Pilot Green Transport Fund

Interim Report
On
Trial of Electric Light Goods Vehicle for Civil Engineering Industry
(Vast Profit Construction Engineering Limited)

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(Vast Profit Construction Engineering Limited)

Interim Report
(Reporting Period: 1 December 2021 – 31 May 2022)

Executive Summary

1. Introduction

1.1 The Pilot Green 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. Vast Profit Construction Engineering Limited (Vast Profit) was approved under the Fund for trial of an electric light goods vehicle. Vast Profit, 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 PolyU Technology and Consultancy Company Limited has been engaged by the Environmental Protection Department as an independent third party assessor to monitor the trial and evaluate the performance of the trial vehicle. Vast Profit assigned a Toyota diesel light goods vehicle (DV) providing the same service as the conventional counterpart for comparing with the EV.

1.3 This Interim Report summarizes the performance of the EV in the first six 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 (GVW) of 3,700 kg, capable of carrying a driver with five passengers and goods. It has a 73.4 kWh lithium-ion battery pack with a travel range of 300 km with its battery fully charged and air-conditioning off. The DV used for comparison in this trial is a TOYOTA HIACE diesel light goods vehicle with a GVW of 3,300 kg and an engine with a cylinder capacity of 2,755 c.c.. The EV and the DV were used for visit of construction sites in the north New Territories region.

2.2 Vast Profit installed a designated 30 kW DC charging facility. The EV was not charged every day, and was charged when it was not in use.

2.3 Key features of the EV, the charging facility and the DV are in Appendix 1 and their photos are in Appendix 2.

3. Trial Information

3.1 The trial commenced on 1 December 2021 and would last for 24 months. Vast Profit 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, and operation downtime due to charging, 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 were collected to reflect any problems of the EV.

4. Findings of Trial

4.1 Table 1 summarizes the statistical data of the EV and the DV.

Table 1: Key operation statistics of each vehicle (1 December 2021 – 31 May 2022)

		EV [1]	**DV**
Total distance traveled (km)		971	8,954
Average daily mileage (km per working day)		8	62
Average fuel economy	(km/kWh)	3.66	-
	(km/litre)	-	7.66
	(km/MJ)	1.02	0.212 [2]
Average fuel cost (HK$/km)		0.352 [3]	2.48 [4]
Average total operating cost (HK$/km)		0.352	2.48
Downtime (working day) [5]		0	0

[1] Vast Profit employed the vehicle supplier to provide remote logging of data which started in January 2022. The distance traveled and the fuel consumption data for the EV are based on data recorded from January 2022 to May 2022 with a total of 119 working days for this period.

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

[3] Electricity cost was based on HK$1.218/kWh for 2021 and HK$1.289/kWh for 2022

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

[5] Downtime refers to the working days the vehicle is not in operation, which is counted from the first day it stops operation till the day it is returned to the operator.

4.2 During the 6 months of the trial, there were 144 working days in the reporting period, and 119 working days from January to May 2022. The total distance traveled and the average daily distance traveled of the EV were 971 km and 8 km/day, respectively, while those of the DV were 8,954 km and 62 km/day, respectively. The drivers of EV and DV were different. The low utilization rate of the EV was due to its' driver and operation of construction sites were affected by the epidemic during this reporting period. However, the operation of the DV was not much affected by the epidemic. The average fuel cost of the EV was HK$2.13/km (86%) lower than that of the DV. The average total operating cost of the EV was also HK$2.13/km (86%) lower than that of the DV.

4.3 There were no maintenances for the EV and the DV in the first six months of the trial. The utilization rates were 100% for the EV and the DV.

4.4 The driver had no problem in operating the EV and were satisfied with its performance.

5. Summary

5.1 In the first six months of the trial, the average daily mileage of the EV was 8 km, while that of the DV was 62 km.

5.2 The average fuel cost of the EV was HK$2.13/km (86%) less than that of the DV. The average total operating cost of the EV was also HK$2.13/km (86%) lower than that of the DV. The utilization rates were 100% for the EV and the DV, as no maintenance was required for the EV and the DV.

5.3 The drivers had no problem in operating the EV and were satisfied with its performance.

5.4 The findings only reflect the performance of the EV in the first six months of the trial. The performance and reliability of the EV will be continuously monitored in the 24 months of the trial.

Appendix 1: Key Features of the Vehicles and EV Charging Facility

1. Trial EV and Charging Facility

(a) EV

Registration mark	**FW783**
Make:	JOYLONG
Model:	EW4
Class:	Light goods vehicle
Gross vehicle weight:	3,700 kg
Seating capacity:	Driver + 5 passengers
Rated power:	50 kW
Travel range:	300 km (air conditioning off)
Battery material:	lithium-ion
Battery capacity:	73.4 kWh
Year of manufacture:	2021

(b) Charging Facility

Make:	Hangzhou AoNeng Power Supply Equipment Co. Ltd
Model:	ANDC5-500V/60A-1
Power:	30 kW, DC (max 500V / 60A)
Charging Standard:	GB mode

2. DV Used for Comparison

Registration mark	**WG6979**
Make:	TOYOTA
Model:	HIACE
Class:	Light goods vehicle
Seating capacity:	Driver + 5 passengers
Gross vehicle weight:	3,300 kg
Cylinder capacity:	2,755 cc
Year of manufacture:	2019

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV and EV Charging Facility

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<tr><td>  </td><td>  </td></tr>
<tr><td>EV – Front view</td><td>EV – Rear view</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>EV – Right side view</td><td>EV – Left side view</td></tr>
<tr><td>  </td><td></td></tr>
<tr><td>30kW DC EV charging facility</td><td></td></tr>
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2. Diesel Vehicle (DV) for Comparison

	
DV - Front view	DV - Rear view
	
DV - Right side view	DV - Left side view