Green Transformation Roadmap of Public Buses and Taxis







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Foreword

Transportation contributes to about 20% of total carbon emissions in Hong Kong. To achieve the target of attaining carbon neutrality before 2050, the Government of the Hong Kong Special Administrative Region is committed to promoting the electrification of vehicles, and announced in 2021 the *Hong Kong Roadmap on Popularisation of Electric Vehicles, Clean Air Plan for Hong Kong 2035*, and *Hong Kong's Climate Action Plan 2050*. In just a few years, Hong Kong has become one of the regions with the fastest penetration of electric vehicles (EVs) in the world, with considerable room for development. As of October 2024, over 16% of private cars in Hong Kong are electric private (e-private) cars. As of today, the number of EVs in Hong Kong has exceeded 100 000, a significant increase to approximately seven times that of five years ago. The proportion of e-private cars in Hong Kong's newly registered private cars has increased from some 20% in 2021 to about 70% now. The growth rate is among the highest in the world.

Public buses and taxis generate over 1.4 million tonnes of carbon emissions each year, accounting for about 4% of Hong Kong's total carbon emissions. Despite the over 35% to 64% reduction in air pollutant emissions in the past decade, passengers queuing at bus stops/ taxi stands or pedestrians may still be disturbed by the exhaust emissions or the vehicular engine noise. The adoption of electric buses (e-buses) and electric taxis (e-taxis) will achieve not only a better score card in carbon reduction and air quality, but also a better environment for the general public to live, work and enjoy.

In Hong Kong, the journey to full green transformation of public buses and taxis is challenging. In addition to making good use of public money, it is also essential to avoid placing excessive burdens on the general public. The Government must, therefore, find cost-effective solutions to strike a balance. Looking forward, new and smarter technologies like fast charging are emerging, and new models of EVs also continue to enter the market. As the availability of e-buses and e-taxis continues to increase, their prices are decreasing and the Government may no longer need to provide subsidies. Hence, we will lead the comprehensive green transformation of public buses and taxis in the most cost-effective manner step by step, so as to achieve zero vehicular emissions and attain carbon neutrality before 2050. With a shared vision and concerted efforts of all sectors of society, we are poised to realise a future fostering a greener, more beautiful and sustainable Hong Kong and a cosmopolitan where man and nature coexist harmoniously!

The Environment and Ecology Bureau December 2024



VISION

> > The drive to eliminate vehicular emissions before 2050 necessitates a strategic shift in public transportation. Embracing green transformation promises a cleaner, smarter, and more inclusive urban environment.

- 1.1 Exhaust emissions from vehicles are the primary source of roadside air pollution in Hong Kong and at the same time account for about 20% of the carbon emissions of the territory. *The Hong Kong Roadmap on Popularisation of Electric Vehicles* and *Hong Kong's Climate Action Plan 2050* promulgated respectively in March and October 2021 proposed the target of attaining zero vehicular emissions before 2050. As of now, there are still tens of thousands of diesel buses and petrol/liquefied petroleum gas taxis (collectively "LPG taxis") running on the road. The Chief Executive announced in the 2023 Policy Address the formulation of a green transformation roadmap (Roadmap) and timetable for public buses and taxis, with a view to achieving zero vehicular emissions before 2050.
- 1.2 Buses and taxis are important components of the public transportation system which serve over four million passenger-rides on a daily basis. A smooth transition from traditional fuel-propelled vehicles to clean energy vehicles in a prudent and pragmatic manner is crucial.
- 1.3 Changes come with opportunities. With the rapidly growing EV technology, we see the need to grasp the possibilities brought about by the green transformation of public buses and taxis. In the course of green transformation, apart from the environmental protection angle, we also need to fulfil a wide perspective of other policy considerations at the same time, such as embracing the latest technology to include smart features and providing wheel-chair accessible taxis to promote social improvement and inclusion.
- 1.4 The green transformation of public buses and taxis requires the joint effort of various stakeholders in the community, including but not limited to the franchised bus (FB) operators, taxi trade, car importers, and our citizens, etc.. The process of green transformation is long. Through the joint efforts of all parties in the process, every small step taken will eventually lead to a big step towards long-term clean air and carbon reduction in Hong Kong, benefiting the general public.

Costs of air pollution and carbon emission

Benefits of switching to e-buses and e-taxis

1	Health effects	Induces respiratory diseases, cardiovascular diseases and other health problems	1	Achieve environmental sustainability	No exhaust emissions which helps improve air quality and reduces carbon footprint
2	Environmental damages	Leads to climate change, and more frequent extreme weather events	2	Upgrade commuting experience	A more comfortable and quiet environment for passengers; and a better walking environment for pedestrians with reduced roadside exhaust emissions and vehicular noise
3	Economic loss	Premature death and increase in medical expenses, resulting in annual economic loss in billions of dollars	3	Replace old vehicles to align with the trends	Generally speaking, LPG taxis are used for some 17 years on average before deregistration and diesel buses shall retire after 18 years of service. The use of e-taxis and e-buses are getting more prevalent in some cities



CHALLENGES AND PROGRESS

The Government announced three roadmap/ action plans in 2021 to guide Hong Kong towards zero vehicular emissions before 2050 and attain carbon neutrality within the same timeframe.

CHALLENGES

- 2.1 The total number of passengers carried by FBs and taxis in Hong Kong is very high, with over four million of daily patronage. Over 95% of the FBs in Hong Kong are doubledeckers and run on an average of over 240 kilometres (km) on a daily basis; while taxis run for about 20 hours a day with a daily mileage of about 400 km.
- 2.2 There are a few options of clean energy vehicle alternatives to traditional fuel buses and taxis, and EV is currently the more mature mode. However, EVs must be supported by charging facilities. E-buses need to be charged in bus depots or the usual parking spaces, and e-taxis require a territory-wide fast charging network.
- 2.3 Currently, there are still limited models in the market for both e-buses and e-taxis, especially double-deck e-buses which are not common in other places in the world. The price of an e-bus is still about 50% higher than that of a diesel bus. As for taxis, so far there are four e-taxi models which have been granted vehicle type-approval by the Transport Department (TD) as at end October 2024.
- 2.4 Looking forward, the continuously improving battery technology will prompt EV manufacturers to develop and manufacture faster charging and higher mileage EV models. On the other hand, the prices of e-buses and e-taxis are gradually decreasing, and the cost of using traditional fuel will gradually increase. But for now, there are still additional costs for replacing traditional fuel-propelled buses and taxis with EVs. Considering the current economic environment, the cost of vehicle replacement will exert additional operating pressure on the trade. To promote e-buses and e-taxis, the Government is still required to provide financial subsidies to a certain extent for the trade to switch to EVs in the initial stage of green transformation.
- 2.5 The structure of EVs is completely different from traditional fuel-propelled vehicles. Repairing and maintaining EVs require knowledge related to electrical engineering, which is different from the skills currently possessed by vehicle mechanics. The market needs to provide more relevant skills training to cope with the increasing demand for EV maintenance.



PROGRESS

2.6 With the EV technological advancement, we expect that more and more models of e-buses and e-taxis with better and safer batteries and higher charging speed would be available in the market.

	2013	2024
e-taxis		LOLI
Vehicle price	\$540,000	\$230,000-\$350,000
Battery capacity	About 60 kilowatt-hour	About 50-90 kilowatt-hour
Charging time	2 hours (from 0 to 100%)	30-36 minutes (from 30% to 80%)
Mileage when fully charged	300 km	370-520 km





- 2.7 The Government has been subsidising trials of e-buses and e-taxis, including subsidising the FB operators to purchase e-buses and install relevant charging facilities, with a view to comprehensively testing and assessing their operational performance in Hong Kong's road environment. The findings of the trials verified the technical feasibility of adopting battery e-buses on a large scale in Hong Kong, and provided valuable experience and data for the FB operators in respect of fleet management, e-buses routing, charging arrangements and the supporting facilities, etc.
- 2.8 Further, trials of about 40 e-taxis have been approved under the New Energy Transport Fund (NET Fund). The Dedicated 100% Loan Guarantee Scheme for Battery Electric Taxis was rolled out in September 2023 to offer loan guarantee to taxi owners to purchase e-taxis at favourable interest rates.
- 2.9 Currently, there are nine EV maintenance training programmes from five institutes, namely the Vocational Training Council, the Occupational Safety and Health Council, the Kowloon Motor Bus Academy, the Guangzhou Communications Technician Institute and Association of Auto Batteries and Tyres Industry. As of end-November 2024, about 820 mechanics had completed the training programmes.



GREEN TRANSFORMATION

Hong Kong will embark on a green journey towards sustainability through strategic principles and proactive initiatives.

PRINCIPLES

- 3.1 In taking forward the green transformation of public buses and taxis, we will adopt the following three guiding principles.
- (I) Carrots but Not Sticks



- 3.2 While the green transformation of road transport including bus and taxi services has seen progress in recent years, there are still rapid changes and developments in the market and technological front. For instance, more diverse models of EVs from wider sources are appearing in the market, prices of EVs are gradually declining, the jump in charging speed of EVs which affect the calculation of the demand for chargers and associated supporting facilities. Unlike the case of private cars, we must ensure the continual smooth and reliable FB and taxi services during their green transformation in respect of their operational costs and supporting measures. Therefore, in the early stage of promoting EVs, the Government needs to promote green transformation primarily by facilitation or subsidy, so that the taxi trade and the FB operators can have the necessary room and time to transform and fully benefit from technological advances and more cost effective EV models. In short, the time is not yet ripe now to impose a mandatory shift to e-taxis and e-buses.
- (II) Gradual and Orderly Approach



3.3 With over 6 000 FBs and 18 000 taxis that could run on the road on a daily basis, the Government needs to take forward the gradual green transformation in an orderly manner. If a significant number of FBs and taxis are switched to e-buses and e-taxis mandatorily in a short period of time, there will unavoidably be problems to the trade that may disrupt the normal operation of FBs and taxis, such as the heavy financial burden on FB operators and taxi owners. Besides, there are many young-aged in-service FBs and taxis that still can be used for a period of time. Premature replacement will result in wastage. Therefore, the Government needs to adopt a gradual approach to allow time for all relevant parties to plan ahead. At the same time, we can also leverage on the

development of EV-related technological innovations to make better use of resources in a more cost-effective manner and assist the taxi trade and the FB operators in their green transformation.

(III) No Additional Costs to Passengers



3.4 Although EVs continue to gain popularity with technological advancement, and we are optimistic that economies of scale will drive down the price difference between EVs and fuel-propelled vehicles, at least in the next few years, a shift to e-buses and e-taxis will still bring additional costs to FB operators and taxi owners. These include costs for the purchase of EVs as well as the costs of necessary support including setting up charging facilities, forming and training maintenance crew, etc. To uphold public support for the green transformation and in the light of the current economic climate, we hope to avoid as far as practicable additional costs to passengers due to the green transformation.

SHORT-TERM TO 2027

3.5 In line with the three guiding principles above, at the initial stage of green transformation of buses and taxis, there is a need for the Government to provide appropriate support to FB operators and taxi owners.

(I) Subsidy Support for FB Operators

- 3.6 As at end October 2024, among some 6 000 FBs owned by four FB operators, only about 1.4% are e-buses. The prices of e-buses can be about 50% higher than that of traditional diesel buses. In order to speed up the green transformation of public buses, there is a need to incentivise FB operators by providing subsidy for their purchase of e-buses, to alleviate their financial burden and minimise pressure on fare increase.
- 3.7 E-buses of the past generation had smaller seating capacity due to space occupied by batteries and shorter service time because of the time needed for mid-day

charging as the battery capacity was not enough to sustain full day operation on all bus routes including long-haul bus routes. Thus, there was concern that the transition from diesel buses to e-buses might require a larger fleet to maintain the same carrying capacity of the bus fleet as a whole. However, with the advancement in technology, the difference between e-buses and diesel buses in terms of seating capacity and service time is narrowing. Furthermore, further advancement in e-bus technology is expected and the maintenance of e-buses should be generally less onerous when compared with traditional fuel-propelled vehicles. Hence, in the respect of replacing diesel buses with e-buses, a one-for-one replacement ratio is adopted for planning purpose.

- 3.8 Although the current price of an e-bus is still higher than that of a traditional diesel bus, an e-bus has higher fuel economy and lower maintenance cost (except for battery replacement) compared with a diesel bus. As per the prevailing cost, having taken into account the total cost of ownership¹ of a traditional diesel bus and an e-bus, FB operators' bus replacement programmes and fleet requirements to meet new service demand in the coming few years, as well as the number of existing e-buses, we propose to subsidise FB operators' procurement of about 600 brand new single-deck and double-deck e-buses at \$400,000 and \$800,000 each respectively, or at 25% of their respective capital cost, whichever is the lower. By capping the proposed subsidy at 25% of the capital cost at the ceiling, it will help safeguard the reasonable use of public money, when there is reduction in the prices of e-buses, while maintaining the incentive to encourage FB operators to negotiate with e-bus suppliers proactively to keep the cost down.
- 3.9 The e-bus subsidy scheme involves an estimated total subsidy amount of about \$470 million. FB operators are required to place purchase orders with irrevocable commitment by end of 2027 with vehicle delivery and registration completed by end of 2029.
- 3.10 The subsidy will be disbursed in two phases. 75% of the subsidy will be disbursed after the completion of vehicle

registration for the e-bus in Hong Kong. The remaining 25% will be disbursed after the e-bus has fulfilled a prespecified mileage.

3.11 As for non-FBs, the prices of non-FB EV models in the market are relatively high as compared with that of traditional diesel models. Under the principle of prudent use of public money, we will first accord priority to the FBs and taxis, which take care of the daily commuting of the majority of road passengers, in the green transportation. With the Government's subsidy, more EV models will be available in the market for selection, thereby driving market competition. With the EV technological advancement and increase of EV supply, we expect the price difference between EVs and traditional vehicles will be reduced to a reasonable level; or even no difference such that Government subsidy may no longer be needed.



(II) Subsidy Support for Taxi Owners

- 3.12 Currently, there are some 18 000 licensed taxis in Hong Kong but only about 0.5% of them are e-taxis. There is no age limit for retiring a taxi. The current average age of all taxis in Hong Kong is about eight years. Following the gradual and orderly principle of green transformation and considering the usable life of taxis, the Government will roll out a scheme to subsidise the taxi trade for the purchase of 3 000 e-taxis.
- 3.13 The e-taxi subsidy scheme seeks to encourage taxi owners (i.e. taxi licence holders including individuals and business entities) to replace their LPG taxis with e-taxis. Having fully communicated with the taxi trade and having regard

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^{1.} FB operators' expenditure on a bus is determined by its total cost of ownership, which includes the cost of (i) purchase (i.e. price of the bus), (ii) fuel/energy, and (iii) maintenance.

to the age profile of all taxis in Hong Kong (i.e. some 3 000 taxis are aged 12 years or more), we consider it justifiable on environmental and economic grounds to accord priority to replace these aged taxis. Hence, we will issue letters to invite taxi owners of the 3 000 oldest taxis to participate in the e-taxi subsidy scheme, and invite participations from taxi owners in accordance with taxi ages for any remaining quotas. To ensure the proper use of public money, fleet taxis committed to be owned by a taxi fleet operator (or one of its shareholders) for fulfilling the relevant taxi fleet licence requirements will not be eligible for the subsidy scheme. Other taxis joining taxi fleets will still be eligible, provided that they are able to fulfil the taxi age requirement of the e-taxi subsidy scheme.

3.14 Under the subsidy scheme, the subsidy level for each e-taxi is \$45,000, equivalent to about 10% to 25% of the current market prices of e-taxis. The total subsidy amount for 3 000 e-taxis is estimated to be about \$135 million. We consider that the proposed subsidy amount should be able to provide sufficient incentive, while ensuring the proper use of public money. 3.15 Upon Government's invitation for participation in the e-taxi subsidy scheme, taxi owners will need to reply on their intention to replace their taxis within two months. They need to place a purchase order of an e-taxi within six months from the date of invitation and obtain the licence within 12 months after placing the purchase order. Taxi owners failing to timely reply to the Government's invitation or to meet these timelines will result in them not being able to obtain the subsidy.

(III) Expanding Charging Network

3.16 To cater for the expected jump in number of e-buses and e-taxis, the Government will continue to adopt a multi-pronged approach in promoting the expansion of charging facilities, so as to gradually develop a territorywide network for ensuring sufficient and convenient charging support for suiting the needs of various EVs.



Different Chargers for EVs

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Chargers	Standard	Medium	Quick	Fast
Charging power (kilowatt)	< 2.8	2.8 to 20	>20 and < 100	≥ 100
Time to charge an e-taxi*	About 12.5 hours	About 3 hours	About 35 minutes	About 21 minutes or even less

* with a 70 kilowatt-hour battery from 30% to 80%

Charging Strategies for Different Types of EVs

Vehicle types		Main charging arrangement		
	Private cars, light duty vehicles, motor cycles		Parking spaces at home or workplaces	
	Large vehicles (such as buses, goods vehicles, and fleets, etc.)		Depots, termini, stations, public transport interchanges, regular parking spaces	
	Commercial vehicles with no designated parking spaces (such as taxis)	0 3 0	A network of fast charging facilities across the territory	

- 3.17 Having regard to the around-the-clock mode of operation of taxis, e-taxis mainly adopt fast chargers (FCs) to charge up rapidly in a short period of time. The Government will implement the measures in the table below, which are estimated to contribute at least 500 FCs across the territory by the end of 2027 additionally on top of the some 1 500 prevailing quick and fast chargers, so as to meet the 3 000 e-taxis' charging needs.
- 3.18 FB operators would arrange at their own costs all necessary support for the operation of the e-buses, including but not limited to charging facilities and maintenance crew. The Government will continue to provide facilitation for FB operators to install charging facilities in new or existing bus depots. Also, for new public transport interchanges or bus terminals, spaces will be reserved for designated charging facilities for FBs.

Measures		Details
1	Convert traditional petrol filling stations (PFSs) into fast charging stations (FCSs) and retrofit existing PFSs to install FCs (to provide about 300 FCs by end-2027)	 Convert some existing PFSs into FCSs in the medium to long run and encourage existing PFSs owners to retrofit charging facilities in the PFSs, so as to prepare for the transition from conventional fuel-propelled vehicles to EVs. FCSs and PFSs retrofitted with FCs are required to cap the charging fee for e-taxis at the ceiling price to be announced by the Environmental Protection Department each month, and reserve a certain number of FCs and serving spaces for the charging of e-taxis and also electric public light buses during the peak shift-change hours, including the period between 3 pm and 6 pm every day.
2	Open up bus depots' charging facilities (to open up about 70 FCs by end-2027)	• FB operators are setting up FCs at their bus depots to support the transition to e-buses and are interested in opening up chargers for providing charging services to other electric commercial vehicles including e-taxis when the chargers are not used by e-buses.
3	Roll out trial projects on e-taxi charging facilities (to provide about 100 FCs by end-2027)	• \$20 million has been earmarked under the NET Fund to implement the trial projects.
4	Install fast charging facilities in taxi stands (to provide about 50 FCs by end-2027)	• 12 dedicated FCs for e-taxis are being installed on Lantau Island and in Sai Kung in phases. The Government has also been identifying taxi stands that may be suitable for setting up dedicated e-taxi FCs thereat.

3.19 Apart from the above measures that the Government will adopt, we cannot overlook the supply of charging facilities from the private market. The number of public charging facilities provided by the private market has almost tripled from about 2 300 in early-2021 to over 6 600 in September 2024, which include 1 500 quick or fast chargers. Together with the charging facilities provided by the Government, there are currently more than 9 100 public charging facilities in Hong Kong. In fact, since the late 2023, the Government has progressively marketised the EV charging services in existing Government carparks to allow operators to impose charging fees on users, so as to promote market participation in the provision of EV charging services. In addition, the Chief Executive's 2024 Policy Address announced that the Government would earmark \$300 million for a new scheme, providing incentive to the private sector for installing by 2030 3 000 FCs for public use.

Private Charging Network

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Through the measure of gross floor area concessions, the Government encourages the installation of EV charging-enabling infrastructure (EVCEI) in all parking spaces of newly built private buildings.



The Government has launched the \$3.5 billion EV-charging at Home Subsidy Scheme for subsidising existing private residential estates to install EVCEI. It is anticipated that the entire scheme will support some 140 000 parking spaces for installing EVCEI.

3.20 As EVs become more popular, the demand for charging services is growing, and the provision of fast charging services has developed into a commercially viable business. Currently, a number of companies in the market are successively joining the provision of fast charging services for EVs, including power companies, developers, EV manufacturers, and a number of public and private enterprises. In addition to e-private cars, the fast charging services the companies provide can also be used for light electric commercial vehicles including e-taxis. The active participation of the private market will help promote the expansion of the EV charging network, and the Government will fully facilitate the process including coordinating with the two power companies to ensure adequate power supply.

EMBRACING TECHNOLOGY

- 3.21 During the course of green transformation, the Government will encourage the FB operators and the taxi trade to actively adopt the latest technology. For instance, we will encourage taxi owners to switch to e-taxis of the latest models in order to boost the charging speed and shorten the charging time. With a view to taking better care of the commuting needs of the disabled and wheel-chair users in response to the ageing population, other than the \$135 million mentioned under paragraph 3.14 above, another \$50 million has been earmarked under the NET Fund for subsidising wheel-chair accessible e-taxis. It is understood that some suppliers are preparing to introduce new types of barrier-free e-taxis. Subsidy proposals will be worked out once there are available models of wheel-chair accessible e-taxis in the market.
- 3.22 For e-buses, the FB operators are also encouraged to suitably include on e-buses environmentally friendly and smart features, such as LED lighting, solar panels on bus roofs, more spacious aisles, 5G Wi-Fi services and provision of USB chargers at seats, etc.
- 3.23 For the parking spaces with EV charging facilities in new Government buildings, they shall be equipped with smart systems, such as charging fee payment system, dissemination of real-time information (such as charger availability status), load management, advance booking, capturing of usage data, reporting of utilisation, smart phone interface and apps, etc.
- 3.24 Apart from e-buses and e-taxis, the Government is open to and will also continue to subsidise trials of other types of new energy vehicles, such as hydrogen fuel cell (HFC) vehicles, through the NET Fund.

Technologies relevant to HFC vehicles are still under trials or at an early stage of development. HFC vehicles have no competitive edge for small-and-medium sized and shortto-medium ranged vehicles at this moment. Under the current supply situation and market price of low-carbon hydrogen energy, the commercial viability of HFC vehicles is yet to be established. The Government will promote the development of the hydrogen energy pursuant to *The Strategy of Hydrogen Development in Hong Kong* promulgated in June 2024 and monitor relevant market and technological developments.

WHAT'S NEXT BEYOND 2027

- 3.25 The Government targets to achieve zero emissions from all road vehicles before 2050. Regarding FBs and taxis, after years of trials and improvements in EV technologies, EV models suitable for the Hong Kong operating environment have started to emerge in the market. The serviceable life of FBs is 18 years, while the average serviceable life of taxis is about 17 years. With sufficient economic incentive to propel replacement of most of the FBs and taxis retiring after 2027 by EVs (or potentially also other new energy variants depending on future technological developments), the Government is confident in reaching the target of zero vehicular emissions for FBs and taxis before 2050. If the target time is further compressed, some FBs and taxis which are still in good working condition would have to be replaced before the end of their serviceable lives, which is not advisable from the perspective of efficient use of resources.
- 3.26 Although EV models suitable for the Hong Kong operating environment for FBs and taxis have started to emerge in the market, there are two main challenges to overcome when replacing FBs and taxis with EVs based on their serviceable lives, namely operating costs and charging arrangements. In addition, maintenance arrangements and personnel training must also be tackled.

Operating Costs

- 3.27 The price of e-buses today has dropped by 30% as compared to five years ago. With the Government's subsidy, more EV models will be available in the market for selection, thereby driving market competition. With the EV technological advancement and increase of EV supply, we expect the price differences between EVs and traditional vehicles will be reduced to a reasonable level; or even no difference. Likewise, we see prospect for the number of EV models suitable for use as taxis to increase in the future, with faster charging, longer range, and lower prices, and the Government may no longer need to provide subsidy.
- 3.28 In order to make good use of public money, the Government will continue to establish a more comprehensive charging network to provide sufficient and convenient charging facilities to support the anticipated growth of EVs in the medium to long run, gradually moving towards the goal of zero vehicular emissions for FBs and taxis before 2050. We plan to review, and devise measures for the next stage in 2027, and update the arrangements every five years thereafter.

Charging Arrangements

- 3.29 The above has introduced some arrangements for the continuous expansion of the fast charging network. We are currently adopting some time-limited subsidy measures so as to provide a large number of fast charging facilities as soon as possible in a short period of time to cope with the charging needs due to the currently rapid growing number of electric commercial vehicles such as e-taxis.
- 3.30 To support the need of all EVs in the longer term, our strategy is to continue to adopt a multi-pronged approach to improve the territory-wide fast charging network. First of all, we will adjust in response to the pace of vehicle electrification in the future. Accordingly, we will gradually convert traditional PFSs with reduced fuel demand into

FCSs. At present, we have specified that charging stations must reserve spaces for e-taxis and electric public light buses. Depending on the electrification progress of non-FBs, we may also consider specifying requirements such as setting a certain number of bus charging bays at future FCSs.

- 3.31 Indeed, as mentioned above, a more suitable venue for charging heavy vehicles such as buses should be at depots or their regular parking locations. In addition to supporting bus companies' proposals of setting up charging facilities, the Government will also consider other policy support, such as continuing to identify suitable places to establish fast charging facilities for heavy electric commercial vehicles and e-taxis, and giving policy support to land rezoning proposals for establishing FCSs, etc.
- 3.32 In the long-run, a more important direction for improving charging facilities is to accelerate the participation of the private market in the construction of public charging facilities, so as to fully utilise the market force and establish a business model applicable to the market. We believe that as the number of EVs including e-buses and e-taxis increases, the charging needs of these EVs (i.e. the charging needs of tens of thousands of e-buses and e-taxis on a daily basis) are large enough to attract investment from the private market. We hope that with keen market competition, there will be sufficient fast charging facilities by then, making fast charging services for EVs especially e-taxis accessible, more convenient and more affordable.
- 3.33 Of course, we will not simply assess the charging needs of e-buses and e-taxis on a piecemeal basis. A more appropriate approach is to examine the electrification process of all land transport vehicles at a macro level, timely review the supply and demand of the overall charging infrastructure, and continue to keep pace with the times in the electrification process. Therefore, we will also review the prevailing position of the charging infrastructure in 2027 and every five years thereafter, and launch corresponding measures in a timely manner.

Maintenance and Personnel Training

- 3.34 Repair and maintenance services for EVs are increasingly popular. These services are commonly provided by vehicle manufacturers or their authorised aftersales agents, as well as general vehicle maintenance workshops. Additionally, FB operators have their own teams responsible for the repair and maintenance of their fleet of e-buses. To address the growing demand for EV maintenance services in the long term, the Government has been actively collaborating with various stakeholders to promote the latest EV technology and enhance the training of maintenance mechanics. This includes compiling the Practice Guidelines for EV Maintenance in conjunction with the Vehicle Maintenance Technical Advisory Committee, referencing relevant international standards; incorporating EV maintenance service scope into the two prevailing voluntary vehicle maintenance registration schemes; allowing mechanics who have completed relevant training courses, or those employed and nominated by vehicle manufacturers or their agents, to become registered EV maintenance mechanics; and providing registered vehicle maintenance workshops with EV maintenance workshop identification signage after fulfilling the registration requirements. In addition, the Vocational Training Council has begun to offer a certificate course on EV repair & maintenance and safety awareness since August 2023. They have set up a dedicated EV training centre to train more qualified EV maintenance mechanics.
- 3.35 The Government will continue to work closely with the trade to promote the vehicle maintenance industry to keep pace with the times, provide more training courses and attract new entrants to the industry, ensuring the sustained and healthy development of the vehicle maintenance industry while responding to the increasing demand for local EV maintenance services.



TIMELINE

Each little step we now take lays a cornerstone to the success of the green transformation of public buses and taxis. With the guiding principles and supportive measures mentioned in this *Roadmap*, the Government seeks to gradually achieve the milestones above.



CONCLUDING REMARKS

In the quest for a sustainable future, embracing green transportation offers a pathway to cleaner and smarter commuting. Through collaborative efforts and adaptive strategies, a bright and more vibrant Hong Kong beckons.

5.1 The increasingly matured EV technology has laid suitable soil for the green transformation of public buses and taxis. However, regarding the changes and transformation of major public transportation that will affect the daily commuting of millions of road passengers, we must adopt a gradual and orderly approach, work hand-in-hand with the trades, and provide the appropriate support.

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- 5.2 Having regard to the rapid advancement in the EV technologies, we need to keep pace with the development and devise the according measures. Therefore, we have set the target to regularly review the supporting measures provided, so as to respond to the dire needs of the trades and the public in a timely manner.
- 5.3 We are confident in realising the full green transformation of public buses and taxis. Green transformation not only reduces air pollution and carbon emissions, but also provides the general public with a cleaner and more comfortable commuting environment and experience. Together, we can move towards a greener and more livable city and build a better Hong Kong.