

New Energy Transport Fund

Final Report
On
Trial of Electric Light Goods Vehicle for
Plumbing Industry
(Woon Kee)

(23 May 2025)

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 Plumbing Industry
(Woon Kee)**

**Final Report
(Reporting Period: 1 July 2023 – 30 June 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. Woon Kee was approved under the Fund for trial of one electric light goods vehicle for Plumbing Industry. Woon Kee, through the tendering procedures stipulated in the Agreement entered with the Government, procured a Joylong EW5 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. Woon Kee assigned one 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 EW5 electric light goods vehicle, has a gross vehicle weight (GVW) of 4,300 kg capable of carrying a driver with four passengers and goods. It has a 73.4 kWh lithium-ion battery pack, and the driving range is 330 km with air-conditioning off. The DV, Toyota Hiace KDH201RSSPDY diesel light goods vehicle with a GVW of 2,800 kg and a cylinder capacity of 2,982 c.c., was used as the conventional counterpart for comparison in this trial. There are 2 designated drivers assigned to drive the EV and the DV. The vehicles were used for delivering tools and materials to different construction sites and clients' premises in Hong Kong. The DV reached its service life and was phased out on 24 April 2024. Therefore, the 12-month data of the DV from April 2023 to March 2024 were used for comparison.

2.2 Woon Kee has installed a designated 30 kW DC charging facility for charging the EV 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 July 2023 and lasted for 12 months. Woon 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, 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 drivers and Woon Kee 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\$1.80/km (about 79%) 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\$1.66/km (about 67%) lower than that of the DV in the 12 months of the trial.

Table 1: Key operation statistics of each vehicle (1 July 2023 – 30 June 2024)

		EV	DV ^[1]
Total distance travelled (km)		16,592	7,663
Average daily mileage (km/working day)		56	26
Average fuel economy	(km/kWh)	3.44	-
	(km/litre)	-	9.62
	(km/MJ)	0.96	0.27 ^[2]
Average fuel cost (HK\$/km)		0.49 ^[3]	2.29 ^[4]
Average total operating cost (HK\$/km) ^[5]		0.80	2.46
Downtime (working day) ^{[5][6]}		2	0

^[1] The DV reached its service life and was phased out on 24 April 2024. Therefore, the 12-month data from Apr-23 to Mar-24 were used for comparison.

^[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\$1.918/kWh (Jul-23); HK\$1.842/kWh (Aug-23); HK\$1.769/kWh (Sep-23); HK\$1.693/kWh (Oct-23); HK\$1.634/kWh (Nov-23); HK\$1.608/kWh (Dec-23); HK\$1.622/kWh (Jan-24); HK\$1.622/kWh (Feb-24); HK\$1.619/kWh (Mar-24); HK\$1.609/kWh (Apr-24); HK\$1.585/kWh (May-24); and HK\$1.560/kWh (Jun-24) as reported by HEC.

^[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. In the 12 months of the trial period, the EV underwent one scheduled maintenance and three unscheduled maintenances, while the DV underwent two scheduled maintenances and no unscheduled maintenance. Three unscheduled maintenances of the EV and one scheduled maintenance of the DV are unrelated to the vehicle performance and therefore excluded from the comparison of the vehicle performance.

4.3 In the 12 months of the trial period, the EV had 2 days of downtime while the DV had no downtime. Hence, the utilisation rates of the EV and the DV were 99.3% and 100%,

respectively. Based on the above, the average daily driving distances of the EV and the DV were 56 km and 26 km, respectively.

4.4 The drivers of the EV liked driving the EV and had no operation difficulties in driving the EV. Overall, they were satisfied with the performance of the EV. Woon Kee was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Woon Kee 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 73.4 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 3,051 kg and 4,779 kg respectively. Hence, there was a 1,728 kg (about 36%) 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\$1.80/km (about 79%) 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\$1.66/km (about 67%) lower than that of the DV. The utilisation rates of the EV and the DV were 99.3% and 100%, respectively. There was a 1,728 kg (about 36%) 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 73.4 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 operation difficulties in driving the EV. Overall, they were satisfied with the performance of the EV. Woon Kee was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Woon Kee 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:	YR9179
Make:	Joylong
Model:	EW5
Class:	Light goods vehicle
Gross vehicle weight:	4,300 kg
Payload:	1,300 kg
Seating capacity:	Driver + 4 passengers
Rated power:	100 kW
Driving range:	330 km (air-conditioning off)
Battery material:	Lithium-ion
Battery capacity:	73.4 kWh
Year of manufacture:	2023

(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:	FA9300
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:	2008

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV 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 Used for Comparison



Front view of DV



Rear view of DV



Left side view of DV



Right side view of DV