

New Energy Transport Fund

Final Report
On
Trial of Electric Light Goods Vehicle for
Gardening Service
(Wholesome Company)

(23 December 2024)

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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 Gardening Service
(Wholesome Company)**

**Final Report
(Reporting Period: 1 January 2023 – 31 December 2023)**

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. Wholesome Company (Wholesome) was approved under the Fund for trial of one electric light goods vehicle for gardening service. Wholesome, through the tendering procedures stipulated in the Agreement entered into 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. Wholesome assigned a Hyundai H1 Van Standard diesel light goods vehicle (DV) providing same services as the conventional counterpart for comparison.

1.3 Since one vehicle is sufficient for the operation, only the operation data of the EV are collected during this 12-month trial period. On the other hand, the historical data of the DV (1 November 2021 – 30 April 2022) are used for comparison.

1.4 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 of 4,300 kg capable of carrying a driver with 4 passengers and goods. It has a 73.4 kWh lithium-ion battery pack and a driving range of 330 km with air-conditioning off. The DV, Hyundai H1 Van Standard diesel light goods vehicle with a gross vehicle weight of 3,230 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 plants and gardening materials to clients in Hong Kong.

2.2 Wholesome installed a designated 30 kW DC charging facility at the workshop at Fung Chi Tsuen, 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 January 2023 and lasted for 12 months. Wholesome 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 Wholesome 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\$1.65/km (about 80%) 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\$1.41/km (about 68%) lower than that of the DV in the 12 months of the trial.

Table 1: Key operation statistics of each vehicle (1 January 2023 – 31 December 2023)

		EV	DV (historical data) ^[1]
Total distance travelled (km)		18,373	12,105
Average daily mileage (km/working day)		51	33
Average fuel economy	(km/kWh)	3.60	-
	(km/litre)	-	10.50
	(km/MJ)	1.00	0.29 ^[2]
Average fuel cost (HK\$/km)		0.42 ^[3]	2.07 ^[4]
Average total operating cost (HK\$/km) ^[5]		0.66	2.07
Downtime (working day) ^{[5][6]}		2	0.5

^[1] Based on the historical data from 1 November 2021 to 31 October 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\$1.544/kWh (Jan 2023 – Feb 2023); 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) and; HK\$1.431/kWh (Dec 2023) as claimed 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 1 scheduled maintenance while the DV had 1 scheduled maintenance and 2 unscheduled maintenances in the 12 months of the trial period. The scheduled maintenance of the EV included battery regular service and annual government vehicle inspection. The maintenance of the DV included annual government vehicle inspection, front left tyre change and replacement of left headlamp light bulb.

4.3 In the 12 months of the trial period, the EV had 2 days of downtime while the DV had 0.5 days of downtime. Hence, the utilisation rates of the EV and the DV were 99.5% and

99.9%, respectively. Based on the above, the average daily driving distances of the EV and the DV were 51 km and 33 km, respectively.

4.4 The driver of the EV liked driving the EV and had no problem in operating the EV. Overall, he was satisfied with the performance of the EV and would promote the EV to other drivers. Wholesome was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Wholesome 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 1,991 kg and 4,852 kg respectively. Hence, there was a 2,861 kg (about 59%) 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\$1.65/km (about 80%) 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\$1.41/km (about 68%) lower than that of the DV. The utilisation rates of the EV and the DV were 99.5% and 99.9%. There was a 2,861 kg (about 59%) 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 driver of the EV liked driving the EV and had no problem in operating the EV. Overall, he was satisfied with the performance of the EV. Wholesome was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Wholesome 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) EV

Registration mark:	YE6759
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:	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:	NP4266
Make:	Hyundai
Model:	H1 Van Standard
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:	2008

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV (YE6759) 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	Charging facility – watt-hour meter

2. DV (NP4266) used for Comparison



Front view of DV



Rear view of DV



Left side view of DV



Right side view of DV