the BEC and Energy Audit Code (“EAC”) every three years. The first review of the BEC and EAC was completed in 2015. The latest review of the BEC and EAC (2018 edition) commenced in mid-2017 for completion and gazettal in 2018.
	The Government should periodically review and enhance the BEC to align with advancement of relevant technology.	See above.

	Recommendations	Latest Development
<p><i>To Consider Providing Recognition For Buildings Achieving High Energy Efficiency</i></p>	<p>The Government should work more closely with the professional bodies concerned to further promote green buildings with reference to overseas experience.</p>	<p>The Environment Bureau (“ENB”) and EMSD have worked closely with professional bodies such as the Hong Kong Green Building Council (“HKGBC”) to promote green building practices. For example, ENB and EMSD supported the HKGBC and the Construction Industry Council for the organisation of the World Sustainable Built Environment Conference 2017 held in June 2017 in Hong Kong.</p>
	<p>The use of BEAM Plus for Existing Buildings promulgated by the HKGBC should be promoted to facilitate more retrofitting projects in existing buildings to undertake assessment on green building performance.</p>	<p>In accordance with joint circular DEVB TC No. 2/2015 and ENB CM No. 3/2015” Green Government Buildings”, all new government buildings of CFA above 5 000 m² with central air-conditioning or above 10 000 m² should aim to obtain the second highest grade or above under the BEAM Plus as promulgated by the HKGBC as far as practicable. Besides, existing government buildings undergoing major retrofitting and/or renovation works should seek opportunities in their design to enhance energy efficiency performance.</p> <p>In the revised Hong Kong Energy Efficiency Registration Scheme for Buildings (2018 Edition) (“EERSB”), certificates will be awarded to existing and new buildings which have: (i) obtained overall final assessment rating at “Bronze” level or above under BEAM Plus; and (ii) obtained “Bronze/Satisfactory” level or above under the Energy Use (“EU”) category of BEAM Plus.</p>

	Recommendations	Latest Development
	<p>The use of rating/certification system should be promoted, e.g. through the development of online building energy performance benchmarking tool, to distinguish and recognize green buildings.</p>	<p>EMSD has set up an on-line benchmarking tool on its website for use by the public (Link at https://www.emsd.gov.hk/en/energy_efficiency/energy_end_use_data_and_consumption_indicators/energy_consumption_indicators_benchmarks/index.html)</p>
	<p>The Government should use the energy data collected through the mandatory energy audit as required under the Buildings Energy Efficiency Ordinance to build up a database which could help establish a benchmark for building operators/occupiers to make reference to in identifying improvement potential among buildings of similar operation and physical characteristics.</p>	<p>See above.</p>
	<p>The Government should review the effectiveness of the existing Gross Floor Area (“GFA”) concession arrangement in the light of the experience gained after a reasonable number of projects have been completed, and consider whether it is necessary to tighten the requirement e.g. by imposing appropriate performance indicators for new building development to be eligible for GFA concession.</p>	<p>As announced in the 2017 Policy Address, the DEVB is reviewing the GFA concession arrangement and will consider the way forward after completion of a relevant study in 2019.</p>
	<p>The Government should conduct continuous review to cover more appliances under MEELS. When identifying additional types of electrical appliances for mandatory labelling under the MEELS, the Government should take into account such relevant considerations as technical factors, e.g. assessment of the energy consumption and potential energy saving of the appliances; and</p>	<p>Having considered comments received during a three-month public consultation in 2015 and other relevant considerations such as overseas practices, availability of test standards and testing laboratories, energy consumption and energy saving potential of appliances, ENB/EMSD have proposed to include the additional types of appliances in the third phase of</p>

	Recommendations	Latest Development
<i>To Explore Extension Of The Application Of The Mandatory Energy Efficiency Labelling Scheme (“MEELS”)</i>	education and awareness-raising purpose, e.g. covering appliances that are widely used.	MEELS, and the legislative amendment process is underway. ENB/EMSD will continue to consider and include more appliances under MEELS.
	The Government should step up publicity and education on the MEELS to enable consumers in general to have better access to energy saving information and make informed choices of energy-efficient appliances.	ENB/EMSD have stepped up publicity and education on MEELS and carried out a series of activities to promote MEELS to consumers, including - (a) thematic website “Energy Label Net”; (b) announcement in TV and radio; (c) school talks, exhibitions and trade talks; (d) publicity visits to retail shops; and (e) articles and newsletters in magazines and publications. ENB/EMSD will continue to carry out publicity activities and will prepare publicity for the impending launch of the third phase of MEELS.
<i>To Consider Updating and Reviewing The Energy Efficiency Grading Levels For Room Air Conditioners And Refrigerators Under The MEELS</i>	The Government should periodically review and update the grading standard of the room air conditioners and refrigerators under the MEELS with reference to the latest international advancement in technology.	In the light of technology development, the grading standards of room air conditioners, refrigerators and washing machines were reviewed and tightened and the new requirements took effect in November 2015. Two more grading standard reviews will be conducted by 2025 to further tighten the grading standards of the prescribed products under the MEELS having regard to latest prevailing technologies, international practices and public aspirations.

Recommendations		Latest Development
<i>To Explore The Way Forward of Phasing Out Energy-Inefficient Incandescent Light Bulbs (“ILBs”)</i>	The Government should take into account public’s views gathered during the SDC’s public engagement process and its own public consultation on phasing out energy-inefficient ILBs in deciding on the best way to take the proposal forward.	ENB/EMSD have launched the Energy Saving Charter on “No ILB” to encourage relevant suppliers/retailers to stop selling and consumers to stop using the energy-inefficient ILB since 2013. According to a market study conducted in 2014, the total annual sale of ILB had dropped from some 20 million in 2008 to 9.3 million in 2014, representing a decline of more than 53%. We will review the effectiveness of the Charter scheme on the basis of the market survey data in 2018. With the continual improvement to LED technology, LED has been increasingly used for general lighting applications as a more energy-efficient alternative to ILB. The Government has also been promoting the application of LED lighting products.
<i>To Promote Green Procurement and The Use of Energy-efficient Electrical Installations Appliances</i>	The Government should take the lead in procuring and using energy-efficient appliances and set good examples in showcasing the electricity/cost saving in using such appliances.	To promote energy efficiency, EPD updated the Government’s green procurement guidelines in 2015 requiring Government bureaux and departments to select only energy efficient products when they have to purchase appliances such as refrigerators, washing machines, dryers, electric or town gas water heaters, room air coolers, dehumidifiers, etc.
Facilitation of Behaviour Change		
	The Government should take the lead to conduct carbon audit in public facilities to showcase the benefits of conducting carbon audit. The Government should start collecting data for conducting carbon audit with	The Government has taken the lead to conduct carbon audits in government buildings and public facilities to showcase the benefits of conducting carbon audit. Starting from

	Recommendations	Latest Development
<i>Energy/ Carbon Audit</i>	a view to publishing the audit results in one to three years' time, depending on the scale of operation of the facilities.	2017, bureaux and departments are required to enhance carbon management by conducting regular carbon audits on major government buildings with a view to exploring room for carbon reduction. They would also disclose their carbon emission information.
	The Housing Authority (“HA”) should conduct carbon audit for the common areas of public rental housing (“PRH”) blocks to demonstrate potential electricity and cost savings. Premises under the home ownership scheme should also be encouraged to follow suit.	HA has been conducting carbon audit for 14 typical PRH domestic blocks covering the majority of HA's block type since 2012/13, to monitor and evaluate energy savings performance. The energy saving measures and improvement works carried out in PRH domestic blocks were effective. Same as other private residential properties, Home Ownership Scheme courts are managed by their Owners' Corporations which are in the position to consider formulating energy saving measures for their properties, including carbon audits.
	Major subvented public bodies (e.g. universities and hospitals) should also actively consider conducting carbon audit.	We fully agree that subvented public bodies should be encouraged to carry out carbon audits at their buildings. To this end, the EPD has approached various universities, hospitals and welfare organizations to encourage them to conduct carbon audits. Such efforts will continue.
	The Hong Kong Stock Exchange should explore how their on-going initiatives on Environmental, Social and Governance (“ESG”) could incorporate conduct of carbon audit	The Hong Kong Stock Exchange has been taking actions to engage listed companies in carbon reporting. As a recommended practice,

	Recommendations	Latest Development
	and/or undertaking of environmental or sustainability reporting with a view to driving for the best practice requirement for listed companies.	the ESG Guide stipulated in August 2012, among others, that listed companies should report their carbon emissions and intensity starting from financial years ending after 31 December 2012. In December 2015, the ESG Guide Consultation Conclusions upgraded the obligation level for carbon footprint disclosure by listed companies from voluntary to “comply or explain” for issuers’ financial years commencing on or after 1 January 2017. This has further raised the standard of ESG disclosure of the listed companies.
	The Government should encourage carbon audit among general businesses and SMEs should also be more incentivized to do energy audit as the results of energy audits are conducive to reducing electricity costs.	<p>To encourage private sector companies to adopt regular carbon auditing, EPD launched the Carbon Footprint Repository for Listed Companies in Hong Kong (“CFR”) in December 2014. The CFR website aims to provide handy information on carbon performance of listed companies to the public, such as their level of greenhouse gas emissions and carbon reduction measures.</p> <p>To provide guidance to the private sector in carrying out carbon audits, EPD has uploaded onto the CFR website a set of nine carbon audit guidebooks covering different types of premises and an Excel template with emission factors and formulas for calculating greenhouse gas emissions.</p>

	Recommendations	Latest Development
<p><i>Better Understanding of Your Energy Consumption</i></p>	<p>The two power companies should explore means to enhance the public’s understanding of their own electricity consumption patterns through informative and user-friendly electricity bills in both paper-based and electronic format.</p>	<p>At present, the power companies display the following information on their electricity bills (both printed and e-bills) to help customers understand their electricity consumption patterns:</p> <p>(a) For Hongkong Electric Company Limited (“HEC”): (i) the past 25-month electricity consumption chart (inclusive of the latest month); (ii) average carbon dioxide emission per unit of electricity consumed; and (iii) electricity consumption per capita for HEC’s residential customers.</p> <p>(b) For the CLP Power Hong Kong Limited (“CLP”): (i) graph showing the electricity consumption for the past 14 electricity bills (equivalent to the past 28 months, inclusive of the latest month); and (ii) average carbon dioxide emission per unit of electricity billed.</p>
	<p>The two power companies should consider the provision of relevant information, such as electricity consumption per capita in Hong Kong or per floor area, and carbon emission per unit of consumption, to facilitate the public in better understanding their relative performance in energy consumption.</p>	<p>See above.</p>
	<p>The Government should further promote the use of building energy efficiency management systems.</p>	<p>The Government has promoted and used various energy efficiency systems for buildings. A recent example is that EMSD has published Technical Guidelines on Retro-commissioning in June 2017 to promote retro-commissioning in</p>

	Recommendations	Latest Development
<i>More Use of Building Energy Efficiency Management Systems</i>	<p>The Government should serve as a role model to showcase building energy efficiency management systems in achieving better energy performance for the private sector.</p>	<p>existing buildings. Retro-commissioning is a cost-effective means for energy efficiency and conservation (“EE&C”) and is relative new to stakeholders in Hong Kong. EMSD hence commenced a retro-commissioning pilot study in 2016. Six existing government buildings were selected to undergo retro-commissioning. The experiences gained were distilled and published in EMSD’s website and relevant guidelines for stakeholders’ reference.</p>
	<p>Facilitation programmes should be organised to enhance the visibility of building energy efficiency management systems in the market to encourage the use of such systems. Such programmes should highlight the importance and benefits of incorporating the building energy efficiency management systems during the planning and design stage of building construction.</p>	<p>Various facilitation programmes have been taken forward. These include real-time energy monitoring and management systems in some new government buildings, energy audits, retro-commissioning, etc. The Government has also encouraged bureaux and departments to publish their building EE&C measures in their sustainability or environmental reports.</p>
	<p>The Government should explore more energy efficiency measures to reduce electricity use in air conditioning, e.g. guidelines on indoor temperatures control, setting a higher temperature in computer server rooms, data centres, etc. Such measures should be promulgated to the private sector to drive for improved energy efficiency in the use of air conditioning.</p>	<p>Since 2015, ENB and EMSD have organised the “Energy Saving for All” Campaign to foster close partnership among the Government, the business sector and non-governmental organisations, as well as schools and tertiary education institutions, to promote energy saving. A dedicated website has been set up to promote energy saving by providing information such as energy saving tips, education kits and updates on related competitions, awards and</p>

	Recommendations	Latest Development
		<p>charters.</p> <p>We have also established a partnership with major stakeholders in the built environment under the “4T” framework (namely target, timeline, transparency and togetherness). The partnership includes property developers, property management companies, hotels, utility companies, professional organisations, large corporations and public bodies. The ENB has encouraged the “4T” partners to set their own energy saving targets and timelines and to share with us their energy saving measures. We will continue to capitalise on this partnership and other channels to promote various energy efficiency initiatives, such as the technical guidelines on retro-commissioning published in 2017.</p>
<p><i>Promote Adoption of Energy-Efficient Electrical Appliances among The Trades</i></p>	<p>The Government should further promote local research and development of energy-efficient electrical appliances.</p>	<p>EMSD provides proactive assistance to start-up companies and explores collaboration opportunities with local universities on innovative energy-efficiency technology. For example, in November 2017, EMSD had implemented an innovative technology project with energy saving potential at the EMSD Headquarters building.</p>
	<p>The Government should further enhance the accessibility to information on energy-efficient appliances with a view to enhancing the awareness of such appliances among the public and the trades.</p>	<p>EMSD provides information on energy-efficient appliances on its website for promotion of EE&C. It has also carried out various public education and publicity initiatives. (see attached link:</p>

	Recommendations	Latest Development
	<p>The Government should encourage green investments on research and development for energy-efficient appliances through various funding schemes.</p>	<p>https://www.emsd.gov.hk/en/energy_efficiency/energy_analysis_and_saving_technologies/advanced_energy_saving_technologies/publications/index.html)</p> <p>EMSD will consider and fund innovative projects with energy saving potential through pilot tests and other channels. Various government public schemes have also funded research on innovative technologies for EE&C.</p> <p>Besides, EMSD also provides advice to local universities and start-up companies on funding applications for the Innovation and Technology Fund as appropriate.</p>
<p><i>Electricity Tariff Structure Review</i></p>	<p>The Government and the power companies should further review the tariff structure with a view to promoting energy conservation. More study and discussion is required to agree on the objectives to be achieved, and all relevant considerations should be taken into account in the upcoming 2013 tariff review.</p>	<p>The two power companies have generally implemented progressive tariff structure to encourage EE&C and have regularly reviewed their tariff structures in the annual tariff review. ENB will continue to follow up with the two power companies in this regard.</p>
	<p>In the meantime, the power companies should continue to enhance existing programmes to support energy saving and efficiency among end-users.</p>	<p>Under the Scheme of Control Agreements (“SCAs”) signed with the two power companies in 2008, the power companies each set up a loan fund over a five-year period to provide loans to non-Government customers to implement energy saving initiatives to promote energy efficiency; and set up an education fund for energy efficiency and promotional activities.</p> <p>As a result of the mid-term review of the SCAs conducted</p>

	Recommendations	Latest Development
		<p>in 2013, the two power companies agreed to, amongst other things, each set up an energy efficiency fund out of the shareholders' earnings to provide subsidies on a matching basis to non-commercial building owners to carry out works for enhancing the energy efficiency of their buildings. The power companies also agreed to extend the loan fund and education fund for a further period of five years.</p> <p>The current SCAs will expire in 2018. The Government entered into the post-2018 SCAs with the power companies in April 2017 and promotion of EE&C is one of the key foci of the post-2018 SCAs. Under the post-2018 SCAs, existing incentive schemes in relation to promotion of EE&C will be expanded while new elements will be introduced. More funds will be available under the existing energy efficiency funds of the power companies to support the carrying out of retrofitting and retro-commissioning, including the implementation of building-based smart/IT technologies to enhance the energy efficiency of a wider coverage of buildings. The ENB will also work with the power companies to introduce new energy saving funds to further support other EE&C programmes and to expand the scope of the energy saving loan funds. The power companies will also introduce demand response programmes to help</p>

	Recommendations	Latest Development
<i>Other Issues</i>	<p>The Government should launch more intensive public education and awareness programmes to widen and deepen the general awareness of the public about the relevance of climate change to the community –</p> <ul style="list-style-type: none"> • on the commercial side, more educational work targeted at SMEs should be pursued; and • as for the general public, consideration should be given to launching a territory-wide campaign to encourage energy conservation to instigate behaviour change in the community. 	<p>reduce maximum demand.</p> <p>Various public education and awareness programmes were launched in the past few years to widen and deepen general awareness about climate change issues. Following the release of Hong Kong’s Climate Action Plan 2030+ in January 2017, to raise public awareness of the importance of combating climate change, and to highlight the key measures that the Government will introduce to combat climate change, ENB released a leaflet, an Announcement in the Public’s Interest (“API”), short videos, a poster and a new climate change website (https://www.climateready.gov.hk)</p> <p>Separately, in order to promote energy efficiency and conservation, EMSD has set up a website, namely “Energy Saving for All” (http://www.energysaving.gov.hk/en/home/index.html).</p>
	<p>The Government should continue to look into the matter of external lighting taking into account all relevant considerations.</p>	<p>Having thoroughly considered the views collected during the public engagement exercise, the Task Force on External Lighting (“Task Force”), set up by the Government in 2011, submitted its report in April 2015. The report pointed out that the views collected during the public engagement exercise were divergent. The Task Force recommended the adoption of multi-pronged approach, including a voluntary charter and re-launching the Guidelines on Industry Best Practices for External Lighting Installations</p>

Recommendations		Latest Development
		<p>to encourage switching off lighting installations with decorative, promotional or advertising purposes that affect the outdoor environment during preset times.</p> <p>The Government is implementing the multi-pronged measures recommended by the Task Force, including introducing the Charter on External Lighting, etc. Since the launch of the Charter on External Lighting in 2016, more than 4 800 properties and shops have signed up the Charter.</p>

7. The Government had accepted all the recommendations put forward in the SDC's report and implemented them accordingly.

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