City University of Hong Kong
Research Centre for Sustainable Hong Kong[1]

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Electrification of Private Cars to Reduce Emissions for Hong Kong's Transportation

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1. Introduction

Transportation produced 20% of all carbon emissions in Hong Kong, the second largest source of emissions by sector after power generation [4]. To substantially reduce the emissions caused by transportation, the most important of all measures, we maintain, is the replacement of fossil-fuel-powered private cars with electric cars (EVs).

Currently 90% of all registered private vehicles in Hong Kong are fossil fuel cars. These vehicles produced nearly 1.5 million CO2e per year, accounting for 4.5% of the city's total carbon emissions of 34 million CO2e (Table 1).

Table 1. Registered Vehicles and their percentage of carbon emissions in Hong Kong*

	Percentage of Carbon Emissions	Percentage of Registered Vehicles
Private vehicles	4.5%	71%
Medium Goods Vehicle	3.2%	4%
Public bus	2.0%	<1%
Light Goods Vehicle	2.0%	8%
Taxi	1.9%	2%
Heavy Goods Vehicle	0.8%	<1%
Private bus	0.8%	<1%
Public Light Bus	0.6%	<1%
Private Light Bus	0.2%	<1%

Source: Environment and Ecology Bureau, The HKSAR Government
* other vehicles (government vehicles, special vehicles and motorcycles), which accounts for 11% of all registered vehicles in Hong Kong, are not included.

[1] Established in June 2017 by a cross-disciplinary research team, the Research Centre for Sustainable Hong Kong (CSHK) is an Applied Strategic Development Centre of City University of Hong Kong (CityU). CSHK conducts impactful applied research with the mission to facilitate and enhance collaborations among the academic, industrial and professional service sectors, the community and the government for sustainable development in Hong Kong and the Region.

[2] This policy paper is the third part in the Center's 3-part Hong Kong Emission Reduction Policy Research Series. Please Click here for the first part and click here for the second part. If you have any comments on this policy paper, email us at sushkhub@cityu.edu.hk.

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[4] Council for Carbon Neutrality and Sustainable Development (2022), "Greenhouse Gas Emissions in Hong Kong (by Sector)",retrieved from https://cnsd.gov.hk/wp-content/uploads/pdf/Greenhouse%20Gas%20Emissions%20in%20Hong%20Kong%20by%20Sector.pdf

The Government began promoting electric vehicles (EVs) in 2018; and after 4 years, the number of new EVs surpassed fossil fuel cars for the first time in 2022. However, given the large fleet of fossil fuel vehicles in use, the government needs to step up efforts and accelerate the transition to EVs. We propose two directions of efforts: (1) adjusting the registration taxes for private cars, and (2) investing more in the infrastructure of electric cars.

Taxis and public light buses in Hong Kong account for 1.9% and 1%, respectively, of Hong Kong's total carbon emissions. The majority of these fleets have transited to Liquefied Petroleum Gas (LPG) as fuel (Table 2), but goods vehicles and public buses still use fossil fuel as current renewable fuel technology cannot produce sufficient power output. To tackle this, the government can finance local transport enterprises, research institutes and universities to develop fuels that can help more types of vehicles to use renewable fuel, and we can learn from the experience of developing EVs from foreign companies as well.

Table 2. Fuel for Taxis and Public light buses in Hong Kong (year 2020)

	Taxi	Public light bus
Liquefied Petroleum Gas (LPG)	18,160 cars	3,566 light buses
Fuel/diesel	3 cars	784 light buses

Source: Environment and Ecology Bureau, The HKSAR Government

2. Policy roadmap – phase out fossil fuel cars by year 2035

The government has implemented the following policies to phase out the fossil fuel cars by year 2035, including a tax allowances for car owners who replace their fossil fuel vehicles with EVs (namely the "one for one replacement " scheme), installing EV charging stations in government car parks and public buildings, and the launch of "EV-charging at Home Subsidy Scheme" ("EHSS") to subsidise the installation of EV charging stations in car parks of existing private residential buildings.

The two-pronged approach of combining administrative policies with incentive measures aligns with the "Push & Pull" policy approach we suggested in Policy Paper no.21.[5]

Table 3. Government's measures to promote the popularisation of Electric Vehicles

	Key policy measures
Law enforcement	➢ Cease new registration of fossil fuel vehicles by year 2035
Economic incentives	➢ Concession of First Registration tax for electric cars ➢ the One for One Replacement Scheme (tax allowance per car up to HK$287,500; HK$ 7.4 billion of total tax exempted during 2015-2021) ➢ Free EV charging stations at government parking lots
Public EV charging stations	➢ 1,800-plus medium-speed EV chargers installed in government parking lots ➢ 30% of parking spaces in new government buildings equipped with medium-speed EV chargers
Private EV charging stations	➢ Mandatory to install EV charging stations at newly constructed private residential buildings ➢ Launched HK $2 billion (now 3.5 billion) "Easy Charging in EV Estates Subsidy Scheme" to subsidise the installation of electric vehicle charging infrastructure in parking spaces of existing private residential buildings

Source: Environment and Ecology Bureau, The HKSAR Government

5 CSHK Policy Paper 21: Linda Chelan Li, Yunhong Liu, Liang Dong, Phyllis Lai Lan Mo, Kin On Li (2023), The Policy Framework to achieve emission reduction targets

Nonetheless, up until 2022, 92% (526,000) of the 572,000 private cars registered in Hong Kong are fossil fuelled vehicles, and only about 8% of all private cars are electricity powered. And Hong Kong has registered 30,000 to 40,000 more vehicles per year on average during 2018-2022 (Table 4).

Table 4. Number of "First Registered" Private Vehicles in Hong Kong by Fuel Mix

	Petrol		Electric		Diesel	
	First registered	Total	First registered	Total	First registered	Total
2018	41.5k	543k	471	11k	265	11k
2019	35.9k	549k	2.4k	13k	28	11k
2020	32.4k	544k	4.6k	17k	--	11k
2021	29.7k	543k	9.6k	27k	2	11k
2022	17.7k	515k	19.8k	46k	--	11k

Source: Transport Bureau, The HKSAR government

Assuming the pace of replacement of private vehicles remaining the same, it would take more than 10 years to replace all fossil fuel vehicles with electric vehicles. The process must thus be accelerated. A number of policy recommendations are put forward below for this purpose.

3. Policy Recommendations

3.1. Regressive tax exemption scheme to incentivise car owners to purchase EVs

The 'One-for-One replacement Scheme' grants a tax exemption up to HK$250,000 to car owners who replaced their fossil fuel cars with electric cars. The tax exemption was later increased to HK$ 287,500 and will last till March 31, 2024. With no long term tax exemption policy in sight, car owners will not be incentivised to switch to electric vehicles.

We propose the Government to extend the "One-for-One Replacement Scheme" until 2035, and reduce the tax exemption each year until it reaches zero. That way car owners will be enticed to replace their fossil fuel cars to EVs sooner to enjoy more tax exemption.

3.2. Progressive first registration tax for fossil fuel vehicles

First Registration Tax in Hong Kong is levied on the taxable value of the vehicle, and they will be charged progressively. When the taxable value reaches HK$150,000, 45% of tax will be charged, and the rate of tax will be increased to 132% when the taxable value reaches HK$500,000.

We suggest to assign different rates for the first registration tax of electric cars and fossil fuel cars. With a higher rate to the latter. The difference in tax rates will increase progressively from 2024 to 2035, to dampen car owners' desire to purchase fossil fuel vehicles.

3.3. More EV charging stations

The lack of charging stations is a material factor putting off car owners in Hong Kong to switch to electric cars. Hong Kong has approximately 5,400 EV charging stations --- one charging station for 8 EVs. Amongst the 5400, 1000 are quick charging stations, 3000 medium charging and 1,400 of regular speed (the slowest).

A quick charging station can replenish 80% of the electric car's battery in 30 minutes; medium-speed chargers will take 3 to 4 hours to do the same, and standard chargers as long as 8 hours. The massive difference in performance explains why Hong Kong's electric car market is dominated by a single brand,

as they build the most quick charging stations in Hong Kong.

More resources need to be invested in encouraging the construction of more quality EV charging stations and to foster healthy competition between a larger number of operators, through for example low-interest loans, return guarantee for a specific amount of time, and service agreements between EV charging station companies and car owners.

4. Summary

To accelerate the transition to electric cars in Hong Kong, similar to our recommendations for the power generation sector,[6] here we propose two measures under the "Market Control" policy mechanism – namely a regressive tax allowance for electric cars, and a progressive tax for fossil fuel cars. The proposal on EV charging stations is a measure under the "Commercialisation Mechanism".

Our proposals focus on private vehicles as they have produced most of the emissions in the transportation sector in Hong Kong. Taxis and public minibuses in Hong Kong have already shifted to LPG with much lower emissions. The Government has set up a HK$1.3 billion "New Energy Transport Fund" and a separate "Low-carbon Green Research Fund" to hasten the development of electric vehicles. Pilot schemes for electric public buses and electric single-decker buses are well under way. Our several proposals are designed to add to the existing mix of policies to speed up the transition process.

This is the last policy paper of our series on emission reduction policies for Hong Kong. We hope that these policy papers will play a small part in helping Hong Kong to achieve carbon neutrality by 2050. Please feel free to discuss and provide feedback to our policy papers via email at sushkhub@cityu.edu.hk.

[6] See CSHK Policy Paper 22, Linda Chelan Li, Liang Dong, Phyllis Lai Lan Mo, Yunhong Liu, Kin On Li "Refining "market control" and "Commercialisation Mechanism" policies to accelerate Energy Transition in Hong Kong"