Pilot Green Transport Fund

Interim Report On
Trial of Hybrid Public Light Bus
for Green Minibus Service
(Multi Logistics Limited)

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Trial of Hybrid Public Light Bus for Green Minibus Service
(Multi Logistics Limited)

Interim Report
(Trial Period: 1 April 2018 – 30 September 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. Multi Logistics Limited (Multi Logistics) was approved under the Fund for trial of one diesel-electric hybrid public light bus for green minibus service. Through the tendering procedures stipulated in the Agreement, Multi Logistics procured one GMI diesel-electric hybrid public light bus (HV) for trial.

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 vehicle. Multi Logistics assigned a LPG public light bus (GV) providing the same type of service for comparing with the HV.

1.3 This Interim Report summarizes the performance of the HV in the first six months of the trial and compares with its conventional counterpart i.e. the GV.

2. Trial Vehicles

2.1 Key features and photos of the HV and the GV are in Appendix 1 and Appendix 2, respectively. The vehicles were used for providing green minibus services in Kowloon. The HV and the GV both served between Kai Tak Cruise Terminal and Telford Gardens in Kowloon Bay. According to the HV's manufacturer, the HV has a gross vehicle weight of 7,000 kg and a cylinder capacity of 2,776 cc.

3. Trial Information

3.1 The trial commenced on 1 April 2018 and would last for 24 months. Multi Logistics was required to collect and provide trial information including the HV odometer reading, the date of refueling, the refueled amount, cost and operation downtime associated with scheduled and unscheduled maintenance of the HV. A similar set of data from the GV was also required. In

addition to the cost information, reports on maintenance work, operational difficulties and opinions of the drivers and Multi Logistics were collected and provided to reflect any problems of the HV.

3.2 Table 1 summarizes the statistical data of the HV and the GV. The average fuel cost of the HV was higher than that of the GV by HK$1.74/km (110.1%). The average total operating cost of the HV was higher than that of the GV by HK$1.69/ km (93.4%) during the reporting period.

Table 1: Key operation statistics of each vehicle (April 2018 to September 2018)

		HV	**GV**
Total mileage (km)		30,421	38,490
Average fuel economy	(km/litre)	4.10	2.22
	(km/MJ)	0.113[4]	0.094[5]
Average fuel cost (HK$/km) [1]		3.32	1.58
Maintenance cost/ HK$ [2]		5,600	8,630
Average total operating cost/ (HK$/km) [2]		3.50	1.81
Downtime/ working day [3]		19	2.5

[1] Market rate was adopted for calculation.

[2] Maintenance due to incidents unrelated to the performance of the vehicle was not included for comparison.

[3] Downtime refers to the equivalent number of working days in which 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. 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.

[4] Assuming lower heating value of 36.13 MJ/litre for diesel fuel.

[5] Assuming lower heating value of 23.67 MJ/litre for LPG fuel.

3.3 During the first six months of the trial, the HV had eleven scheduled maintenances resulting in downtime of 7 working days. The GV had twelve scheduled maintenances resulting in downtime of 2.5 working days.

3.4 The HV had six unscheduled maintenances resulting in downtime of 12 working days. There was no unscheduled maintenance for the GV.

3.5 The HV had 19 days of operation downtime and the GV had 2.5 days of operation downtime in this reporting period. Utilization rates of the HV and the GV were 89.6% and 98.6% respectively.

4. Summary

4.1 In the first six months of the trial, the average daily mileage of the HV was 185 km, while that of the GV was 213 km. The average fuel cost of the HV was higher than that of the GV by HK$1.74/km (110.1%). It is because the HV was using diesel while the GV was using LPG. The average unit price of diesel (HK$13.6) was higher than that of the LPG (HK$3.53) by HK$10.07 (285.3%).

4.2 Multi Logistics had a designated driver for the HV. The driver expressed that the HV ran quieter than the GV when it was not charging, but it was noisy during charging, sometime he even cannot hear passengers notifying him to get off the HV at the next station. The driver was not satisfied with the HV's acceleration rate, especially during uphill and sometime even on flat road. Both the HV driver and Multi Logistics expressed that the tires of HV wore out quickly resulting in replacement of 16 tires in the first 6 months of the trial. In general, Multi Logistics and the driver were unsatisfied with the performance of the HV.

4.3 The findings only reflect the performance of the HV in the first six months of the trial. The data collected was not sufficient to conclude that the performance of the HV did not deteriorate with time.

Appendix 1: Key Features of Vehicles

1. Trial HV

Registration Mark	**AG992**
Make:	GMI
Model:	Gemini
Class:	Public Light Bus
Gross vehicle weight:	7,000 kg
Seating capacity:	20 passengers (including driver)
Engine capacity:	2,776 c.c.
Battery Type:	LiFePO4
Year of manufacture:	2017

2. GV for comparison

Registration Mark	**SS992**
Make:	Toyota
Model:	Coaster LPG SWB
Class:	Public Light Bus
Gross vehicle weight:	4,800 kg
Seating capacity:	17 passengers (including driver)
Engine capacity:	4,104 c.c.
Year of manufacture:	2016

Appendix 2: Photos of Vehicles

1. HV

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<tr><td>Front view of HV</td><td>Rear view of HV</td></tr>
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<tr><td>Left Side view of HV</td><td>Right Side view of HV</td></tr>
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2. GV

	
Front view of GV	Rear view of GV
	
Left Side view of GV	Right Side view of GV