

New Energy Transport Fund

Final Report
On
Trial of Electric Light Goods Vehicle for
Logistics Service
(Fong's Logistics Limited)

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PREPARED BY:

Dr. Rick MO

The Monitoring and Evaluation Team's views expressed in this report do not necessarily reflect the views of the Environment and Ecology Bureau (Environment Branch), HKSAR.

List of Monitoring and Evaluation Team Members

Dr. Rick MO (Team Leader)

Smart City Division
Hong Kong Productivity Council

Ms. Rachel CHAN

Smart City Division
Hong Kong Productivity Council

Mr. Michael WU

Smart City Division
Hong Kong Productivity Council

Mr. K.S. LI

Smart City Division
Hong Kong Productivity Council

**New Energy Transport Fund
Trial of Electric Light Goods Vehicle for Logistics Service
(Fong's Logistics Limited)**

**Final Report
(Reporting Period: 1 March 2023 – 29 February 2024)**

Executive Summary

1. Introduction

1.1 The New Energy 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. Fong's Logistics Limited (Fong's) was approved under the Fund for trial of one electric light goods vehicle for logistics service. Fong's, through the tendering procedures stipulated in the Agreement entered into with the Government, procured a Maxus eDeliver 3 electric light goods vehicle (EV) for trial.

1.2 Hong Kong Productivity Council has been commissioned by the Environment and Ecology Bureau (Environment Branch) (EEB) as an independent third party assessor (the Assessor) to monitor the trial and evaluate the performance of the trial vehicle. Fong's assigned a Kia K2500 diesel light goods vehicle (DV) providing same services as the conventional counterpart for comparison.

1.3 This Final Report summarises the performance of the EV in the 12 months of the trial as compared with its conventional counterpart, i.e. the DV.

2. Trial and Conventional Vehicles

2.1 The trial EV, Maxus eDeliver 3 electric light goods vehicle, has a gross vehicle weight of 2,530 kg capable of carrying a driver with a passenger and goods. It has a 50.23 kWh lithium iron phosphate battery pack and a driving range of 371 km with its battery fully charged under WLTP urban conditions. The DV, Kia K2500 diesel light goods vehicle with a gross vehicle weight of 3,240 kg and a diesel engine with a cylinder capacity of 2,497 c.c., was used as the conventional counterpart for comparison in this trial. The EV and the DV were used for delivering maintenance tools and parts for the vending machines and the beverage dispensers of their brands in Hong Kong.

2.2 Fong's installed a designated 7.4 kW single-phase AC charging facility at the office in Yuen Long for charging and recording the amount of electricity charged. Key features of the EV, the charging facility and the DV are detailed in Appendix 1 and photos of the vehicles and the charging facility are shown in Appendix 2.

3. Trial Information

3.1 The trial commenced on 1 March 2023 and lasted for 12 months. Fong's 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, and cost and downtime associated with scheduled and unscheduled maintenances of the EV and the charging facility. Similar data of the DV were also required. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the driver and Fong's were collected to reflect any problems of the EV.

4. Findings of Trial

4.1 The following table summarises the statistical data of the EV and the DV. The average fuel cost of the EV was HK\$2.71/km (about 89%) lower than that of the DV. Taking the maintenance fee and other costs into account, the average total operating cost of the EV was HK\$3.88/km (about 82%) lower than that of the DV in the 12 months of the trial.

Table 1: Key operation statistics of each vehicle (1 March 2023 – 29 February 2024)

		EV	DV
Total distance travelled (km)		8,496	7,324
Average daily mileage (km/working day)		30	25
Average fuel economy	(km/kWh)	4.56	-
	(km/litre)	-	7.32
	(km/MJ)	1.27	0.20 ^[1]
Average fuel cost (HK\$/km)		0.33 ^[2]	3.04 ^[3]
Average total operating cost (HK\$/km) ^[4]		0.84	4.72
Downtime (working day) ^{[4][5]}		11	4

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

^[2] The electricity cost was calculated using average electricity tariff rates of HK\$1.552/kWh (Mar 2023 – Apr 2023); HK\$1.565/kWh (May 2023); HK\$1.559/kWh (Jun 2023); HK\$1.535/kWh (Jul 2023); HK\$1.508/kWh (Aug 2023); HK\$1.482/kWh (Sep 2023); HK\$1.459/kWh (Oct 2023); HK\$1.442/kWh (Nov 2023); HK\$1.431/kWh (Dec 2023) and; HK\$1.523/kWh (Jan 2024 – Feb 2024) as claimed by CLP.

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

^[4] Maintenance due to incident not related to the performance of the vehicle was not included for comparing the performance.

^[5] Downtime refers to the working days that the vehicle is not in operation due to charging or maintenance, which is counted 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. The EV had one scheduled maintenance and two unscheduled maintenances while the DV had one scheduled maintenance in the 12 months of the trial period. The scheduled maintenance of the EV and the DV included regular services and annual government vehicle inspection. The unscheduled maintenances of the EV included the repair of onboard charging system.

4.3 In the 12 months of the trial period, the EV had 11 days of downtime while the DV had 4 days of downtime. Hence, the utilisation rates of the EV and the DV were 96.3% and 98.7%, respectively. Based on the above, the average daily driving distances of the EV and the DV were 30 km and 25 km, respectively.

4.4 The drivers of the EV liked driving the EV and had no problem in operating the EV. Overall, they were satisfied with the performance of the EV and would promote the EV to other drivers. Fong's was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Fong's would encourage other transport operators to try the EVs.

4.5 It is observed that the amount of electricity stored in the battery after a full charging operation could be maintained at the level of 50.23 kWh after the 12-month trial period. Thus, the deterioration in battery capacity within the 12-month trial period was insignificant, if any.

4.6 Based on the total mileage of the EV and the fuel economy of the DV, the equivalent carbon dioxide (CO₂e) emission from the DV could be estimated for comparison purpose. In the 12-month trial period, the CO₂e emission from the EV and the DV were 726 kg and 3,217 kg respectively. Hence, there was a 2,491 kg (about 77%) reduction of CO₂e, with the replacement of the DV by the EV in the trial.

5. Summary

5.1 The average fuel cost of the EV was HK\$2.71/km (about 89%) lower than that of the DV. Taking the maintenance fee and other costs into account, the average total operating cost of the EV was HK\$3.88/km (about 82%) lower than that of the DV. The utilisation rates of the EV and the DV were 96.3% and 98.7%. There was a 2,491 kg (about 77%) reduction of CO₂e, with the replacement of the DV by the EV in the trial.

5.2 It is observed that the amount of electricity stored in the battery after a full charging operation could be maintained at the level of 50.23 kWh after the 12-month trial period. Thus, the deterioration in battery capacity within the 12-month trial period was insignificant, if any.

5.3 The drivers of the EV liked driving the EV and had no problem in operating the EV. Overall, they were satisfied with the performance of the EV. Fong's was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Fong's would encourage other transport operators to try the EVs.

5.4 The findings showed electric light goods vehicles are becoming more affordable and feasible to the transport trade for saving operating cost and reducing CO₂e emissions, provided that the vehicles can get easy access to charging facilities.

Appendix 1: Key Features of Vehicles and Charging Facility

1. Trial EV and Charging Facility

(a) EV

Registration mark:	YD4228
Make:	Maxus
Model:	eDeliver 3
Class:	Light goods vehicle
Gross vehicle weight:	2,530 kg
Payload:	905 kg
Seating capacity:	Driver + 1 passenger
Rated power:	40 kW
Driving range:	371 km (WLTP urban condition)
Battery material:	Lithium iron phosphate
Battery capacity:	50.23 kWh
Year of manufacture:	2022

(b) EV Charging Facility

Make:	Schneider Electric
Model:	EVLink EVH2S7P02K
Power:	7.4 kW, 230V AC / max. 32A
Charging standard:	IEC 61296-2 Type 2

2. DV Used for Comparison

Registration mark:	VB7285
Make:	Kia
Model:	K2500
Class:	Light goods vehicle
Gross vehicle weight:	3,240 kg
Payload:	1,400 kg
Seating capacity:	Driver + 2 passengers
Cylinder capacity:	2,497 c.c.
Year of manufacture:	2016

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV (YD4228) and Charging Facility

	
Front view of EV	Rear view of EV
	
Left side view of EV	Right side view of EV
	
7.4 kW single-phase AC charging facility	Charging facility – watt-hour meter

2. DV (VB7285) used for Comparison



Front view of DV



Rear view of DV



Left side view of DV



Right side view of DV