Pilot Green Transport Fund

Interim Report
On
Trial of Electric Light Goods Vehicle for Vegetable Delivery II
(Vegetable Marketing Organization)

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Interim Report
(Reporting Period: 1 June 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. Vegetable Marketing Organization (VMO) was approved under the Fund for trial of one electric light goods vehicle for vegetable delivery. VMO, through the tendering procedures stipulated in the Agreement entered into with the Government, procured a JOYLONG EW5 electric light goods vehicle (EV) for trial. According to the manufacturer, the EV has a travel range 330 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. VMO assigned a TOYOTA HIACE diesel light goods vehicle (DV) providing the same service as the conventional counterpart for comparing with the EV. Since the operation of the EV, the DV was replaced by the EV. Hence, historical data of the DV were used 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, i.e. the DV.

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 used for the delivery of vegetables to various districts on Hong Kong Island and in Kowloon and the New Territories.

2.2 VMO installed a 30 kW DC charging facility inside the car park of Cheung Sha Wan Vegetable Marketing Organization office for charging and recording the amount of electricity charged. The EV was charged almost every day.

3. Trial Information

3.1 The trial commenced on 1 June 2020 and would last for 24 months. VMO 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 VMO 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$1.9/km (83%) lower than that of the DV. The average total operating cost of the EV was HK$2.33/km (80%) lower than that of the DV.

Table 1: Key operation statistics of each vehicle (1 June 2020 – 31 May 2021)

		EV	**DV**
Total distance travelled (km)		27,441	29,672
Average daily mileage (km/working day)		88	95
Average fuel economy	(km/kWh)	3.13	-
	(km/litre)	-	6.54
	(km/MJ)	0.87	0.18[1]
Average fuel cost (HK$/km)		0.39[2]	2.29[3]
Average total operating cost (HK$/km) [4]		0.59	2.92
Downtime (working day)[4] [5]		2	2

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

[2] Electricity cost is based on HK$1.218/kWh

[3] Fuel consumption data were based on the historical data of 1 April 2019 to 31 March 2020. For comparison purpose, fuel price was based on market fuel prices of June 2020 to May 2021.

[4] Maintenance due to incident not related to the performance of the vehicle was not included for comparing the performance.

[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 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. Regarding the maintenance related to the EV performance, there were one scheduled but no unscheduled maintenance for the EV whilst the DV had one scheduled and five unscheduled maintenances. The scheduled maintenances of both were for conducting annual examinations. The unscheduled maintenances of the DV were for the replacement of air and oil filters, lubricating oil, clutch disc and bearings, checking of engine exhaust gas recirculation valve and cleaning of inlet pipe, etc.

4.3 The EV and the DV each had two days of downtime. The utilization rates were 99.4% for both of them. The average daily mileages of the EV and the DV were 88 km/day and 95 km/day respectively. Besides, there was no indication on the deterioration of the EV's performance.

4.4 The driver had no problem in operating the EV and was satisfied with its performance. VMO is of the view that using the EV is good because it can provide a greener and quiet environment as well as having a lower fuel cost. VMO is looking for 5,500kg electric light goods vehicle for trial.

5. Summary

5.1 The average fuel cost of the EV was 83% (HK$1.9/km) less than that of the DV. The average total operating cost of the EV was 80% (HK$2.33/km) lower than that of the DV. The utilization rates were 99.4% for both the EV and the DV. In the first twelve months of the trial, there was no indication on the deterioration of the EV's performance.

5.2 The driver of the EV had no problem in operating the EV. Both the driver and VMO were satisfied with the performance of the EV.

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 the Vehicles and Charging Facility

1. Trial EV and Charging Facility

(a) EV

Registration mark	**WN7973**
Make:	JOYLONG
Model:	HKL5041XXYBEVI (EW5)
Class:	Light goods vehicle
Gross vehicle weight:	4,300 kg
Seating capacity:	Driver + 4 passengers
Rated power:	100 kW
Travel range:	330 km (air conditioning off)
Battery material:	lithium-ion
Battery capacity:	73.4 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

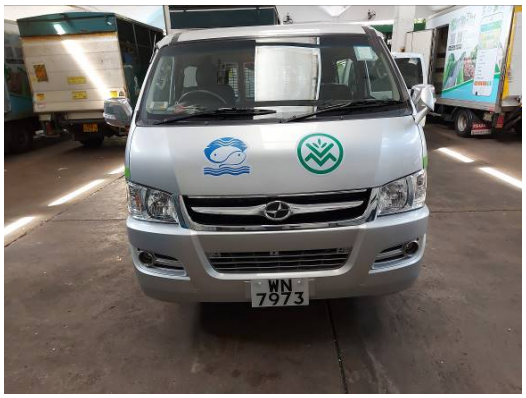
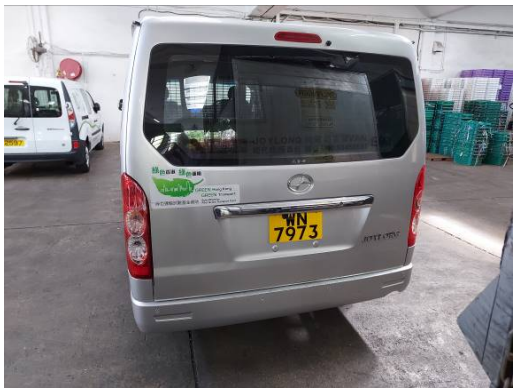
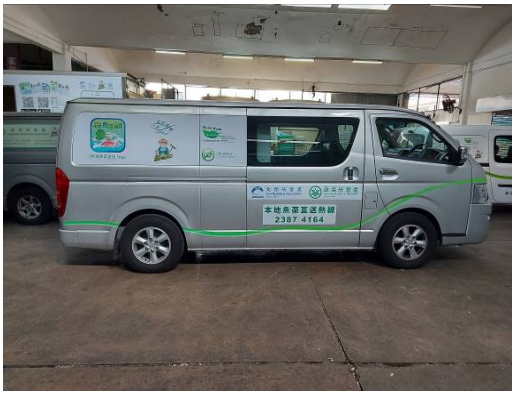
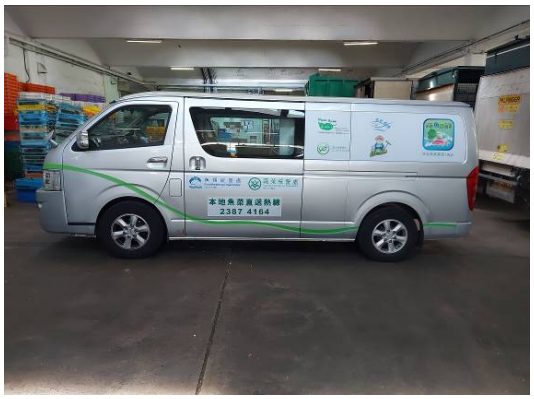
2. DV for Comparison

Registration mark	**SG4115**
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:	2013

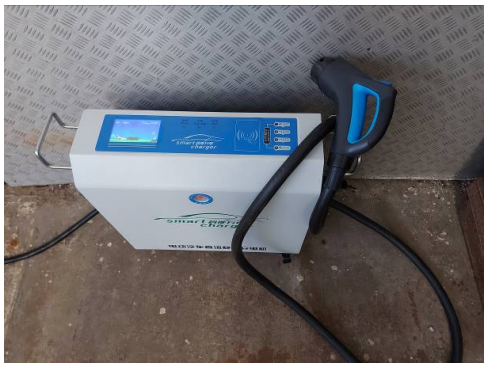
Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV and Charging Facility

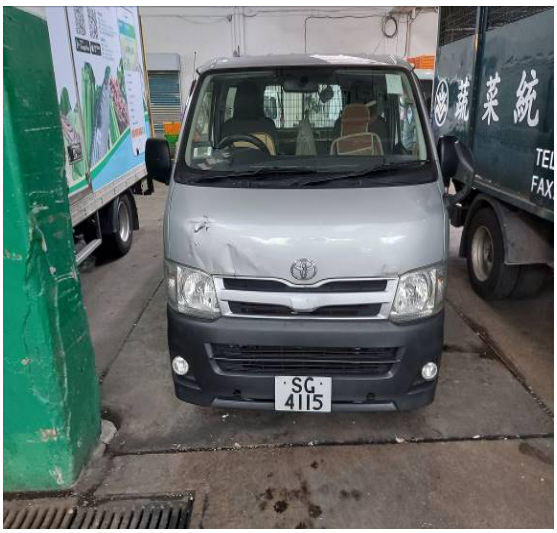
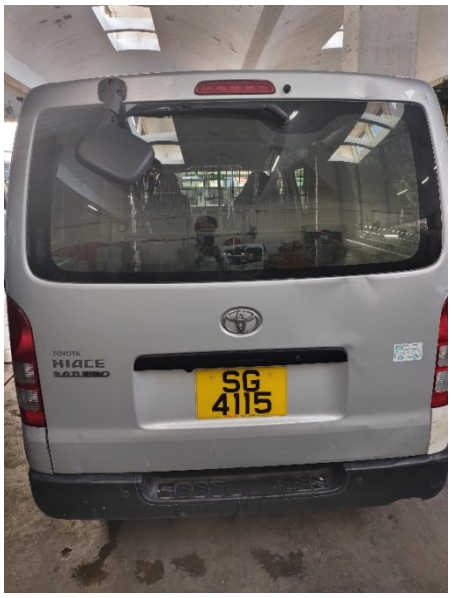
(a) EV (WN7973)

	
EV – front view	EV – rear view
	
EV – right side view	EV – left side view

(b) Charging Facility

	
30 kW DC charging facility	

2. Diesel Vehicle (DV) for Comparison

	
DV – front view	DV – rear view