Pilot Green Transport Fund

Interim Report On
Trial of Electric Van for Retail and Wholesale Industry (Kau Kee)

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Interim Report
(Trial Period: 1 November 2015 – 31 October 2016)

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 (the green innovative technology), contributing to better air quality and public health for Hong Kong. Kau Kee Hong Kong Limited (Kau Kee) was approved under the Fund for trial of one electric van for retail and wholesale industry.

1.2 Hong Kong Institute of Vocational Education (Tsing Yi) 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 vehicles.

1.3 This Interim Report summarizes the performance of the EV in the first twelve months of the trial as compared with its conventional diesel counterpart.

2. Trial Vehicles

2.1 Through the tendering procedures stipulated in the Agreement, Kau Kee procured one Renault Kangoo Van Z.E. electric van (EV) for trial. One diesel light goods vehicle (DV) serving the same purpose was assigned as the conventional vehicles for comparing with the EV.

2.2 Key features of the EV and DV are presented in Appendix 1 and photos of the vehicles are shown in Appendix 2.

3. Trial Information

3.1 The trial started on 1 November 2015 and would last for 24 months. Kau Kee was required to collect and provide trial information including the EV mileage reading before charging, amount of electricity consumed and time used in each charging, downtime due to charging, cost and operation downtime associated with scheduled and unscheduled maintenance of the EV. Similar data from the DV is also required. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the drivers and Kau Kee were collected to reflect any operational problems of the EV.

3.2 The following table summarizes the statistical data of the EV and the DV. The average fuel cost of the EV was HK$1.81/km (89.6%) lower than the DV.

Table 1: Key Operation Statistics of Each Vehicle (November 2015 to October 2016)

		EV	**DV**
Total Mileage (km)		11,092	9,645
Average fuel economy[1]/	(km/kWh)	5.34	-
	(km/litre)	-	5.25
	(km/MJ)	1.48	0.15
Average fuel cost ($/km)[2]		0.21	2.02
Average total operating cost/ ($/km)		1.61	2.02
Downtime/ day [3,4]		5	0

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

[2] Market rate was adopted for calculation.

[3] Downtime refers to the equivalent number of working days in which the vehicle was not in operation due to charging, and the period the vehicle was not in operation due to maintenance, counting from the first day it stopped operation till the day it was returned to the operator.

[4] For incidents with operation downtime less than 1 hour, the no. of working days for the vehicle out of service would be counted as 0. For every 4 hours of operation downtime due to charging, the number of working days for the vehicle out of service would be counted as 0.5.

3.3 Apart from the maintenance cost, other indirect costs might include towing fee, vehicle replacement fee and cost of operation downtime due to charging and maintenance of the EV.

3.4 Since the designated charging station were not installed for the EV, the vehicle was required to recharge at various public parking facilities, with the additional cost of $10,158 (56.9% of total operating cost) from parking fee, when there was no assigned duty.

3.5 The utilization rate of EV was about 98% and DV was 100%.

4. Summary

4.1 The average fuel cost of the EV was $1.81/km (89.6%) lower than the DV. For the average total operating cost, the EV was $0.41/km (20.3%) lower than the DV.

4.2 The EV driver expressed that the vehicle did not have sufficient power for climbing uphill. He also discovered that the battery range and energy consumption deteriorated heavily during extremely hot or cold weather conditions.

4.3 Kau Kee expressed that additional cost of special EV parking space and additional time required for queuing up such space to use the charging facility were the concerns in using the EV. Due to the building restriction from their office building for installing the designated charging

station, Kau Kee has to recharge the EV battery in public car parks while the charging stations were always fully occupied. The EV driver needed to queue for a long time for using the charging station, which brought about the inconvenience in their business operations.

4.4 Since the parking fee in commercial car parks for EV charging contributed about 56.9% of total operating cost, it is reasonable to expect the operational cost be reduced significantly when a designated charging station is made available.

4.5 The findings only reflect the performance of the EV in the first twelve months of the trial. More time is needed to test the reliability and battery performance of the EV.

Appendix 1: Key Features of Vehicles

1. Trial Electric Van

Registration Mark	**RA2668**
Make:	Renault
Model:	Kangoo Van Z.E.
Class:	Light Goods Vehicle
Gross vehicle weight:	2.26 tonnes
Seating capacity:	Driver + 4 passengers
Rated power:	44 kW
Travel range:	170 km (air-conditioning off)
Maximum speed:	130 km/h
Battery Type:	Lithium ion
Batteries capacity:	22 kWh
Charging time:	8 hours (Max. current 16A)
Year of manufacture:	2015

2. Diesel Vehicle for comparison

Registration Mark	**EU1192**
Make:	HINO
Model:	XZU425RHKFQD3
Class:	Light goods vehicle
Seating capacity:	Driver + 2 passengers
Gross vehicle weight:	5.5 tonnes
Engine capacity:	4,009 c.c.
Year of manufacture:	2007

Appendix 2: Photos of Vehicles

1. Trial EV

	
Front view of EV	Rear view of EV
	
Left side view of EV	Right side view of EV

2. Diesel Vehicle for Comparison

	
Front view of DV	Rear view of DV
	
Left side view of DV	Right side view of DV

(Photos taken at 25 November 2016)