

Pilot Green Transport Fund

Interim Report

On

Trial of Electric Light Goods Vehicle for

Retail and Wholesale Industry II

(Kau Kee Hong Kong Limited)

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The Monitoring and Evaluation Team's views expressed in this report do not necessarily reflect the views of the Environmental Protection Department, HKSAR.

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(Kau Kee Hong Kong Limited)**

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(Reporting Period: 1 October 2020 – 31 March 2021)**

Executive Summary

1. Introduction

1.1 The Pilot Green Transport Fund (the Fund) is set up to encourage transport operators to try out green innovative transport technologies, contributing to better air quality and public health for Hong Kong. Kau Kee Hong Kong Limited (Kau Kee) was approved under the Fund for trial of one electric light goods vehicle for retail and wholesale industry. Kau Kee, through the tendering procedures stipulated in the Agreement entered into with the Government, procured one Renault Kangoo Z.E. 33 electric light goods vehicle (EV) for trial. According to the manufacturer, the EV has a gross vehicle weight (GVW) of 2,270 kg and a travel range of 270 km with its battery fully charged and air-conditioning off.

1.2 PolyU Technology and Consultancy Company Limited has been engaged by the Environmental Protection Department as an independent third party assessor (the Assessor) to monitor the trial and evaluate the performance of the trial vehicle. Kau Kee assigned a Hino diesel light goods vehicle with a GVW of 5,500 kg and 4,009 c.c. engine, which provided similar service, as the conventional counterpart for comparison.

1.3 This Interim Report summarizes the performance of the EV in the first six months of the trial as compared with its conventional counterpart, i.e. the DV.

2. Trial and Conventional Vehicles

2.1 Key features of the EV, the charging facility and the DV are in Appendix 1 and their photos are in Appendix 2. The EV and the DV were used for the distribution of wholesale and retail goods to different areas of Hong Kong.

2.2 Kau Kee has installed its own 7 kW AC charging facility inside its car-park in Kwai Chung where the EV is normally parked overnight. The AC charging facility is used for charging and recording the amount of electricity consumed.

3. Trial Information

3.1 The trial commenced on 1 October 2020 and would last for 24 months. Kau Kee was required to collect and provide trial information including the EV's mileage reading before charging, amount of electricity consumed and time used in each charging, operation downtime due to charging, cost and downtime associated with scheduled and unscheduled maintenances of the EV and the charging facility. Similar set of data of the DV was also required. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the driver were collected to reflect any problems of the EV.

4. Findings of Trial

4.1 The following table summarizes the statistical data of the EV and the DV. The average fuel cost of the EV was HK\$2.37/km (91%) lower than that of the DV. The average total operating cost of the EV was HK\$3.44/km (81%) lower than that of the DV.

Table 1: Key operation statistics of each vehicle (October 2020 to March 2021)

		EV	DV
Total mileage (km)		7,174	7,691
Average daily mileage (km/working day)		46.7	50.4
Average fuel economy	(km/kWh)	5.16	-
	(km/litre)	-	5.75
	(km/MJ)	1.43	0.16 ^[1]
Average fuel cost (HK\$/km)		0.24 ^[2]	2.61 ^[3]
Average total operating cost (HK\$/km) ^[4]		0.79	4.23
Downtime (working day) ^{[4][5]}		3	3.5

^[1] Assuming lower heating value of 36.13 MJ/litre for diesel fuel

^[2] Electricity cost is based on the market price HK\$1.218/kWh

^[3] The market fuel price was used for calculation

^[4] Maintenance not related to vehicle performance was not included in comparison

^[5] Downtime refers to the working days in which the vehicle is not in operation due to maintenance, counting from the first day it stops operation till the day it is returned to the operator.

4.2 Apart from the fuel cost, maintenance cost and other indirect costs which may include parking fee, towing fee, vehicle replacement fee and cost of operation downtime due to charging and maintenance of the EV are also included in Table 1. There was one scheduled maintenance for the EV and two unscheduled maintenances for the DV in this reporting period.

4.3 The EV had 3 days of downtime and the DV had 3.5 days of downtime. Hence, the utilization rates were 98.1% for the EV and 97.8% for the DV. The average daily mileages of the EV and the DV were 46.7 km/day and 50.4 km/day respectively.

4.4 The driver of the EV had no problem in operating the EV and was satisfied with the performance of the EV. However, he prefers to drive the DV rather than the EV and considers that the DV was much more powerful on uphill driving.

5. Summary

5.1 The average fuel cost of the EV was HK\$2.37/km (91%) lower than that of the DV. The average total operating cost of the EV was HK\$3.44/km (81%) lower than that of the DV. The utilization rates were 98.1% for the EV and 97.8% for the DV.

5.2 In general, the driver of the EV had no problem in operating the EV and was satisfied with its performance.

5.3 The findings only reflect the performance of the EV in the first six months of the trial. The performance and reliability of the EV will be continuously monitored in the 24 months of the trial.

Appendix 1: Key Features of the Vehicles and Charging Facility

1. Trial EV and Charging Facility

(a) EV

Registration mark	RA2668
Make:	Renault
Model:	Kangoo Z.E. 33
Class:	Light goods vehicle
Gross vehicle weight:	2,270 kg
Seating capacity:	Driver + 4 passengers
Rated power:	44 kW
Travel range:	270 km (air conditioning off)
Battery material:	lithium-ion
Battery capacity:	33 kWh
Year of manufacture:	2019

(b) Charging Facility

Make:	EV Power
Model:	EVC-32NK
Output:	220V AC / max 32A
Charging Standard:	IEC62196-2 Type 2

2. DV Used for Comparison

Registration mark	EU1192
Make:	HINO
Model:	XZU425RHKFQD3
Class:	Light Goods Vehicle
Seating capacity:	Driver + 2 passengers
Gross vehicle weight:	5,500 kg
Cylinder capacity:	4,009 c.c.
Year of manufacture:	2007

Appendix 2: Photos of Vehicles and Charging Facilities

1. Trial EV and Charging Facilities

	
EV – front view	EV – rear view
	
EV – right side view	EV – left side view
	
Charging facility – 7kW AC charger	Charging facility – watt-hour meter

2. Diesel Vehicle (DV) for Comparison



DV – front view



DV – rear view