

Pilot Green Transport Fund

Interim Report On Trial of Electric Medium Goods Vehicle for Logistics Services (Regal Transportation Services (Asia) 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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Trial of Electric Medium Goods Vehicle for Logistics Services
(Regal Transportation Services (Asia) Limited)

Interim Report
(Trial Period: 1 April 2020 – 31 March 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. Regal Transportation Services (Asia) Ltd (Regal) was approved under the Fund for trial of one electric medium goods vehicle for logistics services. Through the tendering procedure stipulated in the Subsidy Agreement signed with the Government, Regal procured a BYD Q1R electric medium goods vehicle (tractor) (hereafter called EV) for trial.

1.2 PolyU Technology and Consultancy Company Limited (PTeC) has been engaged by the Environmental Protection Department (EPD) as an independent third party assessor to monitor the trial and evaluate the performance of the trial vehicle. Regal assigned a SCANIA diesel medium goods vehicle (tractor) (hereafter called DV) providing the same services as the conventional counterpart for comparing with the EV.

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, its charging facility and the DV are in Appendix 1 and photos of the vehicles and charging facility are in Appendix 2. The vehicles were used for carrying container boxes inside the Tsing Yi Container Terminal 9 and in Kwai Tsing district. According to the EV's manufacturer, the EV's gross vehicle weight (GVW) is 16,000 kg and the battery rated power is 150kW. It has a driving range of 150 km (when air conditioning off). The EV had a designated charging station in the Tsing Yi Container Terminal 9. Regal assigned the DV, 16,000 kg GVW SCANIA with a cylinder capacity of 12,742 cc for comparison with the EV.

3. Trial Information

3.1 The trial started on 1 April 2020 and would last for 24 months. Regal was required to collect and provide trial information including the EV mileage reading before charging, amount of electricity consumed in each charging, time taken for charging, operation downtime due to charging, cost and downtime associated with scheduled and unscheduled maintenance of the EV and the charging facility. A similar set of data from the DV was also required. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the driver and Regal were collected and provided 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 April 2020 – 31 March 2021)

		EV	DV
Total distance travelled (km)		21,156	33,693
Average daily distance traveled per working day (km/day)		58	92
Average fuel economy	(km/kWh)	0.45	-
	(km/litre)	-	1.05
	(km/MJ)	0.13	0.03 ^[1]
Average fuel cost (HK\$/km)		2.72	13.94
Average total operating cost (HK\$/km) ^[2]		2.73	14.63
Downtime (working day) ^{[2][3]}		34	9.5

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

^[2] Maintenance due to incident not related to the performance of the vehicle was not included for comparing the performance.

^[3] 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 The average fuel cost saving of EV was HK\$11.22/km (i.e., about 80%) lower than that of the DV. Including maintenance costs incurred, the saving in average total operating costs of the EV over the DV was HK\$11.90/km (i.e., about 81%).

4.3 During the first twelve months of the trial period, the EV had two scheduled and three unscheduled maintenances incurring 17 days downtime while the DV had one scheduled and five unscheduled maintenance incurring 9.5 days downtime. The EV was arranged for 24 hours operation and hence needed to be charged during the operating hours, thus had 17 days additional downtime. The utilization rates were 91% and 97% for the EV and the DV, respectively.

5. Summary

5.1 In the first twelve months of the trial, the average daily mileage of the EV was 58 km while that of the DV was 92 km. The average fuel cost and the average total operating cost of the EV was HK\$11.22/km (i.e., about 80%) and HK\$11.90/km (i.e., about 81%), respectively lower than those of the DV. The utilization rate of the EV and the DV were 91% and 97%, respectively.

5.2 The EV drivers had no problem in operating the EV generally. The drivers felt the EV was less powerful than the DV especially travelled uphill on occasional trips on public roads in Tsing Yi. Regal was satisfied with the performance of the EV as it had significant fuel cost saving and contributed to better air quality. There was no indication of deterioration of the battery and 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 further tested under this 24-month trial.

Appendix 1: Key Features of Vehicles and Charging Facility

1. Trial EV and Charging Facility

(a) Trial EV

Registration Mark:	WR1399
Make:	BYD
Model:	Q1R
Class:	Medium goods vehicle
Gross vehicle weight:	16,000 kg
Seating Capacity:	driver + 1 passenger
Rated Power:	150 kW
Travel range:	150 km (air conditioning off)
Battery type	Lithium-ion phosphate
Battery capacity:	217 kWh
Year of manufacture:	2019

(b) Charging Facility

No. of charging facility:	1
Make:	BYD
Model:	EVH150KG/04
Charging Standard:	GB mode
Charging Mode:	Direct Current, DC (max 250A)

2. DV used for comparison

Registration Mark:	UZ8970
Make:	SCANIA
Model:	P370LA4X2MSZ
Class:	Medium goods vehicle
Gross vehicle weight:	16,000 kg
Seating Capacity:	driver + 1 passenger
Cylinder capacity:	12,742 cc
Year of manufacture:	2016

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV and Charging Facility

(a) Trial EV (WR1399)



Front view of EV



Left side view of EV



Right side view of EV



Rear view of EV

(b) Charging Facility



Charging Facility for EV



Charging Display Panel for EV

2. DV used for comparison

DV (UZ8970)



Front view of DV



Right side view of DV



Left side view of DV



Rear view of DV