

New Energy Transport Fund

Final Report
On
Trial of Electric Light Goods Vehicle for
Gardening Service
(Wing Ho Yuen Landscaping Company Limited)

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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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(Wing Ho Yuen Landscaping Company Limited)**

**Final Report
(Reporting Period: 1 February 2024 – 31 January 2025)**

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. Wing Ho Yuen Landscaping Company Limited (Wing Ho Yuen) was approved under the Fund for trial of one electric light goods vehicle for gardening service. Wing Ho Yuen, through the tendering procedures stipulated in the Agreement entered into with the Government, procured a BYD T3 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. Wing Ho Yuen assigned a Hyundai H1 Van AT Euro 5 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, BYD T3 electric light goods vehicle, has a gross vehicle weight (GVW) of 2,420 kg capable of carrying a driver with four passengers and goods. It has a 44.9 kWh lithium iron phosphate battery pack. According to its manufacturer, it has a driving range of 300 km under NEDC¹ conditions.

2.2 The DV, Hyundai H1 Van AT Euro 5 diesel light goods vehicle with a GVW of 3,230 kg and a cylinder capacity of 2,497 c.c. was assigned for the comparison with the EV in this trial. There is a designated driver assigned to drive the EV and another designated driver assigned to drive the DV. Both the EV and the DV provide the same services for delivering gardening tools and materials in Hong Kong.

2.3 Wing Ho Yuen has installed a 30 kW DC charging facility at the office in Kam Tin for charging the EV. The EV was charged when it was not in use. Key features of the EV, the

¹ The New European Driving Cycle (NEDC) is a driving cycle for measuring the electricity consumption and the driving range of electric vehicles.

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 February 2024 and lasted for 12 months. Wing Ho Yuen 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 Wing Ho Yuen 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\$2.04/km (about 87%) 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\$2.11/km (about 78%) lower than that of the DV in the 12 months of the trial.

Table 1: Key operation statistics of each vehicle (1 February 2024 – 31 January 2025)

		EV	DV
Total distance travelled (km)		9,824	23,068
Average daily mileage (km/working day)		34	79
Average fuel economy	(km/kWh)	5.05	-
	(km/litre)	-	10.39
	(km/MJ)	1.40	0.29 ^[1]
Average fuel cost (HK\$/km)		0.30 ^[2]	2.34 ^[3]
Average total operating cost (HK\$/km) ^[4]		0.58	2.69
Downtime (working day) ^{[4][5]}		6	2

^[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\$1.523/kWh (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); HK\$1.495/kWh (September 2024); HK\$1.494/kWh (October 2024); HK\$1.493/kWh (November 2024); HK\$1.500/kWh (December 2024) and HK\$1.537/kWh (January 2025) as reported 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 equivalent number of working days in which the vehicle is not in operation due to charging or 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. In the 12 months of the trial period, the EV had one scheduled maintenance but no unscheduled maintenance, while the DV had three scheduled maintenances and one unscheduled 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 tyres. In addition, the charging facility had one unscheduled maintenance due to PCB failure.

4.3 In the 12 months of the trial period, the EV had 1 day of downtime due to maintenance and 5 days of downtime due to charging facility maintenance, while the DV had 2 days of downtime due to maintenance. Thus, the EV had 6 days of downtime in total while the DV had 2 days of downtime. Hence, the utilisation rates of the EV and the DV were 98.0% and 99.3%, respectively. Based on the above, the average daily driving distances of the EV and the DV were 34 km and 79 km, respectively.

4.4 The driver of the EV had no operation difficulties in driving the EV and liked driving the EV. Overall, he was satisfied with the performance of the EV. Wing Ho Yuen was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Wing Ho Yuen 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 44.9 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 737 kg and 2,627 kg respectively. Hence, there was 1,890 kg (about 72%) 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\$2.04/km (about 87%) 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\$2.11/km (about 78%) lower than that of the DV. The utilisation rates of the EV and the DV were 98.0% and 99.3%, respectively. There was 1,890 kg (about 72%) 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 44.9 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 operation difficulties in driving the EV and liked driving the EV. Overall, he was satisfied with the performance of the EV. Wing Ho Yuen was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Wing Ho Yuen 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:	YW8486
Make:	BYD
Model:	T3
Class:	Light goods vehicle
Gross vehicle weight:	2,420 kg
Payload:	711 kg
Seating capacity:	Driver + 4 passengers
Rated power:	35 kW
Driving range:	300 km (NEDC conditions)
Battery material:	Lithium iron phosphate
Battery capacity:	44.9 kWh
Year of manufacture:	2023

(b) EV Charging Facility

Make:	CEGN
Model:	CL5871-A01C
Power:	30 kW, 150 – 1000V DC / max 100A
Charging standard:	CCS Combo 2

2. DV Used for Comparison

Registration mark:	SY2022
Make:	Hyundai
Model:	H1 Van AT Euro 5
Class:	Light goods vehicle
Gross vehicle weight:	3,230 kg
Payload:	1,150 kg
Seating capacity:	Driver + 5 passengers
Cylinder capacity:	2,497 c.c.
Year of manufacture:	2016

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV (YW8486) 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 (SY2022) Used for Comparison

	
Front view of DV	Rear view of DV
	
Left side view of DV	Right side view of DV