Pilot Green Transport Fund

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

(29 July 2022)

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(Shanghai Construction Overseas Engineering Limited)

Interim Report
(Reporting Period: 1 January 2022 – 30 June 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. Shanghai Construction Overseas Engineering Limited (Shanghai Construction) was approved under the Fund for trial of one electric light goods vehicle. Shanghai Construction, 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. Shanghai Construction assigned a Hyundai 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 Hyundai diesel light goods vehicle with a GVW of 3,230 kg and an engine with a cylinder capacity of 2,497 c.c.. The EV was used for the delivery of tools and material to construction sites in Tai Po region. The DV was scrapped after a traffic accident on 14 June 2022. Shanghai Construction would arrange another DV as conventional counterpart for comparison.

2.2 Shanghai Construction installed a 22 kW charging facility on its own cost for charging the EV. The EV was charged almost on each working day.

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 January 2022 and would last for 24 months. Shanghai Construction 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 January 2022 – 30 June 2022)

		EV	**DV**
Total distance traveled (km)		8,680	12,166
Average daily mileage (km per working day)		72	101
Average fuel economy	(km/kWh)	2.63	-
	(km/litre)	-	6.40
	(km/MJ)	0.73	0.177 [1][4]
Average fuel cost (HK$/km)		0.49 [2]	3.09 [3][4]
Average total operating cost (HK$/km)		0.49	3.09
Downtime (working day) [5]		0	0

[1] Assuming lower heating value of 36.13 MJ/litre for diesel fuel
[2] Electricity cost was based on HK$1.289/kWh
[3] The market fuel price was used for calculation
[4] The mileage reading reported by Shanghai Construction in February and March 2022 had been adjusted.
[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 There were 120 working days in the reporting period. The total distance traveled and the average daily distance traveled of the EV were 8,680 km and 72 km/day, respectively, while those of the DV were 12,166 km and 101 km/day, respectively. The average fuel cost of the EV was HK$2.60/km (84%) lower than that of the DV. The average total operating cost of the EV was also HK$2.60/km (84%) 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. The DV was scrapped after

a traffic accident on 14 June 2022 but no maintenance cost was involved.

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

5. Summary

5.1 In the first six months of the trial, the average daily mileage of the EV was 72 km, while that of the DV was 101 km.

5.2 The average fuel cost of the EV was HK$2.60/km (84%) less than that of the DV. The average total operating cost of the EV was also HK$2.60/km (84%) 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 driver had no problem in operating the EV and was 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 Charging Facility

1. Trial EV and Charging Facility

(a) EV

Registration mark:	**XN7460**
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 (At the Subsidy Recipient's Own Cost)

Make:	Hangzhou AoNeng Power Supply Equipment Co. Ltd
Model:	ANACE11-400V/32A-1
Power:	22 kW, AC (max 400V / 32A)
Charging Standard:	GB mode

2. DV Used for Comparison

Registration mark	**UT5563**
Make:	Hyundai
Model:	HI VAN STANDARD EURO 5
Class:	Light goods vehicle
Seating capacity:	Driver + 5 passengers
Gross vehicle weight:	3,230 kg
Cylinder capacity:	2,497 cc
Year of manufacture:	2012

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV and Charging Facility

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<tr><td>  </td><td>  </td></tr>
<tr><td>EV – front view</td><td>EV – end 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>22 kW AC 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