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Hong Kong's Roadmap on the Popularisation of Electric Vehicles Views from Business Environment Council Limited 商界環保協會有限公司

Over the last 28 years, Business Environment Council Limited 商界環保協會有限公司 (BEC) has played a leading role in advocating the business case for environmental excellence, given the importance of sustainable development to Hong Kong. Our members are committed to actively engage with the HKSAR Government (the Government) to help develop a supporting policy framework as well as impactful implementation in respect of environmental protection and sustainability.

Views expressed in this submission are those of BEC, in line with BEC's Mission and Vision as well as policy position on relevant issues, but may not necessarily be the same as the views of each individual member. BEC is an independent charitable membership organisation comprising over 200 member companies from Hong Kong's major holding companies to small and medium-sized enterprises.

1 Background

1.1 In the 2020-21 Budget¹, the Financial Secretary announced that the Government will formulate Hong Kong's first roadmap on the popularisation of electric vehicles (EVs). BEC welcomes the Government's plan to develop a clear roadmap with strategies to support and accelerate the adoption of EVs in Hong Kong. To solicit views and expertise from BEC members in order to support the Government's endeavour, a Task Force on Electric Vehicles (EV TF) was set up in June 2020 under the BEC Sustainable Living Environment Advisor Group. One of the main objectives of the EV TF is to prepare a written submission to

¹ <https://www.budget.gov.hk/2020/eng/el.html>

the Government with BEC's recommendations on the Roadmap before the end of 2020.

- 1.2 EVs were first introduced to Hong Kong more than 20 years ago as an alternative to conventional fossil fuel vehicles. With no tailpipe emission, EVs are considered by many as one of the solutions to reduce vehicular emission, improve roadside air quality and protect public health. Besides, with growing urgency in recent years to tackle climate change and to reduce carbon emissions, electrifying the transport sector has become a top priority for many cities and countries, especially those who have committed to carbon neutrality targets by a certain timeline.
- 1.3 Air quality in Hong Kong has improved in the past years. Annual average concentrations of the major air pollutants such as respirable suspended particulates (PM₁₀), fine suspended particulates (PM_{2.5}), sulphur dioxide (SO₂) and nitrogen oxides (NO_x) have dropped relative to the 2010 levels, except for ozone, which is taking an upward trajectory. However, the concentration level of nitrogen dioxides (NO₂), despite the drop, is still twice the World Health Organization's recommended air quality guidelines.² As such, zero-emission vehicles such as EVs still have a major role to play to further improving roadside air quality.
- 1.4 It is estimated that 18% of Hong Kong's carbon emissions are attributed to the transport sector. Chief Executive Mrs Carrie Lam recently announced in her policy address that "Hong Kong will strive to achieve carbon neutrality before 2050." According to the report submitted by the Council for Sustainable Development to the Government on Hong Kong's long-term decarbonisation strategy, it is set out as a short-term recommendation for the Government "to formulate progressive targets and devise a holistic roadmap for increasing the uptake of EVs, including both private and commercial vehicles, while taking into consideration the change in fuel mix for electricity generation in Hong Kong. The roadmap should include incentives for car owners to switch to EV, development of charging infrastructure, management of EV battery recycling and disposal etc." The popularisation of EVs, both electric private cars (e-PCs) and electric commercial vehicles (e-CVs), will make a significant contribution to the decarbonisation of Hong Kong's transport sector.
- 1.5 In the following sections, discussions will focus on several areas central to the popularisation of EVs in Hong Kong, including the adoption of EV by different market segments and the challenges they encounter, the expansion and management of EV charging network, the treatment of EV batteries, and the promotion of smart sustainable transportation. Before

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https://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/air/air_quality_objectives/files/AQOr_consultation_booklet_en.pdf

moving into those discussions, BEC would like to recommend several guiding principles for the development of the Roadmap.

2 Guiding principles for EV popularisation in Hong Kong

- 2.1 BEC emphasises that the main objective of the Roadmap and the supporting policies **should not be solely focused on increasing the number and share of EVs. Rather, it should aim at improving roadside air quality and reducing carbon emissions so as to protect public health and address climate change through the popularisation of EVs.** The transition to EVs should be just one of many measures to achieve the air quality and carbon end goals in the broader context. For example, the total number of vehicles on the road and transport demand should also be managed through coherent transport and urban planning policies. This calls for holistic and integrated city and transport planning. One example is the city of Oslo which set a target to reduce motor traffic by 20% by 2020³, along with other incentives to boost the uptake of EVs. Walking and cycling, especially for the first and last mile, should also be encouraged. Zero-emission zones, which only allow electric and other zero-emission modes of transport to enter, can be widely adopted.
- 2.2 There is also the need to **break down silos and facilitate inter-departmental collaboration**, especially between the Environment Bureau (ENB), Development Bureau (DEVB), Transport and Housing Bureau (THB), Innovation and Technology Bureau (ITB), and other relevant government agencies. For instance, a streamlined, co-ordinated approval process that involves various government departments on granting permits for the installation of public EV charging infrastructure could possibly speed up the entire application process by months.
- 2.3 **Commercial vehicles (CVs)** account for 95% of the vehicular emissions of RSP and NO_x⁴ and also around 75% of carbon emissions⁵, hence they **should receive more attention** in the Roadmap compared to private cars, for which technology options are already mature. CVs are also facing greater challenges in terms of the number of market-ready EV models, upfront capital costs of e-CVs, lack of charging infrastructure, limited battery range, issues with battery end-of-life, and insufficient policy support.
- 2.4 BEC suggests that the Roadmap should take a **multipronged approach for different types of vehicles**. Early transition of those with readily available technologies will have multiplied benefits over time. It is

³ <https://ruter.no/contentassets/4fceaf4f35f54c0bbc0298805bc29241/report-zero-emission-english.pdf>

⁴ https://www.legco.gov.hk/yr19-20/english/panels/ea/ea_ev/reports/ea_evcb1-874-e.pdf

⁵ <https://www.climateready.gov.hk/files/report/en/6.pdf>

undesirable to delay action for sectors that are ready for the transition until the technologies for all sectors are mature and proven. The Roadmap should also **set ambitious goals with practical and achievable milestones to guide and track progress.**

- 2.5 BEC urges the Government to **set a time limit for the phasing out of vehicles that use fossil fuel as its only source.** The bans need to be linked with viable alternatives, so a phased approach would be needed for larger vehicles like buses. Setting a phase-out time will send a clear signal to the market for stakeholders such as vehicle manufacturers, importers, operators, and users to prepare and plan for the transition.
- 2.6 Policies and regulations recommended in the Roadmap should be **permissive rather than prescriptive.** BEC recommends the Government to be open minded and not limit policies and subsidies to be directed to a specific type of solution, as there could be alternative options that meet air pollution and carbon emission targets and goals. This could mean also considering the application of non-electric new energy vehicles in the transition towards a low carbon transportation (see section 7 for more details).

3 Adoption of EVs by private car owners and the commercial fleets

- 3.1 There has been an increasing uptake of e-PCs in recent years. According to the figures, 6.3% of first registered private cars in Hong Kong were electric in 2019, higher than China's 3.9% and South Korea's 1.9%.⁶ As of September 2020, there were 16,759 EVs for road use, or around 1.9% of all registered vehicles in Hong Kong.⁷ Factors that hinder further growth in e-PCs are well-documented, such as high upfront cost of the vehicles and the lack of charging points. Government's provision of financial incentives and the expansion of the charging infrastructure will help remove some of those barriers. Government should also take the lead in its own adoption of EVs in this category, with a commitment to reaching 100% within the next 5 years.
- 3.2 Uptake rate for commercial vehicles, however, has been much lower. BEC gathers that different market segments are facing specific challenges, as well as seeing opportunities as discussed in the following paragraphs.
- 3.3 Electric light goods vehicles (e-LGVs) are technologically mature, with multiple vehicle models available in the market. This is the CV market

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https://www.epd.gov.hk/epd/sites/default/files/epd/english/boards/advisory_council/files/ACE_Paper_10_2020.pdf

⁷ In September 2019, there were 878,539 registered vehicles of all classes
https://www.td.gov.hk/filemanager/en/content_4883/table41a.pdf

segment most ready for the transition. Yet, charging arrangement still presents problems to some operators. The current lack of charging infrastructure requires e-LGVs to return to depots to be charged. For larger fleet operators with depot spaces, e-LGVs can be charged overnight to minimise the disruption to their operating schedule. For operators without a depot such as owner-drivers, public charging infrastructure must be expanded and strategically developed to support charging along the route.

- 3.4 Electric taxis (e-taxis) have to come to terms with difficult operational requirements such as demanding driving range and short turnaround time between shifts. The major barrier would be finding a suitable charging solution that would accommodate for fast charging in a convenient location during shift changeovers. Nonetheless, there are around 7,000 taxis in Hong Kong that are already in service for over 10 years. The Government should take this opportunity to encourage the adoption of e-taxis as the preferred replacement option, to be supported by adding public charging points at strategic locations to smooth the transition.
- 3.5 For electric buses (e-buses), battery range, vehicle performance and passenger carrying capacity are the operator's major concerns. Adding to the high total cost of ownership of e-buses compared to conventional buses, especially without subsidies, and the seemingly impossible task under current political situation to raise fares for bus electrification, it is understandable that the transition to e-buses in Hong Kong will not be straightforward. BEC suggests that perhaps direct government support for bus operators in research and development (R&D) would be beneficial, rather than solely relying on the bus operators to initiate pilot schemes with limited resources and technical knowhow. This sector would benefit from a consortium approach with government departments and utility companies working together to support e-buses trials and deployment, as well as some smoothing by government of any initial impact of deployment on fares.
- 3.6 Like e-taxis, electric public light buses (e-PLBs) are also characterised by their fast-paced service nature and operational requirements. Therefore, the charging solution would require fast charging in convenient locations without interrupting service provision, for example at a PLB terminus. Given that more than 3,000 PLBs (or close to 70% of the entire fleet)⁸ will reach their end-of-life in the next 3 years, it is a golden opportunity for the Government to replace and upgrade these old PLBs with low-emission ones. Missing this window, it could take another 15 years to have a major overhaul.

⁸ The number of PLB are fixed at 4,350. See https://www.td.gov.hk/en/transport_in_hong_kong/public_transport/minibuses/

- 3.7 Electric medium/heavy goods vehicles (e-MGV/HGVs) are yet to be commercially viable in many applications. For short-range local MGV/HGVs that travel for less than 200 km per day, BEVs could be a solution with better battery technology. For cross-border long-haul goods vehicles that are difficult to electrify, other new energy alternatives should be considered. BEC recommends the Government to closely monitor the latest development and performance of concept all-electric battery-powered trucks such as Tesla's Semi on the one hand, and study/revisit the feasibility of natural gas-powered or zero-carbon hydrogen-powered MGVs/HGVs operating in Hong Kong on the other.
- 3.8 Since different CV sectors are encountering different challenges as illustrated above, BEC reiterates the benefits of taking a multi-pronged approach to popularise and support different types of e-CVs, rather than making one-size-fits-all recommendations.

4 EV charging network

- 4.1 On the provision of EV charging facilities, BEC argues that home or private charging should form the backbone of Hong Kong's EV charging infrastructure for e-PCs, complemented by public charging facilities which can service both e-PCs and e-CVs. With many residential carparking spaces involved, the provision of private charging would require private and public sector co-operation and co-ordination.
- 4.2 BEC welcomes the launch of the "EV-charging at Home Subsidy Scheme" since 21 October 2020,⁹ which helps promote the installation of EV charging-enabling infrastructure in car parks of existing private residential buildings. BEC encourages the Government to regularly review and explore new opportunities to offer financial aids to private premises for expanding the infrastructure in accordance with the growing EV demand and EV popularity in Hong Kong.
- 4.3 Public charging should be deployed at a faster rate and at strategic points to accelerate the adoption of EVs, particularly for commercial goods vehicles. Public charging facilities should aim for high utilisation rates to make it a self-sustaining business model, but with priority accorded to strategic commercial segments such as e-taxis and e-PLBs, and maybe also e-LGVs aligned with the Government's future e-CV popularisation policy. The Government must work closely with the private sector and the utility companies to develop strategic high-powered charging hubs as part of the public charging network.

⁹ <https://www.evhomecharging.gov.hk/en>

- 4.4 Many public car parking spaces are owned by private owners. The Government should consider providing incentive or subsidy to the owners for setting up public charging facilities truly open for public use in normal operating hours in order to significantly increase the number of public charging points and reach the pre-defined target. The incentive or subsidy can be set and reviewed regularly with multiple considerations – such as location (region or district), types of associated buildings, power rating of charging facilities, and committed maximum charging fees – to guide the development of public charging infrastructure in Hong Kong. Meanwhile, the Government can also require the private owners to provide the utilisation data of their charging points under the incentive/subsidy scheme for both monitoring and analyses.
- 4.5 While it is a priority to add to the existing EV charging infrastructure, it is equally important to improve the management of the charging facilities, such as maximising utilisation rate, enhancing EV charging facilities availability and usage data, eliminating the abuse of EV charging spaces by non-EVs, and reducing EVs cruising for a charging spot which will slow down traffic and create other problems.
- 4.6 One important element of good facility management is the pricing policy and strategy. Since there is an important role for the private sector to play in providing and managing charging facilities, it is crucial to keep charge point operators (CPOs) interested in investing in their business. In other words, the Government should maintain an operating environment with clear policy directions which are more conducive for the CPOs to make a reasonable return on their investment.
- 4.7 In this respect, BEC recommends that free charging should be progressively phased out in the government- or public sector-owned carparks. With free charging, the market is distorted as EV owners would less likely deploy commercial public EV charging stations, which in turn dissuades the CPOs to invest further in charging facilities. For the utility companies who are currently also offering free charging facilities to users in support of EV popularisation, they still have a critical role to play in the strategic and longer-term development of the city-wide EV charging infrastructure, mainly for facilities that are too specialised and specific to certain applications. The Government will have to take a leadership role in co-ordinating the phased transition and communicating the reasonings to all the stakeholders, including the EV charge point users.
- 4.8 Another area to improve for better management and operation of the charging network relates to data. With a lack of EV charging facilities usage data now, including the number of EVs occupying the charging space and/or using the charger, BEC recommends a common platform to host and share real-time EV charging and parking information to optimise the use of public EV charging infrastructure. Currently, each operator has

its own website and charging map exclusive for their own customers, but there is little intention for information sharing via a common portal. The Government, with its convening power, should take the lead and get a consortium of public EV charging spot owners/operators to co-ordinate and put together such a platform.

5 EV batteries

- 5.1 As the global production of EVs increases exponentially, the amount of lithium-ion battery packs for disposal also increases when they reach their end-of-life. The batteries contain certain types of recyclable metals like cobalt, nickel, and copper. Some operators are concerned with the end-of-life options for depreciated battery packs, and their impact on the environment.¹⁰ Currently in Hong Kong, waste batteries from EVs are considered as chemical waste under the Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C)¹¹ as they contain heavy metals and organic solvents. Registered chemical waste producers (e.g. EV suppliers, dealers, and vehicle repair workshops) will engage licensed collectors to transport waste EV batteries to licensed disposal facilities for preliminary discharging and re-packaging before they are exported for recycling overseas. It is anticipated that as EVs become mainstream and their numbers continue to grow, the issue of handling the reuse, recycling and proper disposal of used batteries will become a major challenge for Hong Kong, which requires the Government's attention and resources (including sites, manpower, technologies, etc.) to address.
- 5.2 Batteries that fall below 70-80% of its original capacity are often defined to have reached their "end-of-life"¹² and not fit for their original equipment. However, these batteries can be re-purposed for usages like peak shaving¹³ or renewable energy storage.¹⁴ For example, car manufacturers like Nissan¹⁵ and Renault¹⁶ are re-purposing end-of-life EV batteries as energy storage systems to meet local energy demand and compensate for intermittence in electricity generation from solar panels.
- 5.3 Moving forward, Hong Kong should consider developing local capacity to re-purpose lithium-ion battery packs, rather than to rely solely on exporting to recycle. When the battery recycling industry has developed the right

¹⁰ http://www.hkpc.org/images/stories/corp_info/hkpc_pub/evstudyreport.pdf

¹¹ https://www.elegislation.gov.hk/hk/cap354C?xid=ID_1438403045133_001

¹² <https://www.nrel.gov/docs/fy17osti/67102.pdf>

¹³ http://www.ee.co.za/wp-content/uploads/2017/12/Ian-Burger_Sola-Future-Energy_Peak-shaving-utilising-batteries.pdf

¹⁴ <https://cleantecnica.com/2017/10/30/bmw-group-officially-commissions-battery-storage-farm-leipzig/>

¹⁵ https://warwick.ac.uk/newsandevents/pressreleases/used_nissan_leaf

¹⁶ <https://group.renault.com/en/news-on-air/news/renault-optimizes-the-lifecycle-of-its-electric-vehicle-batteries/>

level of expertise, under the framework of Cap. 354C, a producer responsibility scheme (PRS) on EV batteries can be introduced. Equivalent measures for other battery types found in ICE vehicles should also be developed.

- 5.4 The Government should also implement new regulations that outline the appropriate recycling / reuse pathways for EV batteries, standardise the types of EV batteries that could be recycled based on their physical conditions, in turn providing second-life batteries companies and potential customers more certainty in the process. This could include setting up specific requirements for EV battery manufacturers when they enter the local market, for example breaking down used batteries to cell- or modular-level, or disclose the state of health of depleted batteries, to facilitate safe recycling and encourage second-life applications.

6 **Smart sustainable transportation**

- 6.1 Smart mobility is one of the six smart city building blocks laid down in *The Smart City Blueprint for Hong Kong*. In the *Smart City Blueprint for Hong Kong 2.0* released on 10 December 2020,¹⁷ initiatives to facilitate the development of vehicle-to-everything (V2X) and autonomous vehicles (AVs) are included. Given the rapid development of EVs, autonomous driving and personal mobility technologies, BEC urges the Government to combine clear policy direction with appropriate regulatory structures to support a seamless integration of EVs and e-mobility into Hong Kong's smart city development.
- 6.2 Holistic transport planning is essential for smart city development. Digital technologies such as taxi hailing services, EV charging spot finders, bus arrival estimations should be extended, and the information should be made available through a common government portal.
- 6.3 Open data is also another important pillar of a smart city that encourages data-driven solutions and services, as well as progress tracking and benchmarking. BEC recommends the Government to explore and disclose alternative metrics to measure the effectiveness of EV policies and the usage of EVs in Hong Kong. Currently, the Government mainly uses the number of registered or licensed EVs, or the ratio of EVs to EV chargers as an indication of progress and development in EV popularisation. However, these metrics do not reflect the actual usage of EVs on the road.

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[https://www.smartcity.gov.hk/modules/custom/custom_global_js_css/assets/files/HKSmartCityBlueprint\(ENG\)v2.pdf](https://www.smartcity.gov.hk/modules/custom/custom_global_js_css/assets/files/HKSmartCityBlueprint(ENG)v2.pdf)

Complementary metrics such as vehicle kilometres travelled (VKT) by EVs or the utilisation rate of EV chargers would help provide a complete picture.

- 6.4 The Government should initiate dialogues with EV manufacturers to devise a Roadmap that not only matches the long-term EV vision for Hong Kong, but also facilitate EV integration to the city's already well-developed transportation network.

7 A note on clean vehicles other than battery electric vehicles

- 7.1 While BEC's views in this submission mainly focus on battery electric vehicles (BEVs), it is noteworthy that hybrid electric vehicles (HEVs), natural gas-powered vehicles, and other new energy vehicles such as fuel cell vehicles (FCVs) should also be considered as part of the transition to cleaner CVs, where the alternative fuel used can offer real and significant benefits in air or carbon emission reduction.
- 7.2 BEC argues that promoting HEVs alone would not be sufficient to achieve zero carbon emissions. However, their role in the transition should not be overlooked if no cleaner options are available in the market in the short term, especially for specific sectors with a relatively short on-road vehicle lifetime or few daily miles travelled, so that substantive progress on air emissions can still be maintained. Yet, when it comes to the provision of financial incentive to encourage the uptake of clean vehicles, the level of subsidy offered to HEVs, if any, should be much lower than that of BEVs to reflect their relatively lower carbon and roadside emissions reduction potential.
- 7.3 Natural gas-powered vehicles may be more suitable for some categories of HGVs. Considering its commercial viability and proven track record in other parts of the world, heavy-duty natural gas vehicles could be considered an interim option for improving roadside emissions over the short and medium term. Yet, methane leakage in the supply chain will undermine the greenhouse gas reduction potential of natural gas vehicles, even though natural gas inherently contains about 25% less carbon dioxide (CO₂) per unit of energy. On the other hand, fuel cell vehicles (FCVs) have enormous emissions reduction potential if they are powered by zero-carbon fuels such as blue or green hydrogen. Thus, they could play a role in the transition of vehicles that are impractical to be powered by batteries. Considering the absence of existing infrastructure to support some of the alternative fuels and their short- to medium-term financial viability, BEC recommends the Government to take a more proactive approach in exploring the application of gas-powered vehicles and FCVs in Hong Kong.

8 Conclusion

- 8.1 With the Chief Executive announcing Hong Kong's commitment to become carbon neutral by 2050 in her last Policy Address, BEC highlights that the EV popularisation roadmap will probably serve as the cornerstone of Hong Kong transport sector's decarbonisation plan moving forward. It is exciting time but also an important juncture for stakeholders like BEC to share the views of the business community to the Government as the Roadmap is taking shape. Businesses always welcome clear government vision and policies to facilitate better planning. A case in point is the phase-out date and pathway of ICE vehicles in Hong Kong: the sooner it is announced the better.
- 8.2 BEC and the EV TF are well-positioned and prepared to facilitate a continued dialogue between the Government and various business segments on EV popularisation, and are looking forward to working with our members and the wider business community to accelerate the transition to a low carbon transportation sector.

For queries related to this submission, please contact our Chief Executive Officer, Mr Adam Koo at adamkoo@bec.org.hk.

Yours sincerely,



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