

Pilot Green Transport Fund

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

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The Monitoring and Evaluation Team's views expressed in this report do not necessarily reflect the views of the Environmental Protection Department, HKSAR.

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Pilot Green Transport Fund
Trial of Electric Light Goods Vehicle for Manufacture and Wholesale of Noodles
(Real Best Limited)

Interim Report
(Reporting Period: 1 July 2020 – 30 June 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. 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 twelve 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 and Real Best 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\$1.13/km (about 73%) lower than that of the DV. The average total operating cost of the EV was HK\$0.85/km (about 53%) lower than that of the DV.

Table 1: Key operation statistics of each vehicle (1 July 2020 – 30 June 2021)

		EV ^[1]	DV
Total distance travelled (km)		8,081	102,744
Average daily mileage (km/working day)		30	282
Average fuel economy	(km/kWh)	2.91	-
	(km/litre)	-	9.87
	(km/MJ)	0.81	0.27 ^[2]
Average fuel cost (HK\$/km)		0.42 ^[3]	1.55 ^[4]
Average total operating cost (HK\$/km)		0.76	1.61
Downtime (working day) ^[5]		7	1

^[1] Real Best had not used the EV from 4 to 23 December 2020 and in May 2021. Besides, no driver was available to drive the EV in June 2021

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

^[3] Electricity cost is based on HK\$1.218/kWh

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

^[5] 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. In the first twelve months of the trial, there were one scheduled maintenance and two unscheduled maintenances for the EV, leading to 7 days of downtime. The DV had one scheduled maintenance leading to 1 day of downtime, but no unscheduled maintenance. The scheduled maintenances of the EV and the DV were for conducting annual examinations. 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.

4.3 The utilization rates were therefore 97.7% for the EV and 99.7% for the DV. Based on the above, the average daily mileages of the EV and the DV were 30 km/day and 282 km/day respectively. In addition, there was no indication on the deterioration of the EV's performance in the first 12 months of the trial.

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 proper procedures for re-start operation on slope against slipping backwards have been mentioned in its operation manual and explained to the EV owner during the training sessions when the EV was delivered, and was of the view that this problem could be tackled through enhancement on driving technique. They had followed up with Real Best and arranged training to its driver. However, Real Best reflected that slip backward might still happen when the EV was re-started on the very steep driveway inside the Transport City Building.

4.5 Real Best agreed that using the EV is good because it can provide a greener and quieter environment as well as having a lower fuel cost. However, the driver and Real Best were not satisfied with the driving range of the EV after charging which was about 170 km with air-conditioning on under their operation, but Real Best originally expected the driving range to be 300 km after charging. Therefore, the EV was not used every day, leading to the very low average daily mileage compared with that of the DV.

5. Summary

5.1 The average fuel cost of the EV was about 73% (HK\$1.13/km) less than that of the DV. The average total operating cost of the EV was 53% (HK\$0.85/km) lower than that of the DV. The utilization rates were 97.7% and 99.7% for the EV and the DV respectively. In addition, there was no indication on the deterioration of the EV's performance.

5.2 Real Best agreed that using the EV is good because it can provide a greener and quieter environment as well as having a lower fuel cost. 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. In addition, 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 twelve 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 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

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

EV (WR5507)



EV – front view



EV – end view



EV – right side view



EV – left side view

Charging Facility



30kW DC charging facility

2. DV for Comparison

DV (UL3224)



DV Front View



DV odometer reading