

**Pilot Green Transport Fund**

**Final Report On**  
**Trial of Hybrid Light Goods Vehicle**  
**for Logistics Service**  
**(DHL Aviation (Hong Kong) Limited)**

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

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**Pilot Green Transport Fund  
Trial of Hybrid Light Goods Vehicle for Logistics Service  
(DHL Aviation (Hong Kong) Limited)**

**Final Report  
(Trial Period: 1 June 2018 – 31 May 2020)**

**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. DHL Aviation (Hong Kong) Limited (DHL Aviation) was approved under the Fund for trial of one hybrid light goods vehicle (HV) for logistics service.

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. DHL Aviation assigned one diesel light goods vehicle (DV) providing similar service as the conventional vehicle for comparing with the HV.

1.3 This report summarizes the performance of HV in the 24 months of the trial as compared with its conventional diesel counterpart.

**2 Trial Vehicle**

2.1 Through the tendering procedures stipulated in the Subsidy Agreement that DHL Aviation entered into with the Government, DHL Aviation procured one Mitsubishi Fuso hybrid light goods vehicle (HV) for trial.

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

**3 Trial Information**

3.1 The trial started on 1 June 2018 and lasted for 24 months. DHL Aviation was required to collect and provide trial information including the HV odometer reading before refueling, the date of refueling, and the refueled amount, cost and operation downtime associated with scheduled and unscheduled maintenance of the HV. Similar monthly data from the DV were also required. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the drivers and DHL Aviation were collected to reflect any problems of the HV.

## 4 Findings of Trial

4.1 Table 1 summarizes the operational statistical data of HV and DV. The average fuel cost of the HV was HK\$0.08/km (3%) lower than that of the DV. The average total operating cost of the HV was HK\$0.14/km (5%) lower than that of the DV.

Table 1: Key operation statistics of each vehicle (April 2018 – March 2020)

	<b>HV</b>	<b>DV</b>
Total mileage (km)	19,286	20,087
Average fuel economy (km/litre)	5.31	5.06
Average fuel cost (HK\$/km) <sup>[1]</sup>	2.68	2.76
Average total operating cost (HK\$/km)	2.83	2.97
Downtime (working day) <sup>[2] [3]</sup>	6	5

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

[2] 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.

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

4.2 There were 1 scheduled maintenance for the HV and 1 unscheduled maintenance for the HV and DV each in this reporting period, leading to 6 days and 5 days of operational downtime for the HV and the DV respectively. There were 731 working days in this reporting period, the utilization rates of HV and the DV were both 99%.

4.3 DHL Aviation had no designated driver for the HV. Different drivers had different opinions on the performance of the HV. One of the drivers considered the HV was sufficient for daily operation whilst another driver considered that the HV did not have enough power during overtake and climbing uphill.

4.4 DHL Aviation was satisfied with the HV's performance, and considered the HV was sufficient for daily operation and functioned well in the trial period. DHL Aviation agreed that, in general, using the hybrid vehicle was good.

4.5 To eliminate the effect of seasonal fluctuations, 12-month moving averages were used to evaluate the trend of the HV's fuel economy. The fuel economy for HV varied between 5.00 and 5.46 km/L (i.e. about 9% variation). There was no indication in the deterioration of the batteries of the HV over the trial period.

4.6 The carbon dioxide equivalent (CO<sub>2e</sub>) emission from the HV was 10,069 kg while that from the DV on HV mileage was 10,382 kg, and hence there is an emission reduction of 313 kg CO<sub>2e</sub>, which is about 3% reduction, in the trial.

## **5 Summary**

5.1 As shown in driver feedback questionnaires, different drivers had different opinions on the performance of the HV. Whilst one considered the HV was sufficient for daily operation, another one considered that it did not have enough power during overtake and climbing uphill. However, DHL Aviation was satisfied with its performance, and considered that it was sufficient for daily operations and functioned well in the trial period.

5.2 The utilization rates of the HV and DV were both 99%. However, the usage of the HV was on the low side as reflected by the difference in the total mileage travelled between the HV (19,286 km, i.e. 26 km on average per working day) and the DV (20,087 km, i.e. 27 km on average per working day) in the 24 months of trial.

5.3 The average fuel cost of the HV was HK\$0.08/km (3%) lower than that of the DV. The average total operating cost of the HV was HK\$0.14/km (5%) lower than that of the DV. The economic advantage of the HV over the DV was unobvious. Also, the HV had about 3% CO<sub>2</sub>e emission lower than the DV.

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

## Appendix 1: Key Features of Vehicles

### 1. Trial HV

<b>Registration Mark</b>	<b>VF9410</b>
Make:	Mitsubishi Fuso
Model:	FEB74ER3SDAL
Class:	Light Goods Vehicle
Gross vehicle weight:	5,500 kg
Seating capacity:	Driver + 2 passengers
Engine capacity:	2,998 c.c.
Battery Type:	Lithium ion
Year of manufacture:	2017

### 2. DV for comparison

<b>Registration Mark</b>	<b>RJ2053</b>
Make:	Mitsubishi Fuso
Model:	FEC71ER3SDAD
Class:	Light Goods Vehicle
Gross vehicle weight:	5,500 kg
Seating capacity:	Driver + 2 passengers
Engine capacity:	2,998 c.c.
Year of manufacture:	2011

## Appendix 2: Photos of Vehicles

### 1. Trial HV



Front view of HV



Rear view of HV



Left side view of HV



Right side view of HV

2. DV for comparison



Front view of DV



Rear view of DV



Left side view of DV



Right side view of DV