Pilot Green Transport Fund

Interim Report
On
Trial of Hybrid Public Light Bus for Green Minibus Service (Hung Kay)

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PREPARED BY:
Dr. W.T. Hung

The Monitoring and Evaluation Team's views expressed in this report do not necessarily reflect the views of the Environmental Protection Department, HKSAR.

List of Monitoring and Evaluation Team Members

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

Dr. C. NG
Department of Mechanical Engineering
The Hong Kong Polytechnic University

Mr. KS Tsang
Department of Mechanical Engineering
The Hong Kong Polytechnic University

Dr. Edward WC Lo
Department of Electrical Engineering
The Hong Kong Polytechnic University

Dr. W.T. HUNG
PolyU Technology and Consultancy Company Limited
The Hong Kong Polytechnic University

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(Hung Kay)

Interim Report
(Trial Period: 1 April 2021 – 31 March 2022)

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. Hung Kay was approved under the Fund for trial of a hybrid light bus for green minibus services. Through the tendering procedures stipulated in the Agreement signed with the Government, Hung Kay procured a GMI Gemini electric-diesel hybrid 19-seat public light bus (HV) for trial.

1.2 PolyU Technology and Consultancy Company Limited 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. Hung Kay assigned a Toyota LPG 16-seat public light bus (GV) as the conventional counterpart for comparison with the HV.

1.3 This Interim Report summarizes the performance of the HV in the first 12 months of the trial as compared with the GV.

2. Trial and Conventional Vehicles

2.1 Key features of the HV and GV are in Appendix 1 and their photos are provided in Appendix 2. The two vehicles were used for public light bus services serving a fixed route 22M between Kwun Tong MTR station and Lok Wah South Estate. The HV's gross vehicle weight (GVW) is 7,000 kg with 2,800 cc cylinder capacity. The GV's GVW 4,350 kg with 4,104 c.c. cylinder capacity.

3. Trial Information

3.1 The trial started on 1 April 2021 and would last for 24 months. Hung Kay was required to collect and provide trial information including the distance travelled, fuel consumed, fuel cost as well as costs and 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 driver, passengers and Hung Kay were collected and provided to reflect any problems of the HV.

4. Findings of Trial

4.1 Table 1 summarizes the statistical data of the HV and GV. The average fuel economy of the HV was 0.011km/MJ (20%) higher than that of the GV. However, since the market fuel price of diesel was higher than that of LPG and the HV carried 3 more passengers than the GV hence with a higher loading, the average fuel cost of the HV was higher than that of the GV by HK$3.87/km (133%). If the fuel price discount was taken into account, the average fuel cost of the HV would be about 8% lower than that of the GV. There were two scheduled maintenances for HV but no fee was incurred under warranty, while the GV had one scheduled maintenance; the average total operating costs of the HV was about 22% lower than that of the GV.

Table 1: Key operation statistics of each vehicle (1 April 2021 – 31 March 2022)

		HV	**GV**
Total mileage (km)		30,977	27,023
Average daily mileage (km/working day)		86	74
Average fuel economy	(km/litre)	2.53	1.39
	(km/MJ) [1]	0.070	0.059
Average fuel cost (HK$/km) [2]		6.79	2.91
Average total operating cost (HK$/km) [3]		6.79	3.42
Downtime (working day) [3] [4]		3	2

[1] Assuming lower heating value of 36.13 MJ/litre for diesel fuel and 23.67 MJ/litre for LPG.

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

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

[4] Downtime refers to the equivalent number of working days in which the vehicle is not in operation due to maintenance, counting from the first day it stops operation till the day it is returned to the operator.

4.2 During this reporting period, HV had two scheduled maintenances while GV had one scheduled maintenance. The utilization rate of the HV was 99.2% and the GV was 99.5%.

4.3 The monthly average fuel economy of the HV varied within a small range (2.10 – 3.37 km/litre) in the first 12 month of trial. There was no indication on the deterioration of the HV performance.

4.4 The HV drivers had no problem in operating the HV and felt the HV was more environmentally friendly compared to the GV. The passengers felt that the air was cleaner inside the HV. Hung Kay was satisfied with the performance of the HV and did not find any deterioration in the performance of the HV.

5. Summary

5.1 In the first 12 months of the trial, the average daily mileage of the HV was 86 km, while that of the GV was 74 km. Taking into account the fuel price discount, the average fuel cost of the HV was about 8% lower than that of the GV. Taking into account the maintenance cost of the GV, the average total operating cost of the HV was about 22% lower than that of the GV. The HV has 20% higher average fuel economy than that of the GV even carrying 3 more passengers. The utilization rates of HV and GV were 99.2% and 99.5% respectively.

5.2 The HV drivers, passengers and Hung Kay were satisfied with the performance of the HV and felt that it was more environmentally friendly.

5.3 The findings only reflect the performance of the HV in the first 12 months of the trial. The performance and reliability of the HV will be continuously monitored in the 24 months of the trial.

Appendix 1: Key Features of Vehicles

1. Trial HV

Registration Mark:	**NR6864**
Make:	GMI
Model:	Gemini
Class:	Public Light Bus
Gross vehicle weight:	7,000 kg
Seating capacity:	driver + 19 passengers
Cylinder capacity:	2,800 cc (diesel)
Year of manufacture:	2018

2. GV for Comparison

Registration Mark:	**LX5233**
Make:	Toyota
Model:	BZB40RZCMSCYY
Class:	Public Light Bus
Gross vehicle weight:	4,350 kg
Seating capacity:	driver +16 passengers
Cylinder capacity:	4,104 cc (LPG)
Year of manufacture:	2007

Appendix 2: Photos of Vehicles

Trial HV

	
Front view	Right side view
	
Left side view	Rear view

GV for Comparison

	
Front view	Right side view
	
Left side view	Rear view