PARIS WATCH CLIMATE ACTION REPORT:
HONG KONG'S CONTRIBUTION TO THE PARIS AGREEMENT GOALS

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PARIS WATCH CLIMATE ACTION REPORT: HONG KONG'S CONTRIBUTION TO THE PARIS AGREEMENT GOALS

DECEMBER 2018

Hong Kong faces its own share of threats from climate change, yet it is far from achieving its responsibility towards the Paris Climate Agreement goals.

Hong Kong's contribution to the Paris Climate Agreement goals

> **The** conclusion we draw after the first year of research is that Hong Kong is far from achieving either its responsibilities or its potential.

THE Paris Watch – Hong Kong Report Card sets out to answer one vital question:

"Is Hong Kong doing enough to deliver its part of the Paris Climate Agreement?"

Tackling climate change involves coordinated action on science, the economy and social policy. The Paris Agreement sets out a clear aim for climate change action:

"Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels."

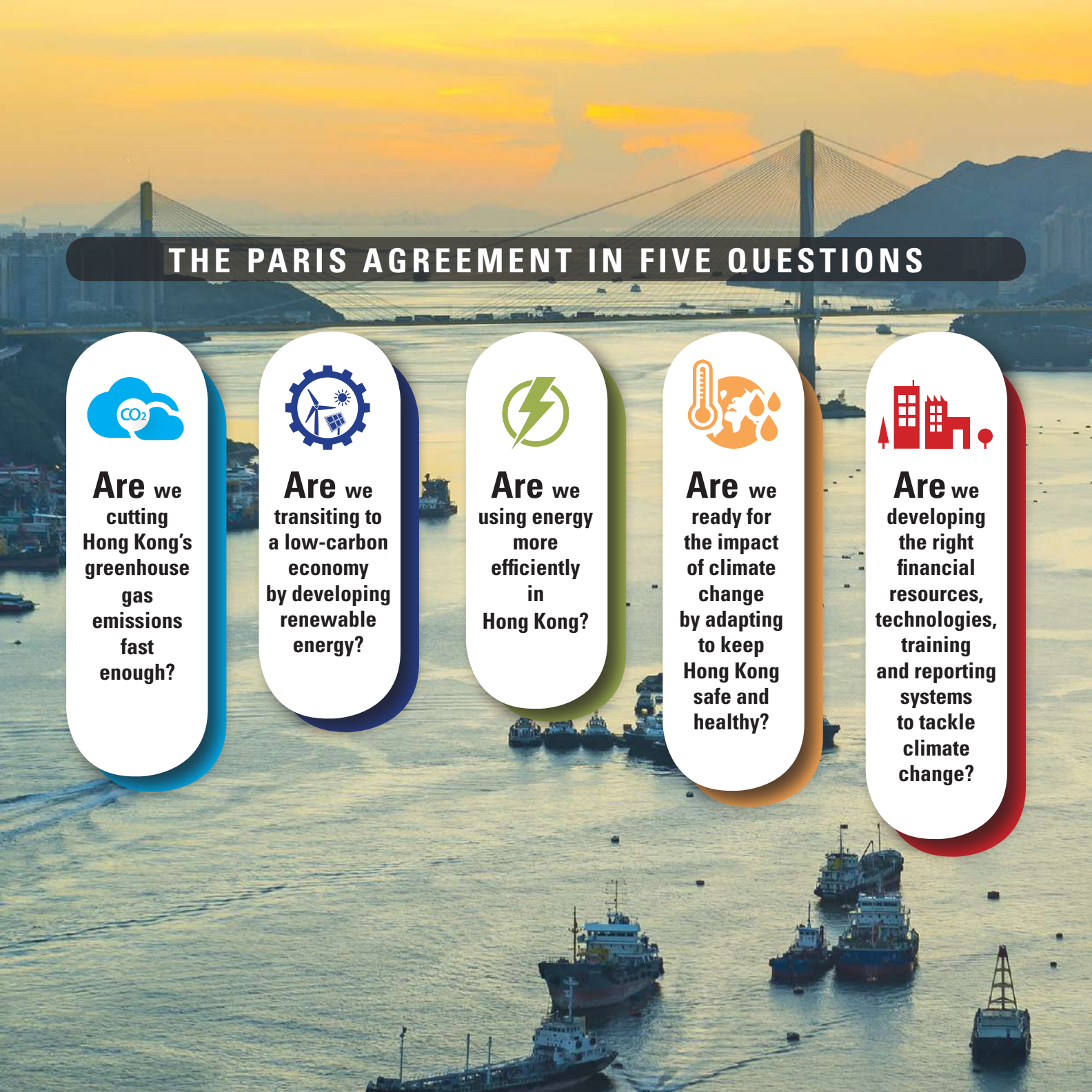
To make a realistic assessment of Hong Kong's performance against the agreement, we have addressed the component parts of the Paris Agreement with five questions (illustrated in the chart on page 7).

The conclusion we draw after the first year of research is that Hong Kong is far from achieving either its responsibilities or its potential. The city is making progress in some areas, but if we compare Hong Kong's actions to the plans of other Asian cities, or to the targets set by China, then Hong Kong SAR is falling short.

Hong Kong is not on track to help hold planetary warming down to the safe levels recognised in the Paris Agreement.

UN members are still finalising the Paris Agreement "rule book" but that must not prevent us from acting now to measure progress at city level. As the C40 Cities / Arup study "Deadline 2020" noted in 2016:

"The overriding and deeply significant finding of the work is that the next 4 years will determine whether or not the world's megacities can deliver their part of the ambition of the Paris Agreement."



THE PARIS AGREEMENT IN FIVE QUESTIONS

Are we cutting Hong Kong's greenhouse gas emissions fast enough?

Are we transiting to a low-carbon economy by developing renewable energy?

Are we using energy more efficiently in Hong Kong?

Are we ready for the impact of climate change by adapting to keep Hong Kong safe and healthy?

Are we developing the right financial resources, technologies, training and reporting systems to tackle climate change?

Are we cutting Hong Kong's greenhouse gas emissions fast enough?

78%

The 2030 target of between 3.3 and 3.8 tonnes per capita would exceed the C40 Cities pathway for cities like Hong Kong by some 80%.

IN 2015, each person in Hong Kong was responsible for emitting an average of 5.7 metric tonnes of CO2 equivalent (tCO2e) of greenhouse gasses (GHGs) down from 6.2 tonnes the year before. Hong Kong's Climate Action Plan sets the goal to reduce GHG emissions to between 3.3 and 3.8 tCO_2e per capita by 2030[i].

A study from ARUP and C40 Cities – a city-level climate action network to which Hong Kong belongs – makes clear that the target for cities with the GNP and emissions levels of Hong Kong should stand at 2.0 tCO_2e per capita by 2030[ii]. Hong Kong's 2030 target of between 3.3 and 3.8 tonnes per capita would exceed the C40 Cities pathway by some 78%.

Not only is Hong Kong falling short of these important 2030 targets, but even current targets lack a clear strategy for their achievement. HK will be able to reduce GHGs substantially with long-standing plan underway to replace coal-fired electricity generation with natural gas. But after reaping the gains from this fossil-to-fossil energy transition, there is no clear strategy for speeding up Hong Kong's emissions reduction beyond 2030.

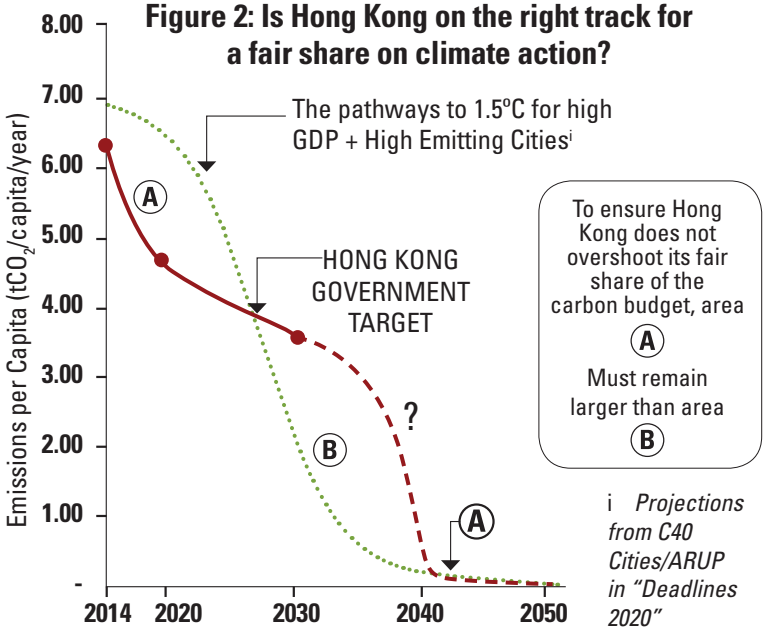
The Intergovernmental Panel on Climate Change (IPCC), the scientific body underlying UN Climate agreements, noted in October 2018 the importance of targeting a 1.5°C limit to temperature rise; setting out evidence that a 2°C rise which will produce markedly higher levels of extreme heat, sea level rise, changed weather, melting ice, species loss, crop failure and diminished fisheries[iii]. In the starkest terms, to stand a chance of achieving 1.5°C, Hong Kong – in step with the rest of the world – needs to reduce greenhouse gas emissions to net zero by 2050.

Figure 1: Carbon Intensity Of Electricity Generation

Size of the bubbles are varied by the amount of carbon intensity; Dotted line bubbles refer to static emission factor due to no further updates of emission factor

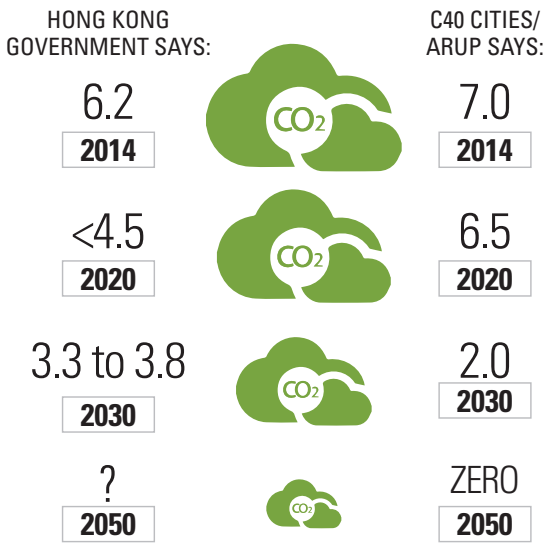
	2010	2011	2012	2013	2014	2015	2016
HONG KONG	0.561 kgCO2/kWh	0.595 kgCO2/kWh	0.589 kgCO2/kWh	0.618 kgCO2/kWh	0.623 kgCO2/kWh	0.558 kgCO2/kWh	0.561 kgCO2/kWh
GUANGZHOU/ SHENZHEN		0.575	0.527	0.527	0.527	0.527	0.527
SEOUL				0.460	0.460	0.415	0.409
SINGAPORE	0.515	0.515	0.491	0.450	0.450	0.450	0.450
TOKYO	0.374	0.463	0.406	0.522	0.496	0.491	0.474

Figure 2: Is Hong Kong on the right track for a fair share on climate action?

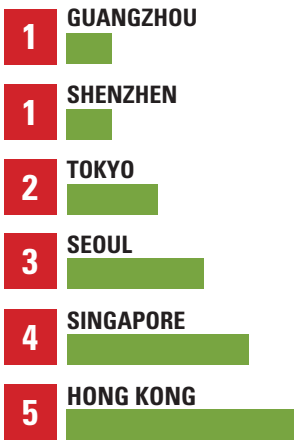


i *Projections from C40 Cities/ARUP in "Deadlines 2020"*

Figure 3: City pathways to 1.5°C tonnes of CO_2 equivalent per capita



Are we transiting to a low-carbon economy by developing renewable energy?



TO ASSESS renewable energy plans, we examine current renewable energy generation capacity; future targets; estimates of the city's potential; and any policies which are designed to increase or incentivise the proportion of renewable energy generated and consumed in Hong Kong.

Current renewable energy generating capacity in Hong Kong stands at a paltry 1%. Future plans are not much better, with a target of realising renewable potential of 3-4% by 2030[iv]. This represents just 2-3% increase for renewable energy over a 13-year period.

We are also able to compare these actual and projected figures with other cities in the region which have their own plans for increasing the proportion of renewable energy they use.

With the exception of Singapore, all cities in the study are part of larger countries. City-level targets for consumption of renewable energy usually include energy generated from sources beyond the city boundaries and outside the jurisdiction of city authorities. This has long been the case for conventional energy supply. Hong Kong already receives substantial proportion of its electricity from the Daya Bay nuclear power plant in mainland China. With the growth of super grids and smart grids, potential for sharing of renewable electricity across boundaries, both national and international, should be considered in low-carbon energy planning.

Hong Kong has the lowest renewable targets of the cities we have examined. Hong Kong's current renewable energy plans leave us 15 times worse than Shenzhen's renewable percentage and 12 times worse than China's nation-wide renewable target.

There are no portfolio standards setting renewable energy targets for the two power companies. The recently-announced feed-in tariff scheme is not designed to open the market to renewable energy generation at scale.

Figure 4: Hong Kong's renewable energy growth compared to neighbouring cities

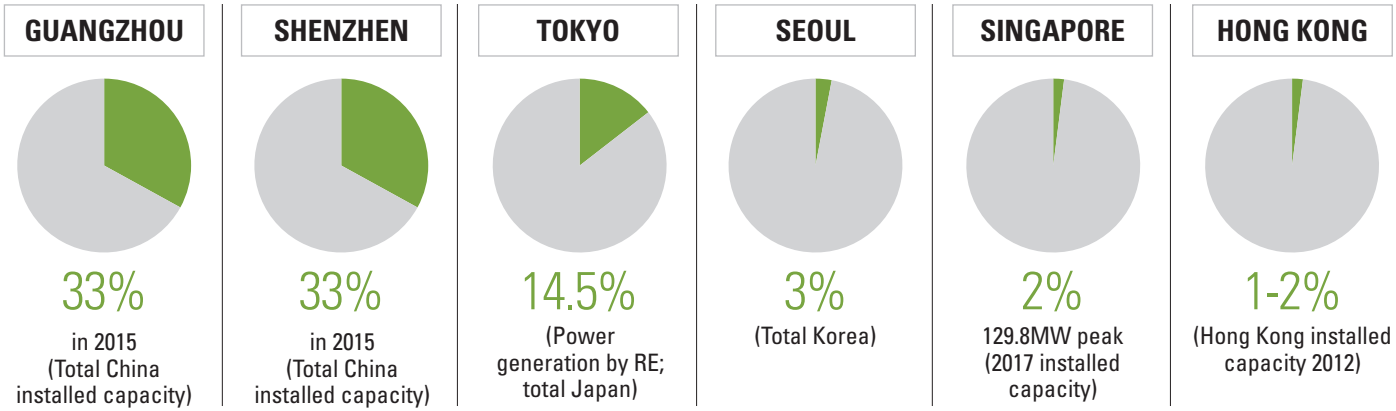
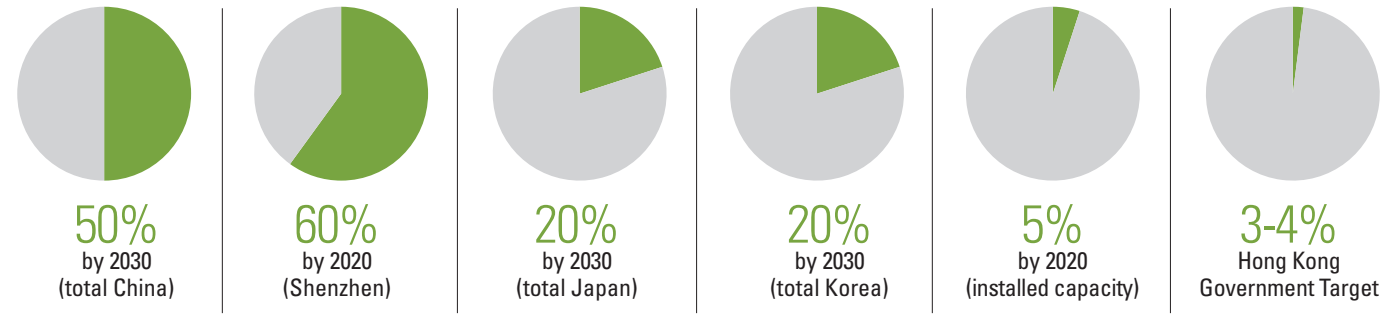


Figure 5: Renewables Targets 2020, 2030



**3-4% potential local (2030) p. 24 Climate Change Action Plan 2030+, 2017*

Are we using energy more efficiently in Hong Kong?

90%

of electricity is consumed in buildings and it is here that effective action will have most impact on Hong Kong's emissions.

REDUCING THE amount of energy we use is just as important as generating it from clean sources. Some 70% of Hong Kong's GHG emissions come from electricity generation and 90% of this is consumed in buildings. A further 16% of emissions come from transport.

We have therefore focused on these two areas which together account for 80% of the city's emissions.

Building efficiency can be examined from the perspective of the energy use per square meter. Green building certification looks as the energy use in terms of energy-efficient equipment and control systems as well as thermal efficiency. This is often assessed from submitted plans rather than tests applied to the finished building. Actual energy use of a building will not only derive from the planned or actual efficiency of the building, but also from the behavior of the building's users.

Action to reduce energy use in buildings must therefore combine regulations or incentives to raise the proportion of buildings which achieve efficiency standards along with ways to encourage occupants within buildings to use energy efficiently and set their own energy-saving targets.

Air conditioners alone are responsible for 30% of the city's overall energy use[v]. Some studies suggest that more efficient air conditioning has great potential for energy saving, especially as use of air conditioning grows in emerging economies. In addition to reducing the city's own footprint, here lies a green technololgy opportunity for Hong Kong with global market potential.

Figure 7: Energy Efficiency in Commercial Buildings

Energy use per unit of gross floor area (TJ / 10,000 sq.m)
Year 2015-2016

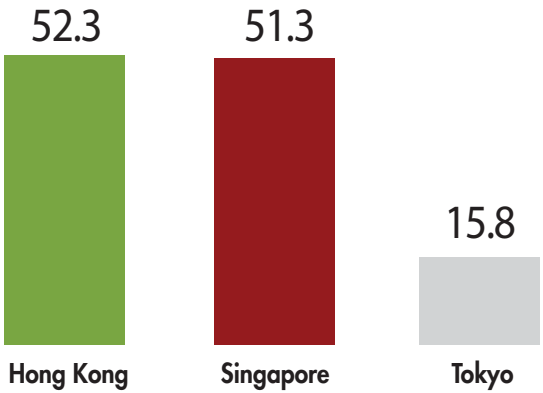


Figure 8: Energy Efficiency in Residential Buildings

Energy use per unit of gross floor area (TJ / 10,000 sq.m) Year 2015-2016

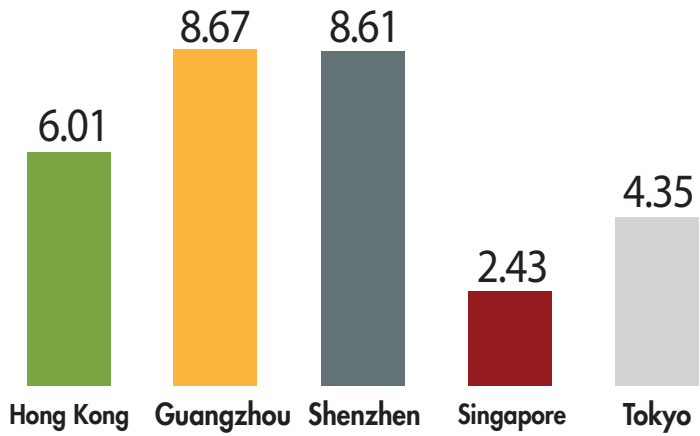
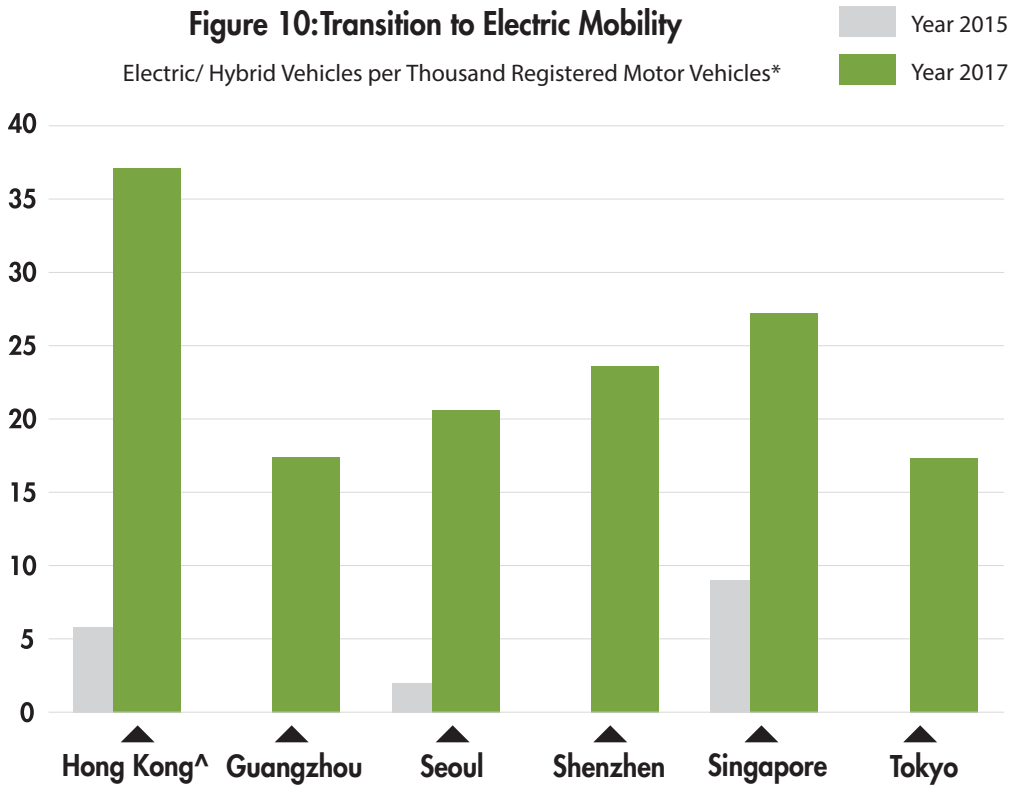


Figure 9: Energy Efficiency in Transport

Energy Use per Passenger-Kilometers Travelled (MJ/ passenger-km)

Figure 10:Transition to Electric Mobility

Electric/ Hybrid Vehicles per Thousand Registered Motor Vehicles*



* Including goods vehicles, excluding motor cycles ^ The 2015 figure for Hong Kong excludes hybrid vehicles

Are we ready for the impact of climate change by adapting to keep Hong Kong safe and healthy?

"Adaptation is a global challenge faced by all with local, subnational, national, regional and international dimensions... to protect people, livelihoods and ecosystems"
– Paris Agreement

TO MEASURE Hong Kong's performance, we look at the most significant climate impacts facing the people of Hong Kong. We begin with health, which can include either illnesses resulting from extremely hot weather, or the spread of diseases resulting from hotter weather.

We cannot place responsibility for higher global temperatures with any single government. We can, however, assess whether governments have taken sufficient adaptive action to prepare for climate-related risks which are known, material and actionable.

Adaptation and resilience measures can be assessed in terms of formulated plans & policies, implemented plans and policies, and key actions. Further measures include the existence of effective institutions and governance bodies with appropriate powers and mandate.

A proxy measure for the success of adaptation policies is provided by incidence of climate-related illnesses, accidents and damage. If more people are getting sick or more of our built and natural environment is being damaged, then adaptation is not going well.

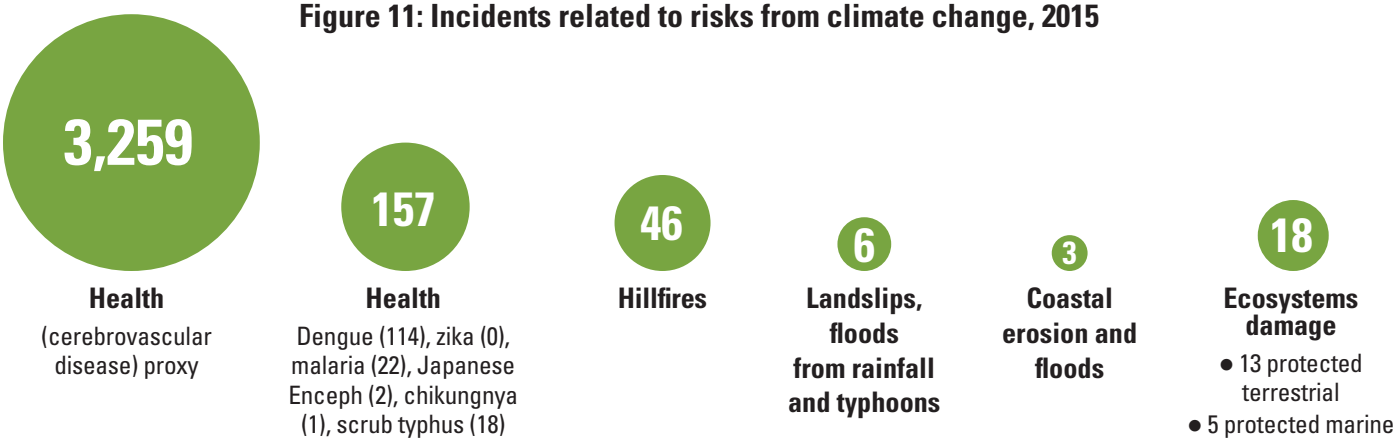
As well as heat, climate change brings the danger of rising sea levels, stronger typhoons and extremely heavy rainfall. As a hilly, coastal city, adaptation for Hong Kong means the creation of an infrastructure that can cope with more floods from above (rain) and below (rising sea) made worse by stronger wind from higher intensity typhoons. Another key measure of our ability to adapt concerns the security of our water supply.

Protecting the quality of life in Hong Kong includes protecting our bio-diversity — the species of plants and animals special to the land and coastal waters of Hong Kong. Threats can be reduced by adaptive actions related to flood prevention, protection of habitats and other policies protecting endangered species.

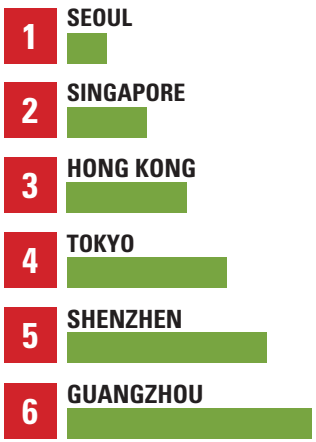
CLIMATE-RELATED RISKS TO HONG KONG

RISK	HAZARD	CAUSE
HEALTH	Heat-induced illnesses & deaths (Health risks to outdoor workers; increased deaths from hot weather; & heat stroke)	Increase in number of very hot days/nights; heat islands & traps
HEALTH	Heat & precipitation vector-borne diseases & deaths (Heightened risk of tropical diseases and asthma)	Rising average temperatures changes disease transmission patterns
WATER SECURITY	Water shortage & drought (upstream East River & reservoir capacity/downstream HK, reservoir capacity & leaks)	Changed rainfall patterns; increased demand in hot weather
LIFE AND PROPERTY	Increased fire risk	Uneven rainfall patterns; number of very hot days
LIFE AND PROPERTY	Floods, landslips and typhoons	Extreme rainfall, monsoons and severe typhoons
LIFE AND PROPERTY	Coastal erosion & flooding (sea level above chart datum)	Rising sea level, increased incidence of severe typhoons, tidal surge
ECOSYSTEMS DAMAGE	Reduced biodiversity, damage to ecosystems	Increased surface temperatures; damage to coastal environment from sea level rise; extreme weather; erosion

Figure 11: Incidents related to risks from climate change, 2015



Are we developing the right financial resources, technologies, training and reporting systems to tackle climate change?



THE FINAL components of the Paris Agreement concern the systems necessary to make mitigation and adaptation happen. For this we measure Hong Kong's performance in establishing financial, technical and training institutions and initiatives.

A vital part of this, particularly relevant to a financial centre like Hong Kong, involves measures to ensure loans and investment support the transition to a low-carbon economy.

Another necessary element for change involves the development and the application of green technology. This report looks at the policies, funding and other incentives which promote Hong Kong's development of technologies suitable for renewable energy, energy efficiency and reduction of climate change risk.

Capacity building and training on climate issues are flagged in the Paris Agreement as essential to ensure climate action is effective. In both the public and the private sector, including the finance sector, limited knowledge and experience regarding climate mitigation and adaptation is a recognised obstacle to action.

The final part of the Paris Agreement calls for robust systems to monitor, report and verify (MRV) climate pledges and the resulting climate action. This is a critical part of determining whether or not the Paris agreement is truly achieving its aims and territories are living up to their commitments. For this, we rate the policies and schemes related to MRV in Hong Kong.

Green Finance, Technology, Capacity Building and Reporting (MRV)

Indicators*	Hong Kong	Singapore	Shenzhen	Guangzhou	Seoul	Tokyo
Green finance	Policies: 2 Institutions: 4 Incentives: 1	Policies: 2 Institutions: 16 Incentives: 3	Policies: 2	Policies: 1	Incentives: 2	Incentives: 2 Policies: 5
Capacity building for green finance	0	2	0	0	0	0
Green technology	Policies: 3 Institutions: 4 Incentives: 3	Policies: 2 Institutions: 3 Incentives: 7	Policies: 6	Policies: 3	Policies (projects): 4	Incentives: 1 Policies: 1
Green technology knowledge transfer	0		0	0	0	2
Capacity building for green technology	Training schemes in government and non-government institutions: 5	Training schemes in government and non-government institutions: 5	Policies (education programmes): 5 Incentives: 3	Guangzhou Private Science and Technology Park: 1	22 projects	0
Measuring, reporting and verification	Enacting of Monitoring, Verification, Reporting schemes: 3 Enacting of Measurement & Disclosure schemes: 1 Incentives to MRV: 3	Policies: 6 Institutions: 5 Incentives: 2	8	2	2	4

**Criteria: targets, formulated policies, implemented policies, key actions: KPIs*

OUR ASSESSMENT

GOVERNANCE

HONG KONG has no dedicated climate authority (unlike Singapore, Seoul and Tokyo). The Environment Bureau has been responsible for various publications and meetings regarding climate change, yet there is no dedicated area concerned with climate change on its website. The Steering Committee on Climate Change, currently chaired by the Chief Executive, was set up to steer direction, monitor and coordinate efforts and enhance public awareness. Since a press announcement was released of its first meeting in April 2016, we have identified no other information of its activity.

As recently as July 2018, the climate agenda appears to have been shifted to the Council for Sustainable Development (SDC), one of many government advisory bodies. In its letter of 10 July 2018, the SDC invited different stakeholders to a focus group discussion on a long-term decarbonization strategy 'to provide a platform to gauge the views of the community in formulating Hong Kong's mid-century decarbonization target'.

Uncertainty as to who in government owns the climate change agenda leads to a dilution of leadership on climate action, which needs to involve a broad socio-economic realignment beyond just environmental protection. The October 2018 IPCC 1.5°C report highlights the need for "rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems." But Hong Kong's lack of a climate 'champion' and corresponding deployment of resources leads to the conclusion that this area of policy is not given sufficient importance.

The October 2018 IPCC 1.5°C report highlights the need for "rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems." But Hong Kong's lack of a climate 'champion' and corresponding deployment of resources leads to the conclusion that this area of policy is not given sufficient importance.

MITIGATION - OVERALL TARGETS

HONG KONG has not defined its appropriate share of the carbon budget to ascertain how the city should contribute to keeping global temperatures at 1.5°C or well below 2°C. The most applicable calculations of an effective city-level GHG reduction target for 1.5°C come from the ARUP / C40 Cities study "Deadline 2020." To address the question of fair shares, this study looks at a city's GNP per capita and current emissions per capita to determine different GHG reduction rates. Applying these criteria, Hong Kong is required to drop per capita emissions to 2.0 tCO_2e by 2030 on its way to a convergence of all cities hitting net zero emissions by 2050. Hong Kong currently has high and low scenario targets of 3.8 and 3.3 of 0 tCO_2e by 2030, which are 65% and 90% (averaging 78%) above the 2.0 tCO_2e target respectively. This is particularly worrying given the steeper decline required between 2030 and 2050. This cliff-edge challenge is illustrated by the graph on page 9 of this report.

The Hong Kong government's Climate Action Plan 2030+ is largely an aspirational narrative rather than a detailed plan. Concepts of global inventories and Hong Kong's fair share of these, with reference to China's national contribution need to be in plain sight for setting the city's targets. Clearly-defined targets should then explain what combination of clean energy generation, reduced energy demand and carbon removals will carry Hong Kong to achieve its goals and responsibilities.

Lack of timely information on the city's emissions trends from the end-use of electricity in buildings, in transport and from other uses reduces the level of understanding about where Hong Kong is and what policy mix will best reduce emissions and increase energy efficiency.

The task of gathering opinions and gaining public support for action needs to be set in the context of the threat to lives and property in Hong Kong if action is insufficient; the scientific evidence about the urgency of the task; and international agreements and national targets which have been signed up to and which are in force. The leadership task for Hong Kong is to identify the city's essential share of global GHG reductions as well as its share of China's total contribution and then chart the most effective way to meet these targets. This is not the time to prolong the debate about the degree of action required.

> Lack of upfront information on the city's total emissions (including trends) from the end-use of electricity in buildings, in transport, and due to other uses, reduces the level of understanding about where Hong Kong is and where it should be heading.

MITIGATION — RENEWABLE ENERGY

HONG KONG has limited but significant potential for renewable power generation. Current targets of 3-4% renewables are many times less that the prospects, without taking into account rapid improvements in renewable energy and storage technologies. Some estimates of HK's potential for solar and wind have suggested that Hong Kong could derive 20% of its energy from wind and solar. Roofs, podiums and public spaces offer opportunities for producing between 11 to 14% of our energy needs[vi] — many times current targets. Hong Kong also has 23.8 sq. km. of reservoirs with potential for floating solar panels — a technology already in use in many parts of the world, which experts say could provide a further 7% of our needs[vii]. These estimates do not include advances in vertical solar panels and photovoltaic window glass, or renewable energy from wind, gas from landfills, and waste to energy projects.

China has the space, the technology and the expertise to receive capital from Hong Kong to develop joint solar, wind and other renewable power generating capacity, and to use smart grids to enable Hong Kong's transition to a clean energy future.

MITIGATION — ENERGY EFFICIENCY

THE HONG KONG government made a pledge in 2015 to improve energy intensity 40% by 2025 using 2005 as base year[viii]. This can be largely achieved through completion of the long-standing plan to replace coal-fired electricity generation with gas.

On the consumption side of this equation, the government has yet to introduce clear and comprehensive regulations for building efficiency. In 1995, the government launched a policy requiring new commercial buildings and hotels to be designed to achieve a certain level of overall thermal transfer value (OTTV)[ix]; in other words better insulation to avoid cooling loss. These standards have been altered three times since then, on one occasion to be weakened.[x] Energy efficiency standards, labelling and reporting on equipment used in buildings have been introduced, along with ten-yearly energy audits. But there have been no complete measures on standards for energy efficiency in the structure or in the overall efficiency of old or new buildings in Hong Kong since the 1995 move.

The city has relied on limited-period, changeable and exploratory incentives and recognition schemes for greener buildings which have included small grants for energy-saving projects, along side tax breaks or increased floor areas for buildings designed to achieve certain levels of green building certification. A forthcoming study suggests the schemes lack serious follow-up to assess if the efficiency levels promised at development stage were actually achieved in practice. Of 989 building projects benefiting from gross floor area concessions, barely 100 projects have submitted estimated energy performance/ consumption calculations[xi].

A parallel policy initiative involves the government "leading by example" to improve the energy efficiency of

public buildings. This scheme began in 2005, but no evidence has been presented that government efforts in its offices, public housing and other public facilities is inspiring greater efforts for energy efficiency in the 84% of HK's buildings owned privately. The target for government buildings to achieve 5% electricity reduction between 2015 and 2020 [xii] represents less than 1.2% efficiency increase every year, acknowledging that energy efficiency did improve in the years before 2015. Due in part to incomplete and indecisive policy, Hong Kong's energy efficiency in commercial and residential buildings is poorer than either Tokyo or Singapore. This despite the fact that Singapore buildings require cooling all year round and Tokyo's require heating in winter.

In 2017 some 30,000 of Hong Kong's 52,000 buildings were over 50 years old with the number expected to rise in the subsequent few years. [xiii] The government estimates that there will be around 326,000 private housing units aged 70 years or above by 2046 [xiv]. There is no plan in place for addressing the energy efficiency of these buildings, or for a more overarching urban renewal strategy which should bring much-needed environmental and social benefits.

Hong Kong's transition to low-carbon transport infrastructure is patchy. On one hand, Hong Kong benefits from low levels of private car ownership due to a wide choice of efficient public transport options and the high cost of running a private car; including very limited parking spaces. The electric Mass Transit Railway subway system is the cleanest public transport, but will only be truly low carbon if the electricity used in the system is in turn generated renewably. There are no current plans to convert the large bus fleets from diesel to electricity. Environmental improvement for buses centres on retrofitting diesel busses to reduce nitrogen oxides emissions and reduce particulate pollution [xv]. Tax incentives for electric cars saw Hong Kong grow to have an above average proportion of private electric vehicles, but these tax incentives were substantially reduced in 2017 and partially improved again in 2018 [xvi].

To maintain a realistic GHG reduction trajectory, emissions from buildings and transportation, which together account for some 80% of Hong Kong's emissions, will soon require mandatory controls [xvii] .The later Hong Kong acts on this, the more challenging those building and transport emission regulations will need to be.

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ADAPTATION

ADAPTATION Plans in the Hong Kong government's Climate Action Plan 2030+ recognise the importance of slope safety, water security, coastal protection and infrastructure resilience programs in case of emergencies. Driven by the lessons from severe typhoons throughout Hong Kong's history, the city has an effective typhoon warning system as well as high-volume drainage and slope stabilization programmes intended to handle very heavy rainfall.

An array of HK government departments have responsibility for different aspects of climate adaptation. These include the HK Observatory (warning systems); the Security Bureau (coordinating the uniform services and other agencies in emergency response); the Drainage Services Department (DSD) (designing and maintaining the master plans of the artificial flood prevention infrastructure and setting protection standards); the Agriculture, Fisheries and Conservation Department (conserving the natural flood prevention defenses such as wetlands, forests, river channels, etc.); and the Civil Engineering and Development Department (CEDD) (maintaining steep slopes.) This diversity of responsibilities might be less of a problem if Hong Kong had a powerful coordinating body for climate planning, mitigation, adaptation, emergency response, resilience and recovery, as we noted in the Governance section above.

The establishment in 2016 of a Climate Change Working Group on Infrastructure (CCWGI) with the mandate to oversee the revision of design standards, to ensure infrastructure resilience of existing and new buildings adds another department to the mix. Members of the working group come from the CEDD, DSD, Highways Department, Water Supplies Department, Architectural Services Department and the Electrical and Mechanical Services Department (EMSD).

The Centre for Health Protection and the Department of Health, while compiling statistics of different types of illness, deaths, hospital admissions and discharges, do not disaggregate which of these may be heat-induced or climate-related. While the number of notifiable infectious diseases are recorded, incidence during heatwaves and during persistent, intense rainfall are not identifiable.

Hong Kong depends on imports from China for 70-80% of its fresh water supplies. No information is available as to how drought in the Dongjiang River, the main body of water supplying Hong Kong, may affect supplies in Hong Kong. The Water Supplies Department notes it has a "Drought Contingency Plan" but the plan has not been shown to members of HK's Legislative Council let alone the public. Seawater for flushing toilets is now supplied to 85% of the population, reducing fresh water demand.

The HK government acknowledges the threat from sea level rise and storm surges. Studies are underway related to this growing risk, but policy responses are still awaited.

Part of the adaptation thrust of the Paris Agreement is to prompt parties draw up plans to ensure terrestrial and marine species are able to absorb and recover from the effects of climate change, particularly heat-related impact. While Hong Kong recognizes the importance of protecting wildlife, no data can be found on the correlation between the loss of species and climate change.

SYSTEMS: FINANCE, CAPACITY BUILDING, TECHNOLOGY AND REPORTING

HONG KONG is still taking its first steps when it comes to having the right policies, institutions, resources and knowledge in place – in other words the systems – to drive the climate action agenda.

There are a limited number of green finance policies in place. A HK $100 billion Green Bond issue was announced in the 2018 budget and is intended to support an unrevealed group of government green public works. An incentive scheme provided by the Green Bond Grant Scheme (2018) to finance third-party conformity assessment was introduced in the same budget. These represent forward movement on green finance but it is too early to evaluate actual climate impact or their contribution to establishing the city as a centre for green finance.

When it comes to green finance knowledge transfer and capacity building for green finance, arrangements were in place from 2008 for the implementation of CDM projects in Hong Kong. Most of these projects relate to the acquisition of certified emissions reductions (CERs) of activities undertaken elsewhere that can count towards achieving emission reduction targets of one's institution.

Four institutions are identified with the promotion of green technology: The Information and Technology Bureau (ITB); the IT Commission; the HK Science & Technology Park, and Applied Science & Technology Research Institute (ASTRI). Capacity building for green technology is increased through the deployment of five training schemes in governmental and non-governmental institutions, such as the Energy Audit for Building Energy Efficiency and others. Capacity is also beefed up with three financial incentives such as the Innovation & Technology Venture Fund although this is not exclusively dedicated to support climate projects.

The Paris Agreement requires measurement, reporting and verification (MRV) of mitigation and adaptation activities. China requires Hong Kong to prepare submissions on emissions inventories and determine what measures the city plans to facilitate mitigation and adaptation. This reporting should be transparent, regular, set in the context of China's plans and available to the public. Other than this, most of the MRV found in the city is voluntary. For example, Hong Kong encourages quality assessment and reporting to support industrial, commercial, transport and building sectors to measure and reduce emissions. Three incentives are in place related to verification services (Carbon Reduction Labelling Scheme), global sustainability services (Carbon Disclosure e-platform), and climate change services such as the GHG Emission Validation and Verification.

Information gaps noted in both the mitigation and adaptation sections of this report call to mind the familiar phrase "you cannot manage what you don't measure."

The Central Policy Unit is supporting a research project to look at what role Hong Kong might play in emissions trading in light of the partial launch of China's national scheme. This official think tank will study the impact and the financial services opportunities that might be available to the city from the scheme so that the government can consider what role, if any, Hong Kong could play.

LOOKING FORWARD

Exemplary action on the part of Hong Kong to develop a low-carbon city would not only contribute to China's overall climate targets, but could also contribute to the rest of the country and the region in the area of green finance

HONG KONG needs to raise its targets for climate mitigation, and build the institutions and policies necessary for their achievement. Hong Kong's targets must be based on the science underlying the Paris Agreement. Our ambition level must be framed in terms of Hong Kong's fair share of global efforts to hold down temperature rise. Displays of short-term self-interest will only diminish the city's reputation and future prospects.

Aspirational targets must be accompanied by well-defined agendas for change in energy generation, energy use in buildings, transport and waste. To adapt to the inevitable impacts of climate change we need plans for protecting Hong Kong's people, infrastructure and natural environment from climate extremes.

One foundation for this work should be stronger governance, coordinating climate action at the highest level of government. The city must position itself in the front ranks of major cities leading the way on low-carbon energy, green finance and climate-ready technology.

Hong Kong faces no political impediments to aspiring to the front ranks of city-level action on climate change. Beijing is committed to climate action as well as building an ecological civilization in China.

Exemplary action on the part of Hong Kong to develop a low-carbon city would not only contribute to China's overall climate targets, but could also contribute to the rest of the country and the region in the area of green finance, the transfer of low-carbon technology and the offering of environmental skills and experience. All of these would simultaneously benefit the economies of Hong Kong and mainland China.

As a special administrative region of China, Hong Kong is no longer "borrowed place." But if it does not act more decisively on climate mitigation and adaptation, it will find at great human cost that it exists on a new kind of "borrowed time."

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This Climate Action Report draws largely on the research, analysis and sources of the Paris Watch Research Report. Specific references in the Climate Action Report text are included below.

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xx Ibid.

Figure 1 Source: Greenhouse Gas Emissions and Carbon Intensity in Hong Kong 2018; Government of Singapore 2017 (data.gov.sg); NCSC 2014; KEPCO Sustainability Report 2013-2017; TEPCO 2016

Figure 7 Source: Hong Kong Energy End-Use Data 2018 (EMSD); Hong Kong Property Review 2018; Government Property Agency Annual Report 2016; Guangzhou Statistical Yearbook 2017; Shenzhen Statistical Yearbook 2017; Government of Singapore 2017 (data.gov.sg); Final Energy Consumption and Greenhouse Gas Emissions in Tokyo 2015 (Tokyo Metropolitan Government 2018); Tokyo Statistic Yearbook 2016.

Figure 8 Source: Hong Kong Energy End-use Data 2018 (EMSD); Guangzhou Statistical Yearbook 2017; Shenzhen Statistical Yearbook 2017; Government of Singapore 2017 (data.gov.sg); Final Energy Consumption and Greenhouse Gas Emissions in Tokyo 2015 (Tokyo Metropolitan Government 2018); Tokyo Statistical Yearbook 2016.

Figure 9 Source: Hong Kong Energy End-use Data 2018 (EMSD); Annual Traffic Census 2017 (Transport Department, HK); Government of Singapore 2017 (data.gov.sg); Tokyo Statistical Yearbook 2016; Final Energy Consumption and Greenhouse Gas Emissions in Tokyo 2015 (Tokyo Metropolitan Government 2018)

Figure 10 Source: Administration Paper to Legislative Council; Government of Singapore 2017 (data.gov.sg); ICCT Briefing on Electric Vehicle Capitals 2018; Government news releases: Shenzhen and Guangzhou.


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