Pilot Green Transport Fund

Interim Report
On
Trial of Electric Light Goods Vehicle for Manufacture and Wholesale of Noodles (Real Best Limited)

(29 June 2021)

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(Real Best Limited)

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

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. Real Best Limited (Real Best) was approved under the Fund for trial of one electric light goods vehicle for noodles delivery. Real Best, through the tendering procedures stipulated in the Agreement entered into with the Government, procured one JOYLONG EW4-A electric light goods vehicle (EV) for trial. According to the manufacturer, the EV has a travel range of 260 km with its battery fully charged and air-conditioning off.

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. Real Best assigned a TOYOTA HIACE diesel light goods vehicle (DV) with a GVW of 2,800 kg and 2,982 c.c. engine and provided similar service as the conventional counterpart for comparison.

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.

2. Trial and Conventional Vehicles

2.1 Key features of the EV, the charging facility and the DV are in Appendix 1 and photos of the vehicles and the charging facility are in Appendix 2. The EV was normally parked at night inside the Transport City Building, Tai Wai, Shatin. The EV was used for the distribution of noodles in Hong Kong.

2.2 Real Best installed a 30 kW DC charging facility inside the Transport City Building, Tai Wai, Shatin for charging and recording the amount of electricity charged. The EV was charged when it was not in use, and was not charged every day.

3. Trial Information

3.1 The trial commenced on 1 July 2020 and would last for 24 months. Real Best 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 The following table summarizes the statistical data of the EV and the DV. The average fuel cost of the EV was HK$1.04/km (about 71%) lower than that of the DV. The average total operating cost of the EV was also HK$1.04/km (about 71%) lower than that of the DV.

Table 1: Key operation statistics of each vehicle (1 July 2020 – 31 December 2020)

		EV	**DV**
Total distance travelled (km)		5,647	49,606
Average distance travelled (km) per working day		32	270
Average fuel economy	(km/kWh)	2.82	-
	(km/litre)	-	9.82
	(km/MJ)	0.78	0.27[1]
Average fuel cost (HK$/km)		0.43[2]	1.47[3]
Average total operating cost (HK$/km)		0.43[2]	1.47[3]
Downtime (working day) [4]		5	0

[1] Assuming lower heating value of 36.13 MJ/litre for diesel fuel
[2] Electricity cost is based on HK$1.218/kWh
[3] The market fuel price was used for calculation
[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 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. There were two unscheduled maintenances but no scheduled maintenance for the EV, while there was no scheduled or unscheduled maintenance for the DV in the first six months of the trial. The first unscheduled maintenance of the EV was for checking condition of the battery charger and upgrading the computer system. The second unscheduled maintenance of the EV was for renewing the programme for battery charging. There was no maintenance cost incurred by the EV as it was still under warranty. Besides, the EV was in working condition during the second unscheduled maintenance but Real Best reserved it for the maintenance work for 20 days. Therefore, the 20 days of downtime were not included in

the calculation of utilization rate. The DV did not have any downtime.

4.3 There were 5 days of downtime for the EV but no downtime for the DV. The utilization rates were 97% for the EV and 100% for the DV. Based on the above, the average daily mileages of the EV and the DV were 32 km/day and 270 km/day respectively.

4.4 The driver had no problem in operating the EV, except that the EV might slip backward when it was started on uphill driving. The problem has been reported to the EV supplier. The EV supplier expressed that when they delivered the electric light goods vehicles to the customers, including Real Best, they would provide them with driving training lessons, including proper procedures for re-start operation on slope against slipping backwards. The EV supplier indicated that the proper procedures have been mentioned in its operation manual, and was of the view that this problem could be tackled through enhancement on driving technique. They would follow up with Real Best and could arrange more training to its driver on need basis.

4.5 In addition, the driver and Real Best were not satisfied with the mileage of the EV after charging which was about 170 km with air-conditioning on under their operation.

5. Summary

5.1 The average fuel cost of the EV was about 71% (HK$1.04/km) less than that of the DV. The average total operating cost of the EV was also about 71% (HK$1.04/km) lower than that of the DV. The utilization rates were 97% and 100% for the EV and the DV respectively.

5.2 The driver had no problem in operating the EV, except that the EV might slip backward when it was started on uphill driving. The EV supplier had advised Real Best to follow the operation manual when restarting the EV on slope to avoid slipping backwards, and could arrange training to its driver on need basis. The driver and Real Best were not satisfied with the travel range of the EV after full charging, which was much lower than that of the DV after being fully refueled with diesel.

5.3 The findings only reflect the performance of the EV in the first six months of the trial. More time is therefore needed to test the performance and reliability of the EV.

Appendix 1: Key Features of the Vehicles and Charging Facility

1. Trial EV and Charging Facility

(a) EV

Registration mark	**WR5507**
Make:	JOYLONG
Model:	EW4-A
Class:	Light goods vehicle
Gross vehicle weight:	3,700 kg
Seating capacity:	Driver + 5 passengers
Rated power:	50 kW
Travel range:	260 km (air conditioning off)
Battery material:	lithium-ion
Battery capacity:	64.8 kWh
Year of manufacture:	2019

(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	**UL3224**
Make:	TOYOTA
Model:	HIACE Diesel LWB
Class:	Light Goods Vehicle
Seating capacity:	Driver + 5 passengers
Gross vehicle weight:	2,800 kg
Cylinder capacity:	2,982 cc
Year of manufacture:	2016

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV and Charging Facility

(a) EV (WR5507)

EV – front view

EV – end view

EV – right side view

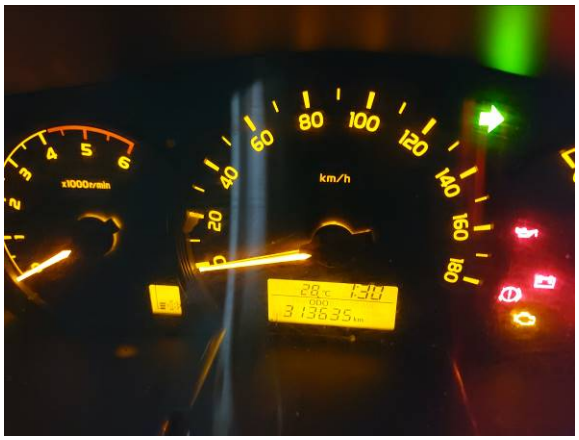
EV – left side view

(b) Charging Facility

30kW DC charging facility

2. DV for Comparison

DV (UL3224)

	
DV Front View	DV odometer reading