

CLP Half-day Workshop on Future Energy Systems: Challenges and Opportunities

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Hong Kong's Initiatives in Achieving Net Carbon Zero

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1. Introduction

Good afternoon Professor Poon, Professor Booth, Professor Lo, ladies and gentlemen, it's my great pleasure to join the CLP Workshop today. I'd like to thank CLP for giving me this opportunity to share the initiatives of Hong Kong to achieve net carbon zero.

According to the Carbon Dioxide Emission 2022 Report issued by the International Energy Agency (IEA) in March this year, the global energy-related carbon emissions continued to grow by nearly 1% in last year, reaching a new high of over 36.8 giga tonnes. And the AR6 synthesis report issued by the United Nation Intergovernmental Panel on Climate Change (IPCC) in March this year reiterated that, human activities have very clearly caused global warming with a temperature rise of about 1.1°C and global greenhouse gas emissions have continued to increase. As mentioned by the UN Secretary-General Antonio Guterres in the press when launching this report, the climate time-bomb is ticking and humanity is on thin ice, and that ice is melting fast. Every country must be part of the solution. Demanding others move first only ensures humanity comes last. Our country, Mainland China, is committed to achieving peak carbon dioxide emissions before 2030 and carbon neutrality before 2060. As an international city of China, Hong Kong has been an active participant to combat climate change.

In Hong Kong, electricity generation is the largest source of carbon emissions, followed by transport and waste. Our local fuel mix for electricity generation mainly relies on fossil fuels. Therefore we can remove most of the carbon emissions if we increase the use of zero-carbon energy for electricity generation, and gradually phase out fossil fuel vehicles by electrifying the transport sector. Buildings account for about 90% of the electricity

consumption. As such, improving building energy efficiency can lower the cost of switching to zero-carbon energy. For carbon emissions from waste, they are mainly greenhouse gases generated by the decomposition of municipal waste in landfills.

Hong Kong reached our peak carbon emissions in 2014. Leading Hong Kong towards the goal of carbon neutrality, the Hong Kong Government published the Climate Action Plan 2050 two years ago. We pledged to achieve carbon neutrality before 2050, including an interim target of reducing carbon emissions by 50% before 2035 as compared to 2005 levels. The action plan outlines the 4 major de-carbonization strategies, namely Net-zero Electricity Generation, Energy Saving and Green Buildings, Green Transport and Waste Reduction. These are not empty words, but are what we are actually working hard on. Here I'm going to show you some solid examples on how the Government is leading the society towards carbon neutrality before 2050.

2. Transition to Carbon Zero

As mentioned before, electricity generation is the largest source of carbon emissions in Hong Kong. As contrasted to coal firing power generation, natural gas for power generation produces only half of the carbon emission rate. Raising the ratio of gas-fired generation is an important measure in the clean energy transition journey. In supporting the Government-lead policy to increase the use of natural gas, the two power companies, CLP Power and Hongkong Electric, have continued to improve the emission performance by constructing new gas-fired generation units and phase out some coal-fired capacity by phases. For example, the new gas-fired generation unit D1 at Black Point Power Station commissioned in 2020 has substantially increased the ratio of natural gas in CLP Power's fuel mix from below 30% up to about 50%. Another new gas-fired generation unit D2 is expected to go into operation soon. The Hongkong Electric has also commissioned two new gas-fired generation units at Lamma Power Station in 2020 and 2022, and another new one is expected to be commissioned in this year. By 2035, Hong Kong will cease using coal for daily electricity generation.

To attain reliability and diversity of natural gas supply for power generation, many years ago the Government had planned to work with the two power companies on infrastructure development to handle much larger quantities of natural gas. With joint efforts of the Government and the two power companies, an offshore LNG terminal using Floating Storage and Regasification Unit (FSRU) technology will be put into operation later this

year, and will be the world's largest FSRU vessel. The two power companies will then be able to purchase LNG from the international market directly, thus strengthening the bargaining power in procurement and help relieve the pressure of tariff increase.

3. Zero Carbon Energy

Since 1994, nearly 30 years ago, Hong Kong has been importing nuclear electricity from the Mainland China, which currently accounts for about a quarter of Hong Kong's fuel mix for electricity generation. To meet the future needs on zero-carbon energy, the Hong Kong Government is actively discussing with the National Energy Administration to further increase the supply of zero-carbon energy to Hong Kong, including nuclear electricity, and plan ahead for the construction of new infrastructure for receiving electricity transmitted to Hong Kong from other regions, such as the electricity facilities being planned to be built on the land reserved in Tseung Kwan O to receive zero-carbon electricity.

The Government has also committed to increase the share of renewable energy in the fuel mix for electricity generation from less than 1% at present to 7.5 to 10% by 2035. This will include the application of wind energy, solar energy and introduction of more waste-to-energy facilities, which I will share more details in later parts. To achieve the renewable energy target, the Government has commissioned a wide range of renewable energy projects at government buildings and facilities. The Government also creates favorable conditions in encouraging renewable energy facilities in private premises. Supported by the two power companies, the Feed-in Tariff Scheme, together with a series of supportive and concessionary measures, have already attracted over 20,000 applications of the Scheme mainly to install PV panels, of which the electricity generated is estimated to meet the annual demand of about 90,000 households. With the Government's facilitation, we are looking forward to seeing more renewable energy facilities to be commissioned in near future.

4. Energy Saving and Green Buildings

To lower the cost of adapting new zero-carbon energy, the Hong Kong Government has also been working on energy saving and green buildings development. A clear target has been set by the Government, that is to reduce the electricity consumption of commercial buildings by 30 to 40%, and that of residential buildings by 20 to 30% by

2050, using the operational conditions of 2015 as basis. To achieve these targets, the Government would adopt a multi-pronged approach for energy conservation. One of them is the legislative approach to continuously tighten the energy efficiency standard of buildings and domestic appliances.

Apart from the legislative approach, the Government also take the lead in implementing green infrastructure such as the district cooling systems. The first district cooling system in Hong Kong has started operation in 2013 at Kai Tak Development Area. More district cooling systems are under construction and planning, including the third system at Kai Tak, new systems at Tung Chung New Town Extension, Kwu Tung North, Hung Shui Kiu and the Northern Metropolis, as well as Artificial Island at Central Water.

5. Green Transport

Transport is the second largest source of carbon emissions in Hong Kong. The Government has set the target of zero carbon emission from vehicles and transport sector by 2050. The measures outlined in the Roadmap on Popularisation of Electric Vehicles announced two years ago cover various aspects, including ceasing the new registration of fuel-propelled private cars in 2035 or earlier, as well as setting targets for providing charging facilities for electric vehicles. Use of hydrogen as fuel is also an option of future energy for green transport, and I will share more to you about the recent developments in Hong Kong later.

6. Waste-to-Energy

On waste reduction, the Government would strive to develop more waste-to-energy facilities. Commissioned in 2018, the Organic Resources Recovery Centre Phase 1 (O.Park 1) at Lantau Island adopts anaerobic digestion technology to convert food waste to biogas. The facility can handle 200 tonnes of food waste daily as well as electrifying 3,000 households. Looking ahead, the O.Park 2 in the North District is under construction and target to commission next year, capable to further handle 300 tonnes of food waste daily and electrifying 5,000 households.

The Government is also building the integrated waste management facility phase 1, namely I.Park 1 on an artificial island in the open sea off Shek Kwu Chau. The facility was target to commission in 2025. It is the first waste-to-energy facility for treating municipal solid waste in Hong Kong. When the facility comes into full operation, it will

be capable of treating 3,000 tonnes waste daily and electrifying 100,000 households. The Government has also announced the planning for I.Park 2 and I.Park 3, which are expected to put into operation in around 2030 and 2035 respectively.

7. Hydrogen as “New Zero-carbon” Energy

Use of hydrogen as fuel has become a global interest in the shift towards a clean energy era. According to the Hydrogen Council’s insights report published in last month, there is more than 1,000 large-scale hydrogen project proposals announced globally. Among them about 80% aim to be fully or partially commissioned by 2030. The announced annual production volume of renewable hydrogen by 2030 would reaches 38 mega tonnes, nevertheless, is only about half what is needed to be on track to a net-zero scenario.

In March 2022, China laid out the medium and long term development plan of hydrogen energy. According to the plan, China would produce 100 to 200 kilo tonnes of renewable-based hydrogen annually and will bring 50,000 hydrogen fuel-cell vehicles on the road by 2025, which is estimated to reduce 1 to 2 million tonnes carbon emission per year.

Currently, there is no comprehensive legislative framework covers the use of hydrogen as fuel in other regions. To pave way for the future, the Hong Kong Government has set up the Inter-departmental Working Group on Using Hydrogen as Fuel last year to keep pace with the hydrogen development. The first key task of the Working Group is the trial of hydrogen vehicles and facilities. The first batch of three trial projects, including a hydrogen refuelling facility at bus depot, hydrogen fuel cell double-deck bus, and hydrogen extraction facility in town gas plant, are in progress and positive results are expected later this year. Moreover, just in the last week, the Working Group has given agreements-in-principle to another three trial projects. They are hydrogen refuelling station at Au Tau, hydrogen fuelled light rail vehicle in Tuen Mun and delivery of hydrogen to the light rail vehicle by tube trailer, which will be commenced in next year. Preparations are also underway to test hydrogen fuel cell heavy vehicles for street cleansing and the trial is expected to commence in next year.

The Inter-departmental Working Group is liaising with stakeholders to examine the feasibility of providing hydrogen refueling facilities at different locations. This includes

transforming existing petrol filling stations to hydrogen refilling stations, or allowing the provision of different vehicle fuels in one station. The Working Group will also formulate operational safety framework including the amendment of the current Gas Safety Ordinance to cover the use of hydrogen as fuel and aim to complete formulating the long-term strategies for the application of hydrogen energy in road transport by 2025 as highlighted in the Chief Executive's Policy Address last year. The Government is determined to facilitate the trial use of hydrogen as fuel in Hong Kong with various supportive policy, strategies, infrastructure facilities and legislative framework.

8. Closing

Achieving carbon neutrality before 2050 is challenging. Among the various decarbonisation strategies, increasing the use of zero-carbon energy for electricity generation is one of the key opportunities on future energy systems. It can thoroughly address two-thirds of Hong Kong's carbon emissions and also provide zero-carbon energy for the electrified transport.

With the challenges ahead which I shared to you before, we also see opportunities along the carbon neutrality journey, such as including the co-development of green finance, green innovation and technologies, and capacity building of talents dedicated for combating climate change. For our planet please work together hand-in-hand to achieve the target of carbon neutrality in Hong Kong by 2050.

Thank you.