Pilot Green Transport Fund

Final Report
On
Trial of Hybrid Medium Goods Vehicle for Logistics Services (Atta-Trans Limited)

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(Trial Period: 1 June 2017 – 31 May 2019)

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 Atta-Trans Limited (Atta-Trans) to try out one hybrid medium goods vehicle (HV) for logistics services.

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

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

2. Trial Vehicles

2.1 Atta-Trans procured one Hino 300 series hybrid medium goods vehicle (HV) of 8,500 kg gross vehicle weight (GVW) and 4,009 cc cylinder capacity for trial. One Mitsubishi Fuso diesel medium goods vehicle (DV) of 9,000 kg GVW and 2,998 cc cylinder capacity was assigned for comparison with the HV. Both vehicles were used for logistics services and were equipped with air-conditioning units.

2.2 Key features and photos of the HV and the DV are in Appendix 1 and Appendix 2 respectively.

3. Trial Information

3.1 The 24-month trial started on 1 June 2017. Both the HV and the DV delivered goods from its Kwai Kung depot to its clients in Tsuen Wan and Kwai Chung areas. There was no fixed route. The vehicles provided services from Monday to Saturday (8:00 am – 6:00 pm) excluding Sunday 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)	67,578	63,103
Fuel cost (HK$) [1]	154,363	160,742
Average fuel economy (km/litre)	5.81	5.21
Average fuel cost (HK$/km)	2.284	2.547
Maintenance cost (HK$) [2] [3]	36,353	70,406
Other cost (HK$)	0	0
Total operating cost (HK$)	190,716	231,148
Average total operating cost (HK$/km)	2.82	3.66
Downtime (working day) [4]	14	38

[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 was not in operation, which counted from the first day it stopped operation till the day it was returned to the operator.

4.2 The average fuel costs of the HV was lower than that of the DV by 10.3%, while the average total operating cost of the HV was 23% lower than that of the DV.

4.3 During the 24-months trial period, the HV had eight scheduled and three unscheduled maintenances. The DV had nine scheduled maintenances and two unscheduled maintenances. Out of the 598 working days in the trial, there were 14 days of downtime for the HV and 37.5 days for the DV, excluding those downtime unrelated to the vehicle performance. The utilization rates were 98% and 94% for the HV and the DV respectively.

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 fluctuated slightly over the 24-month trial period. It appears that there is a gentle rise of the fuel economy probably because the drivers grasped the technique of economical driving. There is no indication of deterioration in fuel economy of the HV.

4.5 The carbon dioxide equivalent (CO_2e) emission from the HV was 30,688 kg while that from the DV was 34,263 kg. Thus, there was a total reduction of 3,574 kg CO_2e emission (i.e., around 10.4%) in the trial by using the HV compared with the DV.

5. Summary

5.1 In the 24-month trial period, the average daily mileage of HV was 116 km while that of the DV was 115 km. The mileages of the two vehicles are more or less the same. 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 10.3%. Including the maintenance costs, the average total operating cost of the HV was 23.0% lower than that of the DV. The utilization rates were 98% and 94% for the HV and the DV respectively.

5.2 Atta-Trans assigned regular drivers for the HV. The drivers found no problem in operating the HV and in general felt the HV was cleaner and produced less air pollutants than the DV. However, they reflected that the HV responded slower and was less powerful than the DV especially when climbing uphill.

5.3 Atta-Trans was generally satisfied with the HV but had no plan to replace the entire vehicle fleet with hybrid vehicles at this stage.

5.4 There was a total of 3,574 kg CO_2e reduction (i.e., 10.4%) by using the HV during the 24-month trial period.

5.5 No deterioration in the performance of the HV was observed during the trial period.

Appendix 1: Key Features of Vehicles

1. Trial HV

Registration Mark:	**JR109 (HV)**
Make:	Hino
Model:	300 Series Hybrid XKU730R-HKUTS3
Class:	Medium goods vehicle
Gross vehicle weight:	8,500 kg
Seating Capacity:	driver + 2 passengers
Cylinder capacity:	4,009 cc
Year of manufacture:	2016

2. DV used for comparison

Registration Mark:	**KY8177 (DV)**
Make:	Mitsubishi Fuso
Model:	FEC91HR3SDAD
Class:	Medium goods vehicle
Gross vehicle weight:	9,000 kg
Seating Capacity:	driver + 2 passengers
Cylinder capacity:	2,998 cc
Year of manufacture:	2012

Appendix 2: Photos of the Trial Vehicles

1. Trial HV

	
Front view of HV	Side view of HV
	
Side view of HV	Rear view of HV

2. DV used for comparison

	
Front view of DV	Rear view of DV