Pilot Green Transport Fund

Final Report
On
Trial of Hybrid Medium Goods Vehicle for Courier Service (DHL Express (Hong Kong) Limited)

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PREPARED BY:

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(DHL Express (Hong Kong) Limited)

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(Trial Period: 1 June 2016 – 31 May 2018)

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. The Fund has subsidized DHL Express (Hong Kong) Limited (DHL) to try out one hybrid medium goods vehicle (HV) for courier service.

1.2 PolyU Technology and Consultancy Company Limited (the assessor) has been engaged by the Environmental Protection Department (EPD) as an independent third party assessor to monitor the trials and evaluate the operational performance of the trial vehicles. The assessor regularly visited DHL to collect information for evaluating the performance of the HV as compared with the diesel medium goods vehicle (DV) which provided the same service. The information collected includes the said vehicles' operation data, fuel bills, maintenance records, reports on operation difficulties, and opinions of the HV driver from survey questionnaires.

1.3 This Final Report summarizes the performance of the HV in the 24-months of the trial as compared with its conventional counterpart, i.e. the DV.

2. Trial Vehicles

2.1 DHL procured one Mitsubishi FUSO hybrid medium goods vehicle (HV) of 7.5 tonnes gross vehicle weight (GVW) and 2998 cc cylinder capacity for trial. One Mitsubishi FUSO 9.0 tonnes GVW diesel medium goods vehicles of 2998 cc cylinder capacity was assigned for comparison with the HV. All the vehicles were equipped with air-conditioning units.

2.3 Key features and photos of the HV and DV are included in Appendices 1 and 2 respectively.

3. Trial Information

3.1 The 24-month trial started on 1 June 2016 and lasted for 24 months. Both vehicles (HV and DV) operated from Cheung Sha Wan Depot. The HV delivered posted packages in Shatin areas while the DV delivered posted packages in Tsuen Wan areas. There was no fixed route. All of them provided service every day from Monday to Saturday (8:00 am – 6:30 pm) excluding Sundays and public holidays.

4. Findings of Trial

4.1 Table 1 shows a summary of the all key statistics for each vehicle.

Table 1: Summary of all the costs of each vehicle

	HV	**DV**
Total distance travelled (km)	32,658	8,121[5]
Fuel cost (HK$) [1]	61,863	16,884
Average fuel economy (km/litre)	6.28	5.36
Average fuel cost (HK$/km) [1]	1.89	2.08
Maintenance cost (HK$) [2] [3]	5,411	1,815
Other cost (HK$)	0	0
Total operating cost (HK$)	67,274	18,699
Average total operating cost (HK$/km)	2.06	2.30
Downtime (working day) [4]	15	2

[1] The market fuel price was used for calculation.

[2] The HV was under warranty, the labour cost was waived and only the parts to be replaced were charged.

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

[4] Downtime refers to working days that the vehicle is not in operation, which counted from the first day it stops operation till the day it is returned to the operator.

[5] Owing to shortage of drivers, the DV was operated for 12 months only within the 24 months trial period.

4.2 The average fuel cost of HV was lower than that of DV by 9% ($0.19/km). while the average total operating cost of the HV was 11% ($0.24/km) lower than that of the DV.

4.3 During the 24-months trial period, the HV had four scheduled and eight unscheduled maintenances. The DV had one scheduled maintenance and two unscheduled maintenances. Out of the 597 and 297 working days for HV and DV respectively in the trial, there were 15 days downtime for the HV and 2 days for the DV, excluding those downtime unrelated to the vehicle performance. The utilization rate was 97.5% for HV and 99.3% for DV.

4.4 To remove the effect of seasonal fluctuations, 12-month moving averages are used to evaluate the trend of the HV's fuel economy**.** The results show that the fuel economy of the HV fell from 6.37 km/L to 6.19 km/L gradually, indicating a slight deterioration of fuel economy of the HV.

4.5 The carbon dioxide equivalent (CO_2e) emission from the HV was 14,421 kg while that from DV on HV mileage was 16,879 kg. Overall, there was a total reduction of 2,458 kg CO_2e emission (i.e., around 15%) in the trial by using the HV.

5. Summary of Findings

5.1 In the 24-month trial period, the average daily mileage of HV was 55 km while that of the DV was 27 km. The mileages of the HV is much higher than that of the DV. The HV had a better fuel economy than the DV. The average fuel cost of the HV was lower than that of the DV by about 9%**.** Including the maintenance costs, the average total operating cost of the HV was 11% lower than that of the DV. The utilization rate was 97.5% and 99.3% for the HV and the DV respectively.

5.2 DHL assigned a driver for the HV. The driver of the HV had no problem in operating the vehicle except that the HV responded slower than the DV and was less powerful than the DV especially when driving upslope. He opined that the HV served well the daily operation.

5.3 DHL was satisfied with the HV and will consider replace the entire medium goods vehicle fleet with green vehicles including HV.

5.4 There was a total of 2,458 kg CO_2e reduction (i.e., 15%) by using the HV during the 24-month trial period.

5.5 There was a slight and gradual deterioration in the performance of the HV observed during the trial period.

Appendix 1: Key Features of Vehicles

1. Trial HV

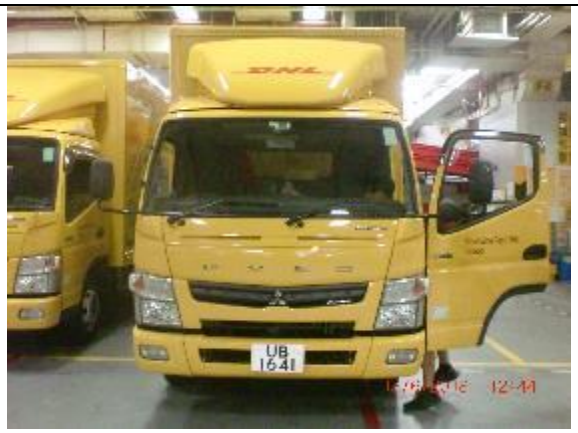
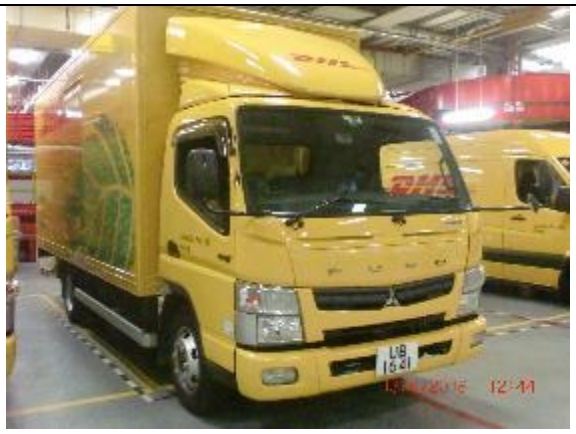
Registration mark	**UB1641 (HV)**
Make:	MITSUBISHI FUSO
Model:	FEB74GR3SDAP
Class:	Medium goods vehicle
Gross vehicle weight:	7500 kg
Seating capacity:	driver + 2 passengers
Cylinder capacity:	2998 cc
Year of manufacture:	2015

2. DV used for comparison

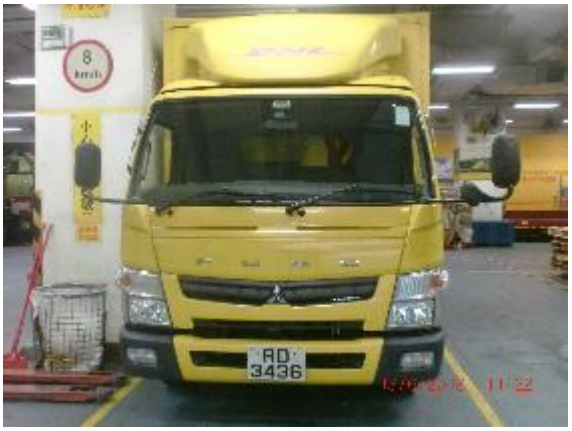
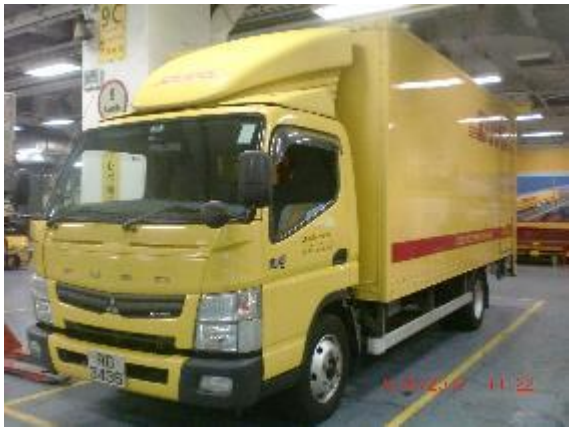
Registration mark	**RD3436 (DV)**
Make:	MITSUBISHI FUSO
Model:	FEC91GR3SDAD
Class:	Medium goods vehicle
Gross vehicle weight:	9000 kg
Seating capacity:	driver + 2 passengers
Cylinder capacity:	2998 cc
Year of manufacture:	2011

Appendix 2: Photos of Vehicles

1. **Trial HV**

	
Front view of HV, UB1641	**Side view of HV**
	
Side view of HV	**Rear view of HV**

2. **DV used for comparison**

	
Front view of DV, RD3436	**Side view of DV**