

Pilot Green Transport Fund

Final Report

On

Trial of Electric Light Goods Vehicle for

Retail and Wholesale Industry

(Garment Express 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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Trial of Electric Light Goods Vehicles for Retail and Wholesale Industry
(Garment Express Limited)

Final Report
(Trial Period: 1 April 2020 – 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 (the green innovative technology), contributing to better air quality and public health for Hong Kong. Garment Express Limited (Garment Express) was approved under the Fund for trial of one electric light goods vehicle for providing garment delivery services to wholesale clients in Kwai Chung, Sham Shui Po and Yuen Long areas. Through the tendering procedure stipulated in the Subsidy Agreement entered into with the Government, Garment Express procured a NISSAN e-NV200 electric light goods vehicle (EV) for trial.

1.2 PolyU Technology and Consultancy Company Limited (PTeC) has been engaged by the Environmental Protection Department (EPD) as an independent third party assessor to monitor the trial and evaluate the performance of the trial vehicles. Garment Express assigned a diesel light goods vehicle (DV), a 2,800 kg Gross Vehicle Weight TOTOTA HIACE, with 2,982 c.c. cylindrical capacity providing the same type of service for comparing with the EV.

1.3 This Final Report summarizes the performance of the EV in the 24-month trial as compared with its conventional counterpart.

2. Trial and Conventional Vehicles

2.1 Key features of the EV, its charging facility and DV are in Appendix 1 and their photos are provided in Appendix 2. The two vehicles were used for delivery services for garment production industry. According to the EV's manufacturer, the EV's gross vehicle weight is 2,250 kg and it has a driving range of 317 km (air conditioning off).

2.2 Garment Express has set up one dedicated 13 Ampere single-phase standard socket at its own cost at its premises in Yau Yat Chuen to charge the EV outside office hours at night.

3. Trial Information

3.1 The trial started on 1 April 2020 and lasted for 24 months. Garment Express was 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 maintenance of the EV and the charging facility. 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 driver and Garment Express were 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 DV.

Table 1: Key operation statistics of each vehicle (1 April 2020 – 31 March 2022)

	EV	DV
Total distance travelled (km)	49,826	101,961
Average daily distance traveled (km/day)	85	174
Average fuel economy	(km/kWh)	4.84
	(km/litre)	-
	(km/MJ)	0.27 ^[1]
Average fuel cost (HK\$/km) ^[2]	0.25	1.62
Average total operating cost (HK\$/km) ^[3]	0.40	1.79
Downtime (working day) ^{[3][4]}	6	6

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

^[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 The average fuel cost of the EV was HK\$1.37 (i.e., about 85%) lower than that of the DV. Taking into account the maintenance costs, the saving in average total operating cost of the EV over the DV was HK\$1.39 (i.e., about 78%).

4.3 In the 24month trial, there were 593 working days for EV and DV. EV had six scheduled and one unscheduled maintenances which incurred 6 days of downtime. The DV also had six scheduled and one unscheduled maintenances with 6 days of downtime. The utilization rates were about 99% for both the EV and the DV.

4.4 To remove the seasonal fluctuations, 12-month moving averages were used in this report to evaluate the trend of the EV's fuel economy. The 12-month moving average fuel economy varied between 4.77 and 4.89 km/kWh. There was no sign of the deterioration in fuel economy and the performance of the batteries 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 3,944 kg and 14,110 kg, respectively and hence the EV emitted 10,166 kg CO_{2e} (i.e., about 72%) less than the DV in this trial.

4.6 The operation of the EV was smooth. The EV driver had no problem in operating the EV and felt the EV was clean and quiet. Garment Express reckoned that the EV served their operational need and was satisfied with the performance of the EV, especially on the saving of operating cost.

5. Summary

5.1 In the 24- months trial, the average daily mileage of the EV was 85 km, while that of the DV was 174 km. The average fuel cost of the EV was HK\$1.37/km (i.e., about 85%) lower than that of the DV.

5.2 Taking into account of the maintenance costs, the average total operating cost of the EV was HK1.39/km (i.e., about 78%) lower than those of the DV.

5.3 The utilization rates of the EV and the DV were both about 99%. Based on the 12-month moving average fuel economy, there was no sign of deterioration in fuel economy of the EV.

5.4 There was about 72% CO_{2e} reduction by using the EV as compared with the DV in the trial.

5.5 The EV driver had no problem in operating the vehicle and the battery capacity was sufficient to support the full-day operation of the EV. Garment Express was satisfied with the performance of the EV, especially on the saving of operating cost.

Appendix 1: Key Features of Vehicles and Charging Facility

1. Trial EV and Charging Facility

Trial EV

Registration Mark:	JW2468
Make:	NISSAN
Model:	e-NV200 Half Panel Van (LGV)
Class:	Light goods vehicle
Gross vehicle weight:	2,250 kg
Seating Capacity:	driver + 4 passengers
Rated Power:	80 kW
Travel range:	317 km (air conditioning off)
Battery type	Lithium-ion
Battery capacity:	40 kWh
Year of manufacture:	2019

Charging Facilities (at Recipient's Own Cost)

No. of charging facility:	1
Charging Standard:	220V standard socket
Charging Mode:	13Amp, single-phase

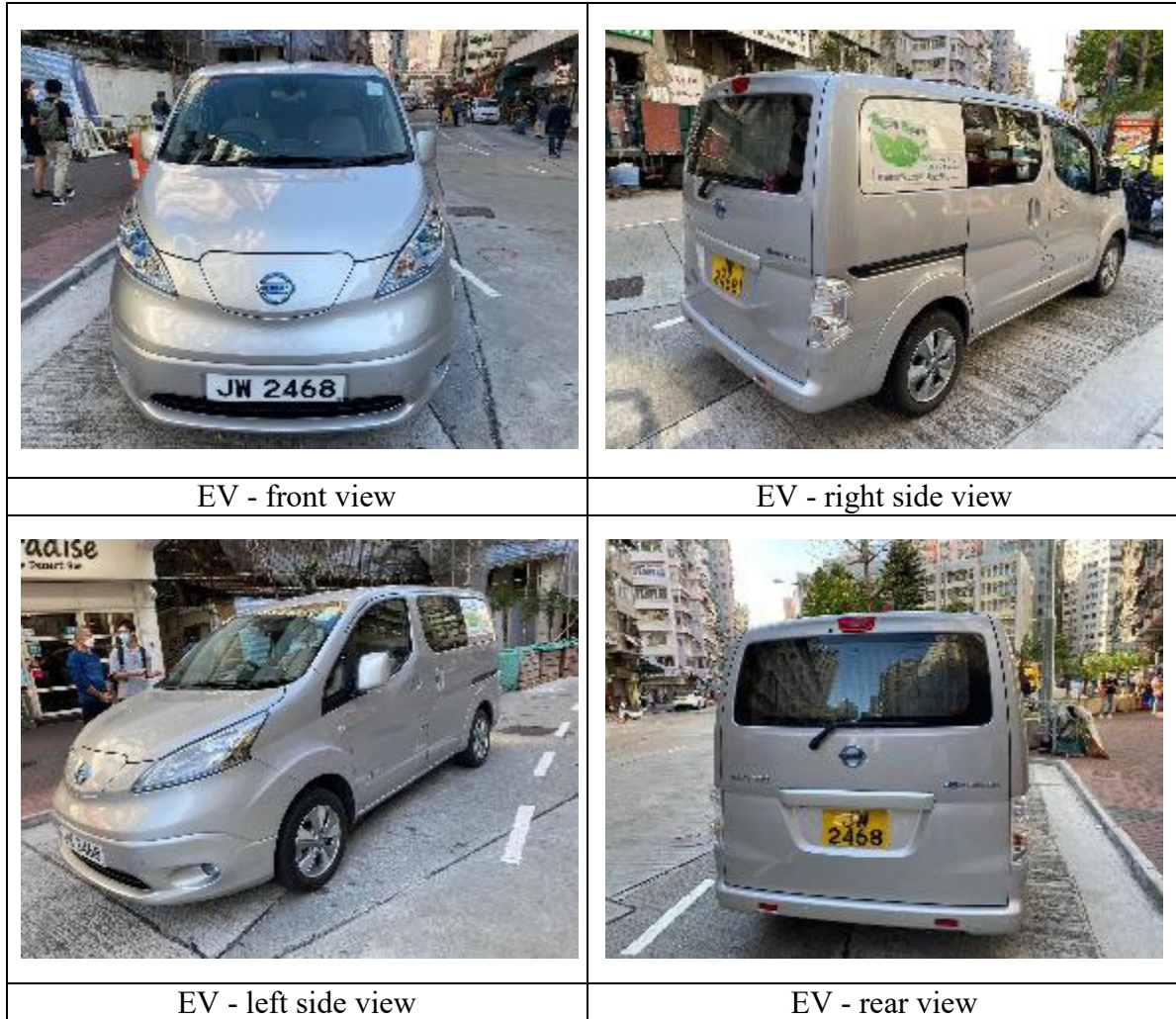
2. DV used for comparison

Registration Mark:	UK7785
Make:	TOYOTA
Model:	HIACE DIESEL LWB
Class:	Light goods vehicle
Gross vehicle weight:	2,800 kg
Seating Capacity:	driver + 5 passengers
Cylinder capacity:	2,982 cc
Year of manufacture:	2016



Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV and Charging Facility

Trial EV (JW2468)



Charging Facility of the EV (at Recipient's Own Cost)

	
<p>Single phase 13A charging facility</p>	<p>Dedicated power meter</p>

2. Diesel Vehicle (DV) used for comparison

DV (UK7785)



DV - front view



DV - right side view



DV - left side view



DV - rear view