1. INTRODUCTION

1.1. Climate change and its impact on Hong Kong

1.1.1. Climate change is a global phenomenon which affects every nation and city in the world. Climate change is here and “Hong Kong is not immune to climate change”: Our annual temperature rose 0.17°C per decade in 1986-2015; the annual total of hot nights reached a historical high of 37 nights in 2015; the mean sea level in Victoria Harbour rose by 30mm per decade during 1954-2015; the annual total rainfall at HKO headquarters rose at an average rate of 31mm per decade in the past 60 years. These are strong evidences that Hong Kong is already experiencing changes in weather and climate that are significant and not a short-term event.

1.1.2. As awareness of the impact of climate change and the understanding of its causes grow, governments around the world strive to tackle its negative consequences both individually and collaboratively. In Hong Kong, a Steering Committee on Climate Change (“Steering Committee”) was formed by the HKSAR Government (“the Government”) in April 2016 to sustain and enhance the efforts in combating climate change. This Committee aims to formulate the post-2020 climate change work plan including carbon reduction targets by the end of this year.

1.1.3. On 12 July 2016, the Steering Committee organised a Climate Change Stakeholder Engagement Forum to exchange views with hundreds of stakeholders from different sectors. The public was then invited to provide views to the Bureau on how Hong Kong should cope with climate change.

1.1.4. Civic Exchange is delighted to see the cross-bureau nature of the Steering Committee together with the higher level of visibility and attention given to the issue by the senior leaders of the Government, especially comparing to the last consultation on “Hong Kong’s Climate Change Strategy and Action Agenda” back in late 2010. We strongly support the Government to roll out long-term action plan for post-2020 to cope with threats and consequences brought by the remarkably changing climate. In light of the Paris Agreement, the best timing for the Hong Kong Government to adopt a more proactive and aggressive approach to climate

change is NOW.

2. GENERAL COMMENTS

2.1. The Paris Agreement

2.1.1. Despite its limitations, the Paris Agreement at the 21st session of the Conference of the Parties ("COP21") to the United Nations Framework Convention on Climate Change ("UNFCCC") was a milestone achievement and one of the most important accords that the world has seen to combat climate change. The Agreement requires every Party to commit to an Intended Nationally Determined Contributions ("INDCs") by specifying its long-term emission reduction target and corresponding climate strategies, according to the Parties' ambition and capabilities. As at 4 April 2016, 161 INDCs were submitted by 189 UNFCCC Parties with the common goal of limiting the increase in global average temperature to below 2°C above pre-industrial levels, with the attempt to limit it to 1.5°C.

2.1.2. While Hong Kong is not an individual Party to the UNFCCC making the city not subject to the INDC commitment, the UNFCCC was extended to Hong Kong in 2003 under the decision of the Government of the People's Republic of China. As a high-income global city with a generally high level of education, financial resources, and civic consciousness, Hong Kong has a responsibility to its people, its country and the world to come up with a substantive and meaningful contribution to the battle against climate change. The Government cannot afford to delay any further in its responsibility to articulate a clear vision and roadmap, in order to deal with climate change in the long run. Civic Exchange urges the Government to come up with a plan which contains comprehensive policies to be adopted expeditiously.

2.2. Hong Kong's Pledge to Climate Change Mitigation

2.2.1. In the recent Stakeholder Engagement Forum, the Secretary for the Environment reiterated the local pledges to climate change mitigation announced in the previous "Hong Kong's Climate Change Strategy and Action Agenda" consultation document. The Environment Bureau ("ENB") aims 1) to reduce carbon intensity by 50-60% by 2020 compared to 2005 level; and 2) to reduce per capita carbon dioxide equivalent emission from the current 6.2 tonnes to 5 tonnes by 2020. The Government stated it is confident that the above CO2 emission per capita target should be achievable as a result of the increase in proportion of natural gas to 50% of the fuel mix for electricity generation.

2.2.2. Civic Exchange understands that carbon intensity was initially adopted as a metric with a view to align Hong Kong with the national target of China. While China is a developing country and its fast economic growth model made it difficult to use carbon reduction as a climate change target, Hong Kong is a developed economy and should adopt, in addition to the carbon intensity reduction target, an absolute carbon reduction target which is the norm

among developed countries and regions.

3. MITIGATION MEASURES

3.1. Hong Kong's Greenhouse Gas Emissions

3.1.1. According to the latest Greenhouse Gas ("GHG") Inventory for 2013, electricity generation, transport and waste are the 3 sectors with the highest GHG emissions in Hong Kong, comprising 68.3%, 16.9% and 5.7% of the total GHG emission in 2013 respectively. To minimise GHG emissions from the abovementioned key sectors, the Government should put its emphasis on the following mitigation measures strategically.

3.2. Fuel Mix

3.2.1. Electricity generation was the largest single source of GHG emission in Hong Kong in 2013, accounting for over 68% of the total GHG emission.

3.2.2. Civic Exchange strongly urges the Government to put forward a long-term plan to phase out coal in the fuel mix in the upcoming work plan. Phasing out coal can contribute a significant portion of carbon reduction to our city. It is an essential step for Hong Kong to approach carbon neutrality by the second half of this century, a target in the Paris Agreement.

3.2.3. In general, Civic Exchange supports the idea of replacing coal by natural gas, which is considered to be a cleaner source of energy compared to coal. Given the availability of the fuel in the foreseeable decades, natural gas could be regarded as an expedient upgrade from coal for Hong Kong in the near to medium term. The Government should have a clear plan to adopt natural gas in place of coal and state a clear timeline for implementation. At the same time, the Government must consider what policies, regulations and infrastructure are required to support this shift and be clear on the cost implications to the public. As measures are made to expand natural gas supply infrastructure, impact on electricity tariffs paid by consumers (especially the light users) should be minimized and partly absorbed by the utilities to ensure affordability to users. Furthermore, if natural gas were to play a bigger role in Hong Kong's fuel mix, diversity of supply is necessary. Hong Kong is unique in that its current source of natural gas supply is singular and highly concentrated which brings with it risks. In any energy policy, diversification of choice and supply is a must.

3.2.4. In the previous consultation on "Hong Kong's Climate Change Strategy and Action Agenda" in 2010, the Government proposed to utilise nuclear power as the dominant source to satisfy 50% of the fuel mix by 2020. This proposal was later dismissed after the Fukushima nuclear accident in 2011. Civic Exchange recognises that the public is more concerned with safety of nuclear plants after the accident. However one should also note that China has an aggressive plan to develop nuclear energy as a source of power supply in the country

including the southern region near Hong Kong. Without a higher percentage of nuclear power and until renewable energy application can become truly widespread in Hong Kong, it is very difficult for Hong Kong to achieve carbon neutrality. We therefore urge the Government to adopt a technology-neutral approach to examine the benefits, costs and risks of leveraging the increased nuclear power generation capability across the border as information about the standard, safety, cost, and reliability of such plants become available. Nuclear energy is undoubtedly a controversial energy source, but that alone is not a good reason to shun it without proper due diligence, given the fact that it has been a clean and reliable energy supply to Hong Kong since 1994. Civic Exchange understands there are valid concerns about the safety, reliability and ethics that must be addressed before going forward. To address these concerns, information sharing by and transparency from the authorities are an absolute must. Nuclear literacy and public engagement are essential to facilitate rational discussion and thoughtful deliberation among the public. Ultimately the decision of going more nuclear or not should be made collectively by the policymakers and the people of Hong Kong in an informed, unhurried manner.

3.2.5. Civic Exchange expects renewable energy, through technological breakthrough to enhance its applicability and efficiency for Hong Kong's use, could make it a more mainstream choice of energy in the longer run. China has been moving at a fast pace with its renewables, expecting to contribute to 15% of the primary energy production by 2020. Estimation from German Advisory Council on Global Change shows that renewable energy sources have the potential to provide 3,078 times of the current global energy needs. A recent research by the Hong Kong Polytechnic University further substantiates the idea that the projected energy yield from all potential rooftop solar PV systems can satisfy 14.2% of local consumption in 2011. All these research illustrate the latent capacity of renewable energy and how it is going to change the future global energy supply.

3.2.6. Civic Exchange hopes the Government will include a more aggressive but realistic target for renewable energy in the upcoming work plan, with the provision of concrete measures (such as feed-in tariff, net-metering and RE certificate) to promote wider adoption of renewable energy among power companies and the public. By taking the opportunity of formulating the post-2018 Scheme of Control Agreement, the Government could introduce both grid connection framework and tariff setting mechanism to encourage more small-scale distributed generation in Hong Kong.

3.3. Transportation

3.3.1. Transportation contributed 16.9% of the total GHG emission in 2013, of which 88% came from vehicles, while marine transport and railway accounted for the remaining 12%.

3.3.2. Civic Exchange acknowledges the Government's consolidation and implementation of

the measures recommended under “A Clean Air Plan for Hong Kong”. Progress on air quality has been made since then, especially with the elimination of the polluting diesel commercial vehicles on road. Going forward, the Government should further beef up its effort in the following two areas: first, the Government should come up with a clear plan towards zero emission vehicles, especially for buses; second, with little progress made over the past 5-10 years on non-tailpipes road demand management tools, Hong Kong is now behind many international cities in this regard and it is necessary to catch up. Examples to consider include adopting smart sensors and camera to manage traffic flows and to ticket illegally parked vehicles.

3.3.3. In Hong Kong, railway has been serving as the backbone of passenger transport system as laid down by the Third Comprehensive Transport Studies (“CTS-3”) in 1999 and the Railway Development Strategy 2000. Hong Kong has one of the highest public transport utilisation rates in the world, with almost 90% of all commuting trips in Hong Kong made by public transport services. The latest Railway Development Strategy 2014 (“RDS-2014”) provides a blueprint for railway development up to 2031. This strategy would increase the coverage of Hong Kong railway network to 75% of homes and 85% of work places. Railway plays a significant role in enhancing road use efficiency, mitigating climate change and curbing GHG emission from the transportation sector. Civic Exchange supports the continued expansion of mass transit rail system as the main form of transportation in the city. Connectivity of the rail system to the first and last mile through walking or cycling should be further enhanced.

3.3.4. Civic Exchange would like to ask the Government to pay attention to the persistent growth in vehicles over the past few years. The total number of licensed vehicles exceeded 737,000 by June this year, which represents a 16% growth in vehicle population compared to the figure in 2011, while private cars accounted for 95% of that increase. The growing private car ownership worsens not only the problem of congestion and unsustainable road use; it also has deleterious impact on the performance of other road-based public transport and GHG emission as a whole. Civic Exchange suggests that the Government regulate new car registration, control vehicle numbers on road, promote car pooling, and tighten enforcement of traffic-related penalties in order to control the number of vehicles on the road and the GHG emission from transportation.

3.3.5. As an alternative to motorised transport, walking and cycling have no carbon emission and should be promoted extensively to the public. Insufficient facilities, unfavourable road design and lack of overall planning hinder citizens to walk or cycle to their destinations. The Government should break new ground in its planning mentality, for example by road pedestrianisation, to embrace the people-oriented and pedestrian-/bicycle-friendly elements

whenever town planning takes place. The Singaporean Government has come up with a new campaign called WCR ("Walk Cycle Ride") in early 2016. Its Prime Minister offered the campaign political support which allows the Walk Cycle Ride concept to be cascaded down to various levels of implementation both within the government and in society. Hong Kong's political leaders must demonstrate equally strong resolve in putting the people-first concept in transportation and urban planning on the top of the agenda of policy makers and technical experts.

3.3.6. Civic Exchange will be releasing a series of research reports and staging an conference in October called Walk21 Hong Kong where government officials, experts and academics from all over the world will congregate in Hong Kong with our policymakers and local stakeholders to share best practice regarding how to promote walking and walkability. We hope the Government will take concrete actions to support walkability including, among other things, introducing a Walkability Commissioner.

3.3.7. Marine transport contributed to about 10% of the energy end-use in the transport sector in 2013, which equals to less than 2% of the total GHG emission in Hong Kong. These figures reflect energy used and GHG emissions from only local shipping in Hong Kong. Civic Exchange believes that Hong Kong's efforts to reduce carbon emission from the marine transport sector should be extended from local vessels to ocean-going vessels. As a major international seaport, Hong Kong has a significant role to play in driving and facilitating GHG emission reduction from the international shipping sector.

3.3.8. Since 1 April 2015, the sulphur content of marine light diesel supplied in Hong Kong has been capped at 0.05%. In July 2015, for at-berth ocean-going vessels, the Government introduced new regulation that requires the use of marine fuel with 0.5% or lower sulphur content. Civic Exchange recommends the Government to implement a tighter 0.1% sulphur fuel rule by 2019 and to co-ordinate with mainland authorities for Hong Kong to become part of the Pearl River Delta domestic emission control area in 2019. These two measures would reduce GHG emissions, as well as air pollutant emissions, from the shipping sector.

3.3.9. Civic Exchange urges the Government to review the feasibility of all carbon-reducing technologies in marine sectors and put them in use when they are considered cost-effective and technologically mature. For example in 2015, the Environmental Protection Department ("EPD") advised the Panel on Environmental Affairs in the Legislative Council against on-shore power supply ("OPS") at the Kai Tak Cruise Terminal based on the assumption that OPS would be underutilised after installation. Civic Exchange argues that the Government should re-consider the installation of OPS in terminal facilities that service not only ocean-going ships, but also river and local vessels, as a means to reduce GHG emissions.

4. ADAPTATION TO CLIMATE CHANGE – BEST PRACTICES LEARNT FROM SINGAPORE

4.1. Adaptation as a strategy to combat climate change

4.1.1. The present day climate change science enables governments to anticipate the extent, though not necessarily the exact timing, of its adverse impacts. This makes it possible and necessary for governments to formulate corresponding measures in advance. Adaptation is an important strategy to absorb adverse impact, maintain functions of infrastructures and minimise loss of life and property when climate change incidents happen. The Government has identified 8 sectors in Hong Kong which are more vulnerable to climate change impacts, namely 1) biodiversity; 2) built environment and physical infrastructure; 3) business and industry; 4) energy supply; 5) financial services; 6) food resources; 7) human health; and 8) water resources.

4.1.2. With reference to the experience of Singapore in climate change adaptation, Civic Exchange would like to comment on the following areas for the Government to come up with the post-2020 climate change adaptation work plan.

4.2. Built environment and the rising temperature

4.2.1. It is well-proven that the highly-dense urban morphology traps heat in the inner city and increase energy consumption for air-conditioning indirectly. Civic Exchange acknowledges efforts from the Government to regulate the Urban Heat Island effect through planning guidelines and greening measures in New Development Areas ("NDAs"). To further improve the ventilation in the built-up area, the Planning Department should play an essential watchdog role in ensuring all redevelopment projects take into account the public interest of alleviating temperature rise at the heart of the city.

4.2.2. Employees working outdoors, for example construction workers, are the most susceptible group to heat stress. To avoid heat stress at workplace, employers are recommended to study the health impact on their workers and come up with flexible arrangement through consultation with medical professionals and the employees when HKO's Very Hot Weather Warning is in force. The Government should consider introducing new regulations to standardize the best practice to protect outdoors workers who bear the brunt of climate change.

4.3. Coastal protection and flood prevention

4.3.1. With the expectation of rising sea level in this century, the low-lying areas in Hong Kong will be prone to flooding when extreme rainfall events arrive. As a coastal city, the Government should focus on strengthening the capacity of both flood discharge and coastal defence. Past history of storm surges showed that the sea level could reach 3.5 metres above the Chart Datum. Areas like Shatin, wetland in the northwest New Territories and both sides along the Victoria Harbour with elevation less than 5 metres may be partly flooded when storm

surges arrive.

4.3.2. In Singapore, there are many planning initiatives and coastal defence infrastructures being utilised to adapt to the rising sea level. For example, the minimum land reclamation level was raised from 3 metres to 4 metres above the sea level since 2011. Also, Singapore's entire coastline now consists of protected walls, stone embankments or natural barriers like beaches and mangroves. Comparatively speaking, Hong Kong is still at the stage of studying the impacts of sea level rise and its implications on coastal design. Civic Exchange understands that research needs to be conducted in disciplines such as coastal engineering and hydrodynamics before coming up with any appropriate protective measures. We strongly urge the Government to seize the time to react to potential risk of coastal inundation before extreme weather leads to severe damage and human loss.

4.3.3. In terms of urban flooding, paved roads reduce the duration for rainwater to infiltrate to the ground and thus increase the speed of surface runoff, resulting in a higher risk of flooding in the city. In Hong Kong, the Drainage Services Department is taking the role of drainage improvement with reference to the Drainage Master Plan Review Studies. The ongoing studies cover the entire Hong Kong in an overview of the drainage system from the district perspective. Civic Exchange supports the comprehensive approach taken and urges the Government to complete the studies of the remaining 9 districts as soon as possible and to share the results with the public.

4.3.4. To address the flooding risk at all parts of the drainage system, the Singaporean Government adopts an integrated "Source-Pathway-Receptor" approach. Under this approach, developers are required to build green roofs, rain gardens and detention ponds to slow down the surface runoff from source; drains are redesigned and constructed so as to cater to more intense extreme rainfall events; receptors like buildings platforms levels are raised and more flood barriers are installed accordingly. The Government in Hong Kong should consider flooding as a chain of events that affect different parts of the city at the same time. Any bottleneck at sources, pathways or receptors may lead to flooding. Civic Exchange urges the Government to adopt a comprehensive approach in flood management, including zoning and planning, to enhance our overall capacities to combat flooding.

4.4. Water security

4.4.1. Hong Kong has limited fresh water supply, about 59% of which was supplied by the Dongjiang in Guangdong Province, 22% from sea for the purpose of flushing, while the remaining 19% was collected from our local yield from reservoirs and catchments. Currently the water demand is not expected to be a problem up to 2030 with the introduction of 3 additional water sources, namely desalination (7% of the water supply in 2030), reclaimed water (1.5% of the water supply in 2030), and grey water recycling and rain water harvesting

(0.5% of the water supply in 2030). Nonetheless Hong Kong needs a more comprehensive and long term water strategy that addresses issues including water security, water safety, water economics, water conservation and water risks under extreme weather such as persistent drought. The supply of water from Dongjiang cannot be taken for granted as climate change is going to pose a severe water shortage challenge in China and water allocation would increasingly be a contentious issue.

4.4.2. Singapore has a similar but more aggressive water diversification plan. Apart from the local catchment water and imported water, the Singaporean Government expects that 70% and 80% of the water demand will be satisfied by NEWater and desalinated water by 2030 and 2060 respectively. These water sources are not dependent on rainfall and can be produced whenever demand exists. To achieve such challenging targets, the Singaporean Government has been investing heavily in the research and development of desalination technologies. They are developing the techniques of electrochemical desalting as a means of seawater desalination, which is a more energy efficient alternative to the traditional membrane-based desalination.

4.5. Contingency planning and education

4.5.1. Climate change adaptation does not only require brick and mortar infrastructure. It also requires equipping individuals and societies with the resilience to cope with and recover from climate events. It is the fundamental responsibility for government to carry out pre-disaster education and execute emergency plan when extreme weather condition takes place.

4.5.2. The Government has established an Emergency Support Unit under the Security Bureau to be in charge of natural hazards contingency planning. The Unit has laid out detailed plans to instantly mobilise all the appropriate resources within the Government under extreme climate events.

4.5.3. To smoothen the implementation of these contingency plans, citizens' and private sector's participation and cooperation are essential. Education on climate change and its potential threats should not be limited to schools but also at the work level. The Government should make more efforts in promoting the climate change message publicly and enhancing the community's preparedness to deal with climate change-related risks. The private sector needs the Government's leadership and support to come up with necessary adaptation measures, especially the SMEs who may not have the knowledge and resources to do it alone.

5. THE WAY FORWARD

5.1.1. Civic Exchange welcomes the Government's consultation on the post-2020 climate change strategies. It is encouraging to observe that the Government steps up its attention to

the climate change challenge and has displayed early stage resolve to coordinate efforts across different bureaus. We sincerely hope that early stage resolve will turn into meaningful commitment and demonstrable action well-coordinated across all departments within the Government. Hong Kong's future hangs in the balance. Our younger generation, brought up with heightened awareness about climate change, expects and demands a more proactive government that is willing to take climate change by its horn. Civic Exchange believes that a comprehensive work plan is long overdue and must be made NOW. We hope the Government could incorporate the suggestions in this submission into the plan in order to transform Hong Kong into a low carbon city where our future generation can thrive.

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