

Pilot Green Transport Fund

Final Report On Trial of Electric Light Goods Vehicle for Servicing Rental Vehicles (Rent A Truck Limited)

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The Monitoring and Evaluation Team's views expressed in this report do not necessarily reflect the views of the Environment and Ecology Bureau (Environment Branch), HKSAR.

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Trial of Electric Light Goods Vehicle for Servicing Rental Vehicles
(Rent A Truck Limited)

Final Report
(Trial Period: 1 June 2021 – 31 May 2023)

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. Rent A Truck Limited (Rent A Truck) was approved under the Fund for trial of one electric light goods vehicle. Through the tendering procedures stipulated in the Subsidy Agreement entered into with the Government, Rent A Truck procured a DFSK EC35, electric light goods vehicle (EV) for trial.

1.2 PolyU Technology and Consultancy Company Limited has been engaged by the Environmental Protection Department¹ as an independent third party assessor to monitor the trial and evaluate the performance of the trial vehicle. Rent A Truck assigned a Ssangyong diesel light goods vehicle (pick-up) (DV) providing the same service as the conventional counterpart for comparison in this report.

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

2. Trial and Conventional Vehicles

2.1 The trial EV, DFSK EC35 electric light goods vehicle, has a gross vehicle weight of 2,330 kg capable of carrying a driver with four passengers and goods. It has a 41.4 kWh lithium-ion battery pack and the driving range is 300 km with air-conditioning off. No designated driver was assigned to drive the EV. The DV, Ssangyong MUSSO 2,157 c.c. diesel light goods vehicle, was used as the conventional counterpart for comparison in this trial. The vehicles were used mainly for providing documents and vehicle maintenance parts dispatch in the New Territories and such services were required on need basis.

2.2 Rent A Truck has installed a designated 7.2 kW, single phase AC charging facility at its own cost for charging the EV at its warehouse at Pat Heung, Yuen Long. Key features of the EV, EV charging facility and the DV are presented in Appendix 1. Photos of vehicles and the EV charging facility are shown in Appendix 2.

¹ The Administration of the New Energy Transport Fund was migrated to the Environment Branch of the Environment and Ecology Bureau [EEB (Environment Branch)] since 1 January 2023 after internal re-organisation of EEB (Environment Branch) and EPD.

3. Trial Information

3.1 The trial commenced on 1 June 2021 and lasted for 24 months. Rent A Truck is required to collect and provide trial information including the EV mileage reading before charging, amount of electricity consumed in each charging, time taken for charging, operation downtime due to charging, cost and downtime associated with scheduled and unscheduled maintenances of the EV and the charging facility. Similar data of the DV are also collected. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the drivers are collected and provided to reflect any problems of the EV.

4. Findings of Trial

4.1 Table 1 summarizes the statistical data of the EV and the DV.

Table 1: Key operation statistics of each vehicle (1 June 2021 – 31 May 2023)

	EV	DV
Total distance travelled (km)	25,812	24,102
Average daily mileage (km/working day)	38	36
Average fuel economy	(km/kWh)	5.09
	(km/litre)	-
	(km/MJ)	1.41
Average fuel cost (HK\$/km) ^[2]	0.27	1.81
Average total operating cost (HK\$/km)	0.44	1.90
Downtime (working day) ^[3]	13	32

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

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

^[3] Downtime refers to the working days that the vehicle is not in operation due to charging or maintenance, counting from the first day it stops operation till the day it is returned to the operator.

4.2. During the 24 months of the trial, there were 696 working days. The total distance traveled and the average daily distance traveled of the EV were 25,812 km and 38 km/day, respectively while those of the DV were 24,102 km and 36 km/day, respectively. The average fuel cost of the EV was HK\$1.54/km (i.e. about 85%) lower than that of the DV. Taking maintenance fee into account, the average total operating cost of the EV was HK\$1.46/km (i.e. about 77%) lower than that of the DV.

4.3 The EV had 13-day downtime due to five scheduled maintenances and two unscheduled maintenances; while the DV had 32-day downtime due to two scheduled maintenances and an unscheduled maintenance. The utilization rates of the EV and the DV were 98.1% and 95.4%, respectively.

4.4 To remove the effect of seasonal fluctuations, the 12-month moving average were used to evaluate the trend of the EV's fuel economy. The 12-month moving average fuel economy varied narrowly from 5.01 to 5.15 km/kWh. There was no sign of the deterioration in fuel economy over the trial period.

4.5 Based on the total mileage of the EV and the fuel economy of the DV, the equivalent carbon dioxide (CO_{2e}) emission from the DV could be estimated for comparison purpose. The CO_{2e} emission from the EV and DV were 1,977 kg and 6,678 kg, respectively and hence the

EV emitted 4,701 kg CO_{2e} (about 70%) less than the DV in this trial.

4.6 The drivers' and Rent A Truck's view on the performance of the EV in this trial period were also collected. Overall, the drivers had no problem in operating the EV. However, the drivers and Rent A Truck expressed concern in using the EV for long journey (such as those over 130 km) for the worry of not being able to access to charging facility at the midway of the journey, especially during summer or hot weather when the EV's air conditioning was draining more energy.

5. Summary

5.1 In this trial, the average daily mileage of the EV and the DV were 38 km and 36 km, respectively.

5.2 The EV had a better fuel economy than the DV. The average fuel cost of the EV was HK\$1.54/km (i.e. about 85%) lower than that of the DV, while the average total operating cost of the EV was HK\$1.46/km (i.e. about 77%) lower than that of the DV. In addition, there was no sign of deterioration in fuel economy of the EV.

5.3 The utilization rates of the EV and the DV were 98.1% and 95.4%, respectively.

5.4 Compared with the DV, there was about 70% CO_{2e} emission reduction by using the EV.

5.5 The drivers of the EV had no problem in operating the vehicle, but the drivers and Rent A Truck expressed concern in using the EV for long journey (such as those over 130 km) for the worry of not being able to access to charging facility at the midway of the journey, especially during summer or hot weather when the EV's air conditioning was draining more energy.

5.6 The findings showed electric light goods vehicle is becoming more affordable and feasible to the transport trade for saving operating cost and reducing CO_{2e} emissions, provided that the vehicle can get easy access to charging facilities.

Appendix 1: Key Features of Vehicles and EV Charging Facility

1. Trial EV and the EV Charging Facility

(a) EV

Registration mark:	XC335
Make:	DFSK
Model:	EC35
Class:	Light goods vehicle
Gross vehicle weight:	2,330 kg
Seating capacity:	Driver + 4 passengers
Rated power:	30 kW
Driving range:	300 km (air conditioning off)
Battery material:	Lithium-ion
Battery capacity:	41.4 kWh
Year of manufacture:	2020

(b) EV Charging Facility (At Recipient's own cost)

Make:	SKYTEC
Model:	BS-B20-BA-7.2kW
Type:	Single Phase 220V / 32A
Power:	7.2kW, AC
Charging standard:	IEC62196 Type 2

2. DV Used for Comparison

Registration mark	SSYS
Make:	SSANGYONG
Model:	MUSSO
Class:	Light goods vehicle (Pick-up)
Gross vehicle weight:	2,880 kg
Seating capacity:	Driver + 4 passengers
Cylinder capacity:	2,157 c.c.
Year of manufacture:	2018

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV and EV Charging Facility

	
<p>Front view of EV</p>	<p>Rear view of EV</p>
	
<p>Left side view of EV</p>	<p>Right side view of EV</p>
	
<p>7.2 kW AC charging facility (At Recipient's own cost)</p>	

2. DV for Comparison



Front view of DV



Rear view of DV



Left side view of DV



Right side view of DV