

Pilot Green Transport Fund

Final Report On
Trial of Hybrid Medium Goods Vehicle
for Chemical Waste Collection and Treatment
Services
(Ecospace Limited)

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PREPARED BY:

Dr. Joe K.W. LO
Mr. Bruce Organ

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. Joe K.W. LO (Team Leader)

Centre Manager

Jockey Club Heavy Vehicle Emissions Testing and Research Centre

Hong Kong Institute of Vocational Education (Tsing Yi)

Mr. Bruce ORGAN (Team Member)

Vehicle Emissions Testing Manager

Jockey Club Heavy Vehicle Emissions Testing and Research Centre

Hong Kong Institute of Vocational Education (Tsing Yi)

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(Ecospace Limited)

Final Report
(Trial Period: 1 August 2015 –31 July 2017)

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. Ecospace Limited (Ecospace) was approved under the Fund for trial of one hybrid medium goods vehicle (HV) for chemical waste collection and treatment services.

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. Ecospace assigned one diesel medium goods vehicle (DV) providing similar services as the conventional vehicle for comparing with the HV.

1.3 This Final 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 Ecospace entered into with the Government, Ecospace procured one Hino 300 Series hybrid medium 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 August 2015 and lasted for 24 months. Ecospace was required to collect and provide trial information including the HV odometer reading at refueling, 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 DV was also required. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the drivers and Ecospace were also collected to reflect any problems of the HV.

4 Findings of Trial

4.1 Table 1 below summarizes the total operating costs of HV and DV. The average total operating cost of the HV is HK\$0.82/km (27%) lower than of DV. The average fuel cost of the HV is HK\$0.47/km (18%) lower than the DV.

Table 1: Summary of all the costs of each vehicle (August 2015 to July 2017)

	HV	DV
Total mileage (km)	14,496.0	20,817.0
Average fuel economy (km/litre)	5.12	4.17
Average fuel cost (HK\$/km) ^[1]	2.10	2.57
Average total operating cost (HK\$/km)	2.23	3.05
Downtime (working day) ^{[2] [3]}	10	18

[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 5 and 6 scheduled maintenances for the HV and the DV and 0 and 3 unscheduled maintenances for the HV and DV in this reporting period, leading to 10 days and 18 days of operational downtime respectively. There were 627 working days in this reporting period, the utilization rates of HV and the DV were 98% and 97% respectively.

4.3 In general, the HV drivers did not have many difficulties in operating the HV, but considered its performance was lower than their expectation. They did not see any distinctive advantages on this HV.

4.4 In contrast, Ecospace was satisfied with the HV's performance. The HV was functioning well in the trial period. Ecospace agreed that, in general, using the HV 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 of the HV varied from 4.84 to 5.23 km/L (i.e. about 7.5% variation). The average fuel economy was varied during the trial period with smaller changes.

4.6 The carbon dioxide equivalent (CO_{2e}) emissions from the HV and the DV are 7,467 kg and 9,171 kg, respectively, and hence there is an emission reduction of 1,704 kg CO_{2e}, which is about 19% reduction, in the trial.

5 Summary

5.1 As shown in driver feedback questionnaires, drivers had strong opinions of the HV in the beginning of the trial. However, as from the latter questionnaires, they expressed that they encountered less difficulties in driving the HV when the trial went on, and felt that the HV provided a greener and quieter environment compared with the diesel vehicle.

5.2 The utilization rates of HV and DV were 98% and 97% respectively. However, the usage of the HV was on the low side as reflected by the difference in the total mileage travelled between the HV (14,496 km, i.e. 23 km on average per working day) and the DV (20,817 km, i.e. 34 km on average per working day) in the 24 months of trial.

5.3 Ecospace satisfied the HV's performance. The HV was functioning well in the trial period. Ecospace agreed that, in general, using the hybrid vehicle was good.

5.4 The trial results showed that the HV had lower average fuel cost as compared with its conventional diesel counterpart, with a saving of HK\$0.47/km (18%). The average total operating cost of the HV was HK\$0.82/km (27%) lower than that of the DV. Also, the HV had about 19% CO₂e emission less than the DV.

Appendix 1: Key Features of Vehicles

1. Trial HV

Registration mark	TL3329
Make:	HINO
Model:	300 Series Hybrid XKU730R-HKUTS3
Class:	Medium goods vehicle
Gross vehicle weight:	8,200 kg
Seating capacity:	Driver + 2 passengers
Year of manufacture:	2015
Cylinder Capacity:	4,009 c.c.

2. DV used for comparison

Registration mark	SB8248
Make:	HINO
Model:	300 Series
Class:	Medium goods vehicle
Gross vehicle weight:	8,500 kg
Seating capacity:	Driver + 2 passengers
Year of manufacture:	2013
Cylinder Capacity:	4,009 c.c.

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



HV Odometer

2. DV for Comparison



Front View of DV



Rear View of DV



Left Side View of DV



Right Side View of DV