

New Energy Transport Fund

Final Report
On
Trial of Electric Light Goods Vehicle for
Logistics Service
(Hung Fung Transportation 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. Miracle SUN

Smart City Division
Hong Kong Productivity Council

Mr. Sam SHAN

Smart City Division
Hong Kong Productivity Council

**New Energy Transport Fund
Trial of Electric Light Goods Vehicle for Logistics Service
(Hung Fung Transportation Limited)**

**Final Report
(Reporting Period: 1 October 2023 – 30 September 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. Hung Fung Transportation Limited (Hung Fung) was approved under the Fund for trial of one electric light goods vehicle for logistics service. Hung Fung, through the tendering procedures stipulated in the Agreement entered into with the Government, procured a Maxus e-Deliver 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. Hung Fung assigned a Toyota Hiace 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 e-Deliver 3 electric light goods vehicle, has a gross vehicle weight (GVW) of 2,530 kg, capable of carrying a driver with one passenger and goods. It has a 50.23 kWh lithium iron phosphate battery pack. According to its manufacturer, it has a driving range of 371 km with under WLTP¹ urban condition.

2.2 The DV, Toyota Hiace diesel light goods vehicle with a gross vehicle weight of 3,300 kg and a cylinder capacity of 2,755 c.c. was assigned for the comparison with the EV. There is a designated driver assigned to drive the EV while another designated driver is assigned to drive the DV. Both the EV and the DV were used for delivering goods in Hong Kong.

2.3 Hung Fung has installed a 22 kW three-phase AC charger at its own cost at the office in Yuen Long for charging the EV. 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.

¹ The Worldwide harmonised Light vehicles Test Procedure (WLTP) is a global standard for determining the range of electric vehicles.

3. Trial Information

3.1 The trial commenced on 1 October 2023 and lasted for 12 months. Hung Fung 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. 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 Hung Fung 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\$2.43/km (about 90%) 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\$2.32/km (about 86%) lower than that of the DV in the 12 months of the trial.

Table 1: Key operation statistics of each vehicle (1 October 2023 – 30 September 2024)

		EV	DV ^[1]
Total distance travelled (km)		27,027	49,257
Average daily mileage (km/working day)		93	166
Average fuel economy	(km/kWh)	5.56	-
	(km/litre)	-	8.85
	(km/MJ)	1.54	0.24 ^[2]
Average fuel cost (HK\$/km)		0.27 ^[3]	2.70 ^[4]
Average total operating cost (HK\$/km) ^[5]		0.39	2.71
Downtime (working day) ^{[5][6]}		6.5	0.5

^[1] The operation data of the DV for December 2023 was absent due to the loss of the submission form. The operation data of the DV for December 2023 will be skipped and January 2024 to October 2024 were used for the replacement for December 2023 to September 2024.

^[2] Assuming lower heating value of 36.13 MJ/litre for diesel fuel.

^[3] The electricity cost was calculated using average electricity tariff rates of HK\$1.459/kWh (October 2023); HK\$1.442/kWh (November 2023); HK\$1.431/kWh (December 2023); HK\$1.523/kWh (January 2024 – February 2024); HK\$1.513/kWh (March 2024); HK\$1.507/kWh (April 2024); HK\$1.499/kWh (May 2024); HK\$1.500/kWh (June 2024); HK\$1.496/kWh (July 2024 – August 2024) and HK\$1.495/kWh (September 2024) as reported by CLP.

^[4] The market fuel price was used for calculation.

^[5] Maintenance due to incident not related to the performance of the vehicle was not included for comparing the performance.

^[6] 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 one unscheduled maintenance while the DV had one scheduled maintenance in the 12 months of the trial period. The scheduled maintenance of the EV included government annual vehicle inspection, and its unscheduled maintenance included the software update.

4.3 In the 12 months of the trial period, the EV had 6.5 days of downtime and the DV had 0.5 days of downtime. Hence, the utilisation rates of the EV and the DV were 97.8% and 99.8% respectively. Based on the above, the average daily driving distances of the EV and the DV were 93 km and 166 km, respectively.

4.4 The driver liked driving the EV and had no operation difficulties in driving the EV. In general, he was satisfied with the performance of the EV. Hung Fung was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Hung Fung 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 (CO_{2e}) emission from the DV could be estimated for comparison purpose. In the 12-month trial period, the CO_{2e} emission from the EV and the DV were 1,860 kg and 8,463 kg respectively. Hence, there was a 6,603 kg (about 78%) reduction of CO_{2e}, 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\$2.43/km (about 90%) 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\$2.32/km (about 86%) lower than that of the DV. The utilisation rates of the EV and the DV were 97.8% and 99.8% respectively. There was a 6,603 kg (about 78%) reduction of CO_{2e}, 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 driver liked driving the EV and had no operation difficulties in driving the EV. In general, he was satisfied with the performance of the EV. Hung Fung was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Hung Fung 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 CO_{2e} 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) Trial EV

Registration mark:	HUNGFUNG
Make:	Maxus
Model:	e-Deliver 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 conditions)
Battery material:	Lithium iron phosphate
Battery capacity:	50.23 kWh
Year of manufacture:	2021

(b) Charging Facility (at Recipient's own cost)

Make:	Schneider Electric
Model:	EVLink Smart Wallbox EVB1A22P2RI
Power:	22 kW, 380 V AC / max 32A three-phase
Charging standard:	IEC 61851-1, IEC 61296-2 Type 2 Socket

2. DV Used for Comparison

Registration mark:	WW3391
Make:	Toyota
Model:	Hiace
Class:	Light goods vehicle
Gross vehicle weight:	3,300 kg
Payload:	935 kg
Seating capacity:	Driver + 5 passengers
Cylinder capacity:	2,755 c.c.
Year of manufacture:	2020

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV (HUNGFUNG) and Charging Facility

	
Front view of EV	Rear view of EV
	
Left side view of EV	Right side view of EV
	
22 kW three-phase AC charger (at Recipient's own cost)	

2. DV (WW3391) Used for Comparison



Front view of DV



Rear view of DV



Left side view of DV



Right side view of DV