Pilot Green Transport Fund

Interim Report
On
Trial of Electric Light Goods Vehicle for Mechanical Plant Maintenance Service (China Wealth Hong Kong Machine Limited)

(28 July 2021)

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Pilot Green Transport Fund
Electric Light Goods Vehicle for Mechanical Plant Maintenance Service
China Wealth Hong Kong Machine Limited

Interim Report
(Reporting Period: 1 December 2020 – 31 May 2021)

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. China Wealth Hong Kong Machine Limited (China Wealth) was approved under the Fund for trial of one electric light goods vehicle to deliver the mechanical plant maintenance tools and materials among its site office, warehouses and a number of clients' sites in various areas of Hong Kong. Through the tendering procedure stipulated in the Agreement signed with the Government, China Wealth procured a DFSK EC35 electric light goods vehicle (EV) for trial.

1.2 The 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. China Wealth assigned a TOYOTA HIACE diesel light goods vehicle (DV) which provided similar services 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 the conventional counterpart, i.e. the DV.

2. Trial and Conventional Vehicles

2.1 Key features and photos of the EV, the EV charging facility and the DV are provided in Appendix 1 and Appendix 2, respectively. There were no fixed daily routes and drivers for the EV. In the first 6 months of the trial, the average daily (working day) mileage of the EV was 115 km while that of the DV was 97 km.

2.2 The EV had no designated driver. The EV was charged overnight with a 7 kW charging facility installed at China Wealth's site office car-park in Wang Toi Shan, Pat Heung.

3. Trial Information

3.1 The trial commenced on 1 December 2020 and would last for 24 months. China Wealth was required to collect and provide trial information including the vehicle mileage reading before recharging, amount of energy in each recharging, cost and downtime associated with scheduled and unscheduled maintenances of the EV. Similar set of data of the DV was also required. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the drivers were collected to reflect any problems of the EV.

4. Findings of Trial

4.1 The following table summarizes the statistical data of the EV and DV.

Table 1: Key operation statistics of the vehicles (1 December 2020 to 31 May 2021)

		EV	**DV**
Total distance travelled (km)		17,198	14,513
Average daily mileage (km/working day)		115	97
Average fuel economy	(km/kWh)	5.02	-
	(km/litre)	-	9.82
	(km/MJ)	1.39	0.27 [1]
Average fuel cost (HK$/km) [2]		0.24	1.61
Average total operating cost (HK$/km) [3]		0.35	1.66
Downtime (working day) [3] [4]		1	0

[1] Assuming lower heating value of 36.13 MJ/litre for diesel fuel.
[2] The market fuel price was used for calculation.
[3] Maintenance due to incident not related to the performance of the vehicle was not included for comparing the performance.
[4] Downtime refers to the equivalent number of working days in which the vehicle is not in operation due to maintenance, counting from the first day it stops operation till the day it is returned to the operator.

4.2 In the first six-month trial period, the average fuel cost of the EV was lower than that of the DV by HK$1.37/km (85%). Taking into account the maintenance cost in the trial period, the average total operating cost of the EV was lower than that of the DV by HK$1.31/km (79%).

4.3 There were 150 working days in the first 6 months of the trial. For the EV, it had 1 day of downtime for one scheduled maintenance, hence the utilization rates of the EV was 99.3%. The utilization rate of the DV was 100% as there was no downtime for its required simple one unscheduled maintenance for replacing the battery.

4.4 The driver found that the operation of the EV was smooth and had no problem in operating the vehicle. However, they were worried about its driving range, so they charged the EV whenever they had a chance. One of them felt that the EV was not as good as the DV in the steering handling and the noise level of the vehicle cabin. Overall, the drivers were satisfied with the performance of the EV.

5. Summary

5.1 In the first 6 months of the trial, the average fuel cost of the EV was lower than that of the DV by HK$1.37/km (85%). Taking into account the maintenance, the average operating cost of the EV was lower than that of the DV by HK1.31/km (i.e., about 79%). The utilization rates of the EV and the DV was 99.3% and 100%, respectively.

5.2 The drivers had no problem in operating the EV and were quite satisfied with its performance, except on the limited driving range.

5.3 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	**CW8318**
Make:	DFSK
Model:	EC35
Class:	Light Goods Vehicle
Gross vehicle weight:	2,330 kg
Seating capacity:	driver + 4 passengers
Travel range:	300 km (air-conditioning off)
Rated Power:	30 kW
Battery type:	Lithium-ion
Battery capacity:	41.4 kWh
Year of manufacture:	2020

(b) Charging Facility

Phase:	Single-phase
Rated input voltage:	220 V
Rated input frequency:	50 Hz
Rated input current:	32 A
Maximum input power:	7 kW
Output socket:	IEC Type 2 Universal Socket

2. DV Used for Comparison

Registration mark	**SR1318**
Make:	TOYOTA
Model:	HIACE Diesel LWB
Class:	Light Goods Vehicle
Gross vehicle weight:	2,800 kg
Seating capacity:	driver + 5 passengers
Cylinder capacity:	2,982 c.c.
Year of manufacture:	2014

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV and Charging Facility

(a) Trial EV (CW8318)

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<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>
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(b) Charging Facility

The single-phase 7 kW charger with the electricity meter

2. DV (SR1318) for Comparison

	
DV – front view	DV –rear view
	
DV – right side view	DV – left side view