Pilot Green Transport Fund

Interim Report
On
Trial of Hybrid Light Goods Vehicles for Courier Service (DHL)

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PREPARED BY:
Dr. C.S. Cheung
Dr. W.T. Hung
Ir Dr. C. Ng

List of Monitoring and Evaluation Team Members

Dr. C.S. Cheung (Team Leader)
Professor
Department of Mechanical Engineering
The Hong Kong Polytechnic University

Dr. W.T. Hung (Deputy Team Leader)
PolyU Technology and Consultancy Company Limited
The Hong Kong Polytechnic University

Ir Dr. C. NG
Senior Technical Officer
Department of Mechanical Engineering
The Hong Kong Polytechnic University

Pilot Green Transport Fund
Trial of Hybrid Light Goods Vehicles for Courier Service (DHL)

Interim Report
(Trial Period: 1 June 2016 – 30 November 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, contributing to better air quality and public health for Hong Kong. The Fund has subsidized DHL Express (Hong Kong) Limited (DHL) to try out two hybrid light goods vehicles (HVs) 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 HVs as compared with the diesel light goods vehicles (DVs) which provided the same service in the same areas and road conditions. The information collected includes the said vehicles' operation data, fuel bills, maintenance records, reports on operation difficulties, and opinions of the HV drivers from survey questionnaires.

1.3 This Interim Report summarizes the performance of the HVs for courier service in the first six months of the trial as compared with their conventional counterpart, i.e. the DVs.

2. Trial Vehicles

2.1 DHL procured two Mitsubishi FUSO HVs of 5.5 tonnes gross vehicle weight (GVW) of 2998 cc cylinder capacity for trial. Two Mitsubishi FUSO DVs of about 5.5 tonnes GVW (one 4899 cc; the other 2998 cc cyliner capacity) were assigned for comparison with the HVs. All the vehicles were equipped with air-conditioning.

2.2 Key features and photos of the HVs and DVs are in Appendix 1 and Appendix 2 respectively.

3. Trial Information

3.1 The 24-month trial started on 1 June 2016 and will last for 24 months. One pair of vehicles (HV-1 and DV-1) operated from Tsuen Wan Depot to deliver posted packages to Tung Chung and Tsuen Wan areas; the other pair of vehicles (HV-2 and DV-2) operated from Cheung Sha Wan Depot to deliver posted packages to Shatin and Hunghom areas. They did not have fixed route. The vehicles 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 During this six-month report period, the HVs travelled an average 7,977 km whereas the DVs travelled an average 6,251 km. The fuel costs comparisons are as follows: HV-1 was $0.76/km (28.7%) lower than DV-1; HV-2 was $0.28/km (13.1%) lower than DV-2. The performance of the HVs and their average operating costs as compared with the DVs in the first six months of the trial is summarized in Table 1 below:

Table 1: Average fuel economy and average fuel cost of trial vehicles

	HV-1	**HV-2**	**DV-1**	**DV-2**
Average fuel economy, km/litre	5.84	5.97	4.19	5.19
Average fuel cost[1] HK$/km	1.89	1.85	2.65	2.13
Average total operating cost[1],[2] , HK$/km	1.99	1.98	2.65	3.56

[1] The market fuel price was used for calculation

[2] Including costs incurred from maintenance. DHL did not pay for the labour cost of the maintenance of the HVs because the vehicles were under warranty.

4.2 The average fuel cost of HVs (HK$1.87/km) was lower than its conventional counterparts (HK$2.39/km) by 22%. The vehicles' operating conditions and the drivers' driving habit would affect its fuel saving performance.

4.3 In addition to fuel costs, maintenance cost, other costs associated with breakdowns, such as replacement of components and parts, were also accounted for in calculating the total operating cost. It should be noted that the maintenance cost of the HVs did not include labour cost as the vehicles were still under warranty, the labour cost was waived and only the parts to be replaced were charged. The average total operating cost of the HVs was 36% lower than the DVs.

4.4 During this report period, the HVs had undergone one scheduled maintenance each and seven unscheduled maintenance altogether. For the scheduled maintenance, HV-1 lost two (2) working days while HV-2 lost three (3) working days. The unscheduled maintenance involved replacing the door lock of the cargo box and installing the tail lift platform control to meet the prevailing safety standard; HV-1 lost thirteen (13) working days while HV-2 lost seventeen (17) working days. These maintenance actions were unrelated to the performance of the HVs. There was no scheduled maintenance for the two DVs. DV-1 had no unscheduled maintenance while DV-2 had five unscheduled maintenance; it involved cargo box defects, cargo body works and front screen damages as well as installing the tail lift platform control to meet the prevailing safety standard. Four out of the five maintenance were unrelated to the performance of the DV-2. DV-2 lost thirty five (35) working days. However, after deducting those downtime unrelated to vehicle performance, DV-2 lost (16) days. The utilization rate of HV-1 and HV-2 was 99% and 98% respectively (excluding the downtime un-related to its performance), while DV-1 was 100% and DV-2 was 89%.

5. Summary

5.1 The vehicle operating conditions and the drivers' driving habit would affect the fuel saving performance of the hybrid vehicles. According to the first six months' data, the two HVs had an average of 22% saving in fuel cost per kilometer travelled as compared to the DVs. In general, the HVs had better fuel economy than the DVs.

5.2 The HV drivers reflected that they had no problem to operate the vehicles. They in general felt the HV was clean and less polluted. However, they reflected that the HVs rolled back on uphill start. They had to use hand brake to perform the uphill start. They also had to adjust the gear from third to second gear at start on flat.

5.3 HVs had one scheduled maintenance each; HV-1 and HV-2 had three and four unscheduled maintenance respectively in the six-month trial period but they are unrelated to the performance of the HVs. The HVs had an average 99% (ignoring those down days unrelated to its performance) utilization rate, which was better than the 95% of the DVs.

5.4 No deterioration in the performance of the HVs was observed from the six months reported data.

5.5 The findings only reflect the performance of the HVs in the first six months of the trial. More time is needed to test the performance and reliability of the HVs.

Appendix 1: Key Features of Vehicles

1. Trial HV

Registration Mark:	**UB1433 (HV-1)**
Make:	MITSUBISHI FUSO
Model:	FEB74ER3SDAL
Class:	Light goods vehicle
Gross vehicle weight:	5500 kg
Seating Capacity:	3 passengers (including driver)
Cylinder capacity:	2998 cc
Year of manufacture:	2016

Registration Mark:	**UB1966 (HV-2)**
Make:	MITSUBISHI FUSO
Model:	FEB74ER3SDAL
Class:	Light goods vehicle
Gross vehicle weight:	5500 kg
Seating Capacity:	3 passengers (including driver)
Cylinder capacity:	2998 cc
Year of manufacture:	2016

2. DV used for comparison

Registration Mark:	**NK2784 (DV-1)**
Make:	MITSUBISHI FUSO
Model:	FE83DEZSRDA
Class:	Light goods vehicle
Gross vehicle weight:	5500 kg
Seating Capacity:	3 passengers (including driver)
Cylinder capacity:	4899 cc
Year of manufacture:	2007

Registration Mark:	**RT4992 (DV-2)**
Make:	MITSUBISHI FUSO
Model:	FEB71ER3WDAD
Class:	Light goods vehicle
Gross vehicle weight:	5500 kg
Seating Capacity:	6 passengers (including driver)
Cylinder capacity:	2998 cc
Year of manufacture:	2012

Appendix 2: Photos of the Trial Vehicle

1. Trial HVs

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Front view of HV-1 (UB1433)</td><td>Side view of HV-1</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Side view of HV-1</td><td>Rear view of HV-1</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Front view of HV-2 (UB1966)</td><td>Side view of HV-2</td></tr>
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Side view of HV-2	Rear view of HV-2

2. DVs used for comparison

	
Front view of DV-1 (NK2784)	Side view of DV-1
	
Front view of DV-2 (RT4992)	Side view of DV-2