33/F, Revenue Tower, 5 Gloucester Road, Wan Chai, Hong Kong
香港灣仔告士打道5號稅務大樓33樓

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The Roadmap on the Popularisation of Electric Vehicles

PURPOSE

This paper briefs Members on the Government's strategy for promoting the use of electric vehicles (EVs) and the way forward of the formulation of the Roadmap on the Popularisation of Electric Vehicles ("EV Roadmap").

THE EV DEVELOPMENT IN HONG KONG AND RELATED STRATEGIES

2. Vehicular emission is one of the key air pollution sources. As EVs have no tailpipe emission and low carbon emission, the Government has been putting a lot of efforts to promote the use of EVs. The main source of roadside air pollution in Hong Kong comes from commercial vehicles (CVs), including public transport, lorries, etc. These types of vehicles account for 95% of the vehicular emissions of respirable suspended particulates and nitrogen oxides in Hong Kong. Hence, to significantly improve roadside air quality, the Government's ultimate goal is to electrify different types of vehicles, in particular CVs. While the use of the electric private cars (e-PCs) has become more and more popular in recent years due to rapid technological advancement, the use of electric commercial vehicles (e-CVs) is still very limited, mainly because of the slower development and less advanced battery technologies for heavier vehicles. In view of the above, we have formulated different policies and measures to promote further use of e-PCs and e-CVs respectively.

3. The policy to promote the use of EVs should tally with technological development, market supply and competitiveness of EVs, as well as social acceptance. To advance with the times, the EV policies have been adjusted and optimised in accordance with the factors as set out in the following three major stages.

4. The first stage was from mid-1990s to around late 2000s. At that period of time, EVs were still in early stage of research and development and the market supplied mainly models for trials with basically no mass production. In view of the above, the Government's then policy on EV was forward looking, which aimed to

encourage the development of EV technologies. To this end, the Government has waived the first registration tax (FRT) for EVs since April 1994 and extended such arrangement for multiple times in order to lower the cost of trying out EVs and promote the technological development of EVs.

5. In late 2000s, the development of EVs entered into the second stage with the supply of mass production of e-PCs in the market. However, the driving range and performance of e-PCs could not match that of the conventional petrol private cars (PCs) due to the immaturity of the overall EV technology. Many users were only able to make limited use of the e-PCs and e-PCs could hardly replace conventional petrol PCs. Under the circumstances, the Government continued to promote the technological development of EVs by waiving FRT on EVs. On the other hand, the Government noticed that the technology of e-PCs had started to develop rapidly and would very likely become more mature in the future. Since charging network supporting wide adoption of EVs takes time to construct and it would be extraordinarily difficult to add charging facilities after the completion of the building construction, the Government must plan ahead. In this connection, the Government set up a Steering Committee on the Promotion of EVs, led by the Financial Secretary, in 2009 to coordinate the strategies for promoting EVs and study the feasibility of installing charging facilities in the Government multi-storey car parks. In 2011, the Government amended the *Hong Kong Planning Standards and Guidelines*, updated the guidelines on the design of new government buildings and offered gross floor area (GFA) concessions for car parks in new developments in order to require and encourage the provision of such facilities in preparation of the extensive use of EVs in the future. The Government also set up the New Energy Transport Fund (previously named Pilot Green Transport Fund) in March 2011 to encourage the public transport sector to try out green innovative transport technologies, and step up its effort to promote EV's technological development, in particular that on e-CVs.

6. Starting from around 2014, the development of EVs has entered into the third stage. E-PCs that are more technically mature with longer driving range were gradually available in the market. Their prices are also more and more comparable to conventional PCs. As the number of e-PC models is on the rise and EVs begin to receive wider market acceptance, the pace of growth of EVs has noticeably picked up. That said, popularisation of e-PCs requires mass supply of affordable models. The policy of full exemption of FRT, however, tilted in favour of high-priced e-PCs and undermined the popularisation of a wide range of EV models. In fact, many places across the globe are reducing or withdrawing their subsidies on e-PCs in order to facilitate the introduction of more affordable e-PCs by vehicle manufacturers. On the other hand, the number of PCs in Hong Kong increases continuously. In view of this, the Government introduced a revised FRT concession with an upper limit and the 'One-for-One Replacement' Scheme to ensure the policy will not be inclined to high-priced e-PCs and could contain the increase in PCs after reviewing the arrangement of FRT for EVs in 2017 and 2018.

7. With our continuous effort, Hong Kong has become one of the leading cities in Asia in the promotion of the use of EVs. 6.3% of first registered PCs in Hong Kong were electric in 2019, higher than 3.9% of the Mainland China and other Asian economies such as South Korea (1.9%), Japan (0.5%) and Thailand (0.1%). The number of e-PCs in Hong Kong has grown from 70 in 2010 to more than 16 000 at the end of August 2020, representing about 2.5% of the total number of PCs and about 1.8% of the total number of vehicles in Hong Kong respectively.

THE EV ROADMAP

8. The Financial Secretary has announced in the 2020-21 Budget that the Government would formulate Hong Kong's first EV Roadmap. The roadmap aims to set out the vision of the Government in the adoption of EVs in Hong Kong, and the strategies to achieve the vision. The current situation and the Government's considerations in the formulation of the EV Roadmap are elaborated below.

Promoting the Use of EVs

9. To promote the use of EVs instead of conventional fuel-propelled vehicles, the Government has been waiving in full the FRT for e-CVs. E-PCs currently enjoy a FRT concession up to $97,500. To strike a balance between promoting wider use of e-PCs and not increasing the overall number of PCs, the Government also introduced the 'One-for-One Replacement' Scheme. Under the scheme, purchasers of e-PCs who scrap and de-register their eligible old PCs and then first register a new e-PC can enjoy a higher FRT concession of up to $250,000.

10. From the introduction of the 'One-for-One Replacement' Scheme in February 2018 to the end of August 2020, 4 906 applications were approved, of which 4 759 have completed first registration. Near 90% of the first registered e-PCs have benefitted from the scheme, and this percentage further increased to more than 93% in the past six months (i.e. from March to August 2020). In view of the successful implementation of the FRT concession arrangements, the Government has announced in August 2020 to extend their deadline for three years to 31 March 2024.

11. Besides, enterprises which procure EVs are allowed full profits tax deduction for the capital expenditures on the vehicles in the first year of procurement. Annual vehicle licence fees for e-PCs are also significantly lower than that for conventional PCs.

12. In the EV Roadmap, we will further explore setting up short, medium and long term targets on EV adoption and further incentives to promote the wider use of EVs, taking into account global development, overseas experience, and stakeholders' views. We will examine the possibility to establish a timeline to ban the sale of conventional internal combustion engine cars to show the public the Government's staunch determination to push ahead the EV transition and motivate vehicle owners to switch to EVs at the soonest possible time.

Adoption of e-CVs

13. The promotion of wider adoption of e-CVs has met with enormous challenges. First, the e-CV models available nowadays generally do not have the battery capacity, range or charging speed to cope with the unique and demanding operational environment that is featured by long hours of operation, high daily mileage and high passenger loading. Second, the price of most e-CVs remains high and makes them not commercially viable. For example, the price of an electric double-decker bus is more than double of that of a diesel counterpart. Third, as some types of CVs like public light buses (PLBs) are very unique to the local market due to their size and passenger capacity, very few models of the electric version of such vehicles are available in the market. While it may be premature to electrify some types of the public transport or medium to heavy goods vehicles at the moment, the Government is keeping abreast of the global and local development of e-CV technologies with a view to devising suitable trial scheme to test the technical and commercial viability of certain types of e-CVs for use in the local environment and to pave the way for the eventual adoption in Hong Kong, as elaborated in the ensuing paragraphs.

Electric buses

14. The Government has fully subsidised the franchised bus companies (FBCs) to purchase 36 single-deck electric buses for conducting a two-year trial to test out their operational performance, reliability and economic feasibility in local conditions. At present, 33 electric buses have commenced operation. The remaining three electric buses are expected to commence operation in late 2020 or early 2021. The Government will consider the way forward to encourage FBCs in using more electric buses, taking into account the affordability of the FBCs and passengers.

Electric public light buses (e-PLBs)

15. The Government has earmarked $80 million to launch a pilot scheme for e-PLBs that subsidises about 40 quick charging e-PLBs running on various routes for a trial for 12 months, to test their operations under local environment and compare their performances with the conventional LPG or diesel PLBs. Green PLBs will be the major participants in the pilot scheme as they are running on relatively short routes, requiring a relatively lower driving range and charging power. Since they are running on fixed routes, the daily operation of e-PLBs can be supported by installing quick charging facilities at the PLB termini, public transport interchanges or other designated places where they operate.

Electric taxis

16. Under general operational mode, taxis are being operated daily for more than 20 hours and over 500 km in mileage. The establishment of a quick charging network and swift maintenance support are both required for the promotion of electric taxis in Hong Kong. The Government has commissioned a consultant in

October 2019 to look for suitable sites for setting up quick charging stations in various districts of Hong Kong, and will continue to encourage suppliers to introduce more suitable electric taxi models and provide sufficient maintenance support. We understand that some taxi operators are also looking for electric taxi models that suit the operation needs of the market, in preparation for the trial of electric taxis in the future.

New Energy Transport Fund

17. From its establishment in March 2011 to the end of August 2020, the New Energy Transport Fund has approved 183 trial applications for green innovative transport technologies, including 110 on e-CVs, 65 on hybrid CVs and nine on technologies applicable to conventional buses or ferries, with a total subsidy of about $146 million. The Government has injected an additional $800 million into the Fund in 2020 to encourage further adoption of innovative green transport technologies.

Enhancing EV Charging Infrastructure and Networks

18. A comprehensive charging network is a prerequisite for the wider adoption of EVs in Hong Kong. The most efficient arrangement would be that routine charging of EVs can be carried out at home and/or work places. Public charging network mainly serves to provide top-up charging in the case of occasional needs while on the road.

19. In the light of land scarcity and dense population in Hong Kong, establishing charging network has been proven more challenging than that in other economies. In view of this, a tailor-made strategy to help us improve the situation of insufficient provision of charging facilities is called for.

Charging facilities in private buildings

Concessions on GFA

20. The Government has tightened the GFA concession requirements since April 2011 that only underground car parks in new private buildings provided with EV charging-enabling infrastructure (including provision of sufficient power supply, cabling and conduits for all parking spaces, etc.) at each parking space can be fully exempted from the GFA calculations. The key objective of the policy is to enable owners of parking spaces to install chargers at their parking spaces and arrange for power connection according to their needs without technical constraints.

21. For new developments approved from April 2011 to March 2020, over 80% of private parking spaces, i.e., some 65 000 parking spaces in about 540 car parks, will be provided with EV charging-enabling infrastructure. The Government is examining the requirements for EV charging-enabling infrastructure under the *Technical Guidelines for Electric Vehicle Charging-enabling for Car Parks of New*

Building Developments, with a view to refining the policy, and keeping pace with market developments.

Subsidising installation of charging-enabling infrastructure in car parks of existing private residential buildings

22. The Government is preparing for a $2 billion pilot scheme to subsidise installation of EV charging-enabling infrastructure in car parks of existing private residential buildings, to tie in with the development of EVs in Hong Kong and the world as a whole.

23. Some individual EV owners cannot charge their EVs at home, as owners of parking spaces in existing private residential buildings often find it difficult to reach consensus with owners' corporations on installation works of charging facilities and sharing of the associated costs. The pilot scheme would assist car parks in existing private residential buildings to overcome the technical and financial difficulties often encountered in installation of charging-enabling infrastructure, and enable owners of individual parking spaces to install chargers according to their own needs in future. We plan to launch the pilot scheme by 2020, which will cover roughly 60 000 private parking spaces in about 3 years.

Enhancing public charging network

24. A total of 973 government public chargers are currently provided at government car parks, most of which are medium chargers. The Government continues to install additional medium chargers at the car parks managed by the Transport Department, the Government Property Agency, the Leisure and Cultural Services Department and the Tourism Commission which are open to the public. The total number of government public chargers will increase to about 1 800 by 2022.

25. The Government not only takes the lead in providing and enhancing its public charging facilities at government car parks, but also encourages other organisations, including the MTR Corporation Limited, the Hong Kong Housing Society and the Link REIT, etc., to set up and enhance public charging facilities at their car parks. As at the end of June 2020, the non-government sector is providing 2 152 chargers which are open for public use, making a total of 3 125 chargers open to the public.

Future development

26. To pave the way for electrification of public transport, we will continue to adopt a multi-pronged approach to meet the charging needs. Apart from encouraging installation of charging infrastructure in new and existing buildings, the Government has, as mentioned in paragraph 16 above, commissioned a consultancy study with a view to constructing a territory wide network of quick charging facilities. We are also looking for suitable on-street parking spaces to install charging facilities.

27. Regarding public transport and other CVs, their application of EVs is largely hinged on the battery capacity, charging speed and vehicle price. Since the charging technology for these vehicles are relatively less mature at the moment, the Government will continue to study and review global development and overseas experience, with a view to developing charging facilities that are suitable for local needs and operational mode.

Handling of EV Batteries

28. Waste EV batteries have to be properly handled under the Waste Disposal Ordinance (Cap. 354) and its subsidiary Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C). EV suppliers have currently engaged licensed collectors to collect the waste batteries of their brands' EVs. After proper preliminary treatment (e.g. sorting, discharging and insulating) and packaging, these waste EV batteries are exported to appropriate treatment facilities in Japan, Korea or Belgium for recycling.

29. Although the number of retired EV batteries in Hong Kong remains small at this stage, the Environmental Protection Department (EPD) has embarked on a study on promotion of recycling of EV batteries. Apart from analysing overseas experiences, the EPD has been maintaining close liaison with the trade and EV suppliers to explore solutions that are applicable to local situation and are necessary to enhance environmental protection in the long run.

Training of EV Mechanics

30. As EVs become increasingly popular, the demand for EV maintenance is on a rise. It is essential to prepare Hong Kong with suitable and sufficient expertise to carry out maintenance for EVs by both training new mechanics and equipping existing vehicle mechanics with EV knowledge.

31. The Vocational Training Council (VTC) currently offers a number of in-service training programmes and two full-time programmes related to automobile maintenance, including the Higher Diploma in Automotive Engineering and Diploma of Vocational Education (Automotive Technology). The two full-time programmes are expected to provide more than 280 training places in total in the 2020/21 academic year. The VTC has embedded professional knowledge relevant to EV in the pre-employment programmes relevant to the automobile industry at various levels, such as design, operational modes, safety standards, and maintenance skills, and will suitably update the relevant programme curricula having regard to the development of EV-related technology and industry demands.

32. To tie in with the overall policy of promoting EVs, the Government will strive to secure sufficient supply of qualified professionals and workers to the market. We will continue to collaborate with the VTC and relevant stakeholders regarding the maintenance of EV, with a view to strengthening related training and allowing existing vehicle mechanics to upgrade themselves for the development of EVs.

WAY FORWARD

33. We are actively examining policy objectives and plans to promote the use of EVs and their associated supporting measures for the formulation of the EV Roadmap. The relevant work is tentatively scheduled for completion in the first quarter of 2021.

34. When formulating policies on promoting the use of EVs and implementing different measures, the Government will, as in the past, consult and listen to the views from various stakeholders of the trades and the general public through different channels with a view to refining the proposed policies. The Government will also actively study overseas experience and carefully examine the feasibility of applying such experiences to the local environment of Hong Kong.

Environmental Protection Department
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