

New Energy Transport Fund

Final Report
On
Trial of Electric Light Goods Vehicle for
Electrical Engineering Industry
(Yick Tung Engineering Co.)

(16 January 2025)

PREPARED BY:

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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.

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**New Energy Transport Fund
Trial of Electric Light Goods Vehicle for Electrical Engineering Industry
(Yick Tung Engineering Co.)**

**Final Report
(Reporting Period: 1 May 2023 – 30 April 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. Yick Tung Engineering Co. (Yick Tung) was approved under the Fund for trial of one electric light goods vehicle for electrical engineering industry. Yick Tung, through the tendering procedures stipulated in the Agreement entered into with the Government, procured a Joylong EW4 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. Yick Tung assigned a Toyota Hiace KDH201RSSPDY 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, Joylong EW4 electric light goods vehicle, has a gross vehicle weight of 3,700 kg capable of carrying a driver with five passengers and goods. It has a 73 kWh lithium-ion battery pack and a driving range of 300 km with air conditioning off. There was a designated driver assigned to drive the EV.

2.2 The DV, Toyota Hiace KDH201RSSPDY diesel light goods vehicle with a gross vehicle weight of 2,800 kg and a diesel engine with a cylinder capacity of 2,982 c.c., was used as the conventional counterpart for comparison in this trial. Both the EV and the DV were used for delivering maintenance tools and materials to different construction sites in Hong Kong. Since the DV reached its 15-year service life and was phased out in March 2023, only the operation data of the EV were collected during this 12-month trial period. Hence, the historical data of the DV were used for comparison.

2.3 Yick Tung installed a designated 30 kW DC charging facility at the house in Tai Po 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 May 2023 and lasted for 12 months. Yick Tung 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 Yick Tung 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\$2.44/km (about 83%) 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\$2.41/km (about 79%) lower than that of the DV in the 12 months of the trial.

Table 1: Key operation statistics of each vehicle (1 May 2023 – 30 April 2024)

		EV	DV (historical data) ^[1]
Total distance travelled (km)		26,905	22,835
Average daily mileage (km/working day)		92	77
Average fuel economy	(km/kWh)	3.04	-
	(km/litre)	-	7.71
	(km/MJ)	0.84	0.21 ^[2]
Average fuel cost (HK\$/km)		0.50 ^[3]	2.94 ^[4]
Average total operating cost (HK\$/km) ^[5]		0.66	3.07
Downtime (working day) ^{[5][6]}		5	2

^[1] Based on the historical data from 1 January 2022 to 31 December 2022.

^[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\$1.565/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); HK\$1.523/kWh (Jan 2024 – Feb 2024); HK\$1.513/kWh (Mar 2024) and; HK\$1.507/kWh (Apr 2024) as claimed by CLP.

^[4] The market fuel prices from 1 May 2023 to 30 April 2024 were 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. In the 12 months of the trial period, both the EV and the DV had one scheduled maintenance. The scheduled maintenance of the EV included service for government annual vehicle inspection, while that of the DV included service for government annual vehicle inspection and replacement of windscreen.

4.3 In the 12 months of the trial period, the EV had 2 days of downtime due to the charging and 3 days of downtime due to maintenance, while the DV had 2 days of downtime due to maintenance. Thus, the EV had 5 days of downtime in total while the DV had 2 days of

downtime. Hence, the utilisation rates of the EV and the DV were 98.3% and 99.3%, respectively. Based on the above, the average daily driving distances of the EV and the DV were 92 km and 77 km, respectively.

4.4 The driver of the EV had no problem in operating the EV and liked driving the EV. Overall, he was satisfied with the performance of the EV. Yick Tung was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Yick Tung 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 73 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 3,448 kg and 9,676 kg respectively. Hence, there was a 6,229 kg (about 64%) 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\$2.44/km (about 83%) 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\$2.41/km (about 79%) lower than that of the DV. The utilisation rates of the EV and the DV were 98.3% and 99.3%. There was a 6,229 kg (about 64%) 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 73 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 of the EV had no problem in operating the EV and liked driving the EV. Overall, he was satisfied with the performance of the EV. Yick Tung was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Yick Tung 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:	ME3623
Make:	Joylong
Model:	EW4
Class:	Light goods vehicle
Gross vehicle weight:	3,700 kg
Payload:	1,100 kg
Seating capacity:	Driver + 5 passengers
Rated power:	50 kW
Driving range:	300 km (air conditioning off)
Battery material:	Lithium-ion
Battery capacity:	73 kWh
Year of manufacture:	2022

(b) EV Charging Facility

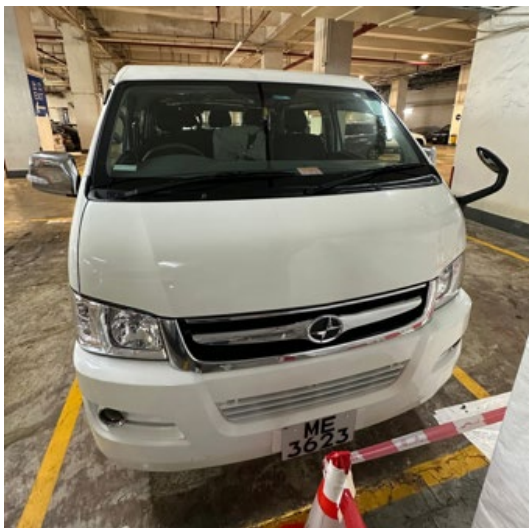
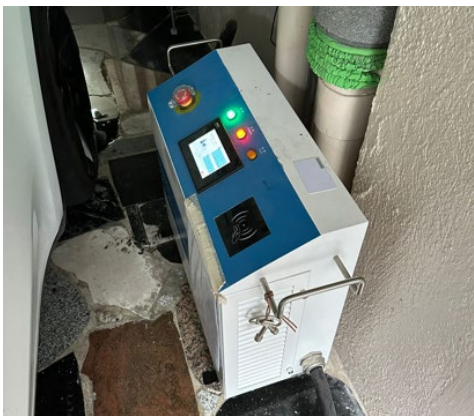
Make:	Only Power Supply
Model:	ANDC5-500V/60A-1
Power:	30 kW, 500V DC / max. 60A
Charging standard:	GB Mode

2. DV Used for Comparison

Registration mark:	YF4857
Make:	Toyota
Model:	Hiace KDH201RSSPDY
Class:	Light goods vehicle
Gross vehicle weight:	2,800 kg
Payload:	850 kg
Seating capacity:	Driver + 5 passengers
Cylinder capacity:	2,982 c.c.
Year of manufacture:	2007

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV (ME3623) and Charging Facility

	
Front view of EV	Rear view of EV
	
Left side view of EV	Right side view of EV
	
30 kW DC charging facility	

2. DV (YF4857) Used for Comparison



Front view of DV



Rear view of DV



Left side view of DV



Right side view of DV