New Energy Transport Fund

Final Report
On
Trial of Electric Light Goods Vehicle for Logistics Service
(Ferrari Logistics (Asia) Limited II)

(16 January 2025)

PREPARED BY:

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(Reporting Period: 1 June 2023 – 31 May 2024)

Executive Summary

1. Introduction

1.1 The New Energy 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. Ferrari Logistics (Asia) Limited II (Ferrari II) was approved under the Fund for trial of one electric light goods vehicle for logistics service. Ferrari II, through the tendering procedures stipulated in the Agreement entered into with the Government, procured a JAC HFC1073EV1 electric light goods vehicle (EV) for trial.

1.2 Hong Kong Productivity Council has been commissioned by the Environment and Ecology Bureau (Environment Branch) (EEB) as an independent third-party assessor (the Assessor) to monitor the trial and evaluate the performance of the trial vehicle. Ferrari II assigned an Isuzu NPR75KH-V diesel light goods vehicle (DV) providing same services as the conventional counterpart for comparison.

1.3 This Final Report summarises the performance of the EV in the 12 months of the trial as compared with its conventional counterpart, i.e. the DV.

2. Trial and Conventional Vehicles

2.1 The trial EV, JAC HFC1073EV1 electric light goods vehicle, has a gross vehicle weight of 5,500 kg capable of carrying a driver with two passengers and goods. It has a 96 kWh lithium iron phosphate battery pack and a driving range of 210 km under C-WVTC conditions. The DV, Isuzu NPR75KH-V diesel light goods vehicle with a gross vehicle weight of 5,500 kg and a diesel engine with a cylinder capacity of 5,193 c.c., was used as the conventional counterpart for comparison in this trial. The EV and the DV were used for delivering goods in Hong Kong. There was no designated driver assigned to drive the EV or the DV.

2.2 Ferrari II installed a designated 7.4 kW single-phase AC charging facility at the warehouse in Tsuen Wan for charging and recording the amount of electricity charged. Key features of the EV, the charging facility and the DV are detailed in Appendix 1 and photos of the vehicles and the charging facility are shown in Appendix 2.

3. Trial Information

3.1 The trial commenced on 1 June 2023 and lasted for 12 months. Ferrari II was required to collect and provide trial information including the EV's mileage reading before charging, amount of electricity consumed and time used in each charging, operation downtime due to charging, and cost and downtime associated with scheduled and unscheduled maintenances of the EV and the charging facility. Similar data of the DV were also required. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the drivers and Ferrari II were collected to reflect any problems of the EV.

4. Findings of Trial

4.1 The following table summarises the statistical data of the EV and the DV. The average fuel cost of the EV was HK$4.01/km (about 82%) lower than that of the DV. Taking the maintenance fee and other costs into account, the average total operating cost of the EV was HK$4.25/km (about 83%) lower than that of the DV in the 12 months of the trial.

Table 1: Key operation statistics of each vehicle (1 June 2023 – 31 May 2024)

		EV	**DV**
Total distance travelled (km)		18,372	35,586
Average daily mileage (km/working day)		66	121
Average fuel economy	(km/kWh)	1.74	-
	(km/litre)	-	4.68
	(km/MJ)	0.48	0.13 [1]
Average fuel cost (HK$/km)		0.86 [2]	4.87 [3]
Average total operating cost (HK$/km) [4]		0.86	5.11
Downtime (working day) [4][5]		20	2

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

[2] The electricity cost was calculated using average electricity tariff rates of HK$1.559/kWh (Jun 2023); HK$1.535/kWh (Jul 2023); HK$1.508/kWh (Aug 2023); HK$1.482/kWh (Sep 2023); HK$1.459/kWh (Oct 2023); HK$1.442/kWh (Nov 2023); HK$1.431/kWh (Dec 2023); HK$1.523/kWh (Jan 2024 – Feb 2024); HK$1.513/kWh (Mar 2024); HK$1.507/kWh (Apr 2024) and; HK$1.499/kWh (May 2024) as reported by CLP.

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

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

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

4.2 Apart from the fuel cost, maintenance cost and other indirect costs which may include parking fee, towing fee, vehicle replacement fee and cost of operation downtime due to charging and maintenance of the EV are also included in Table 1. In the 12 months of the trial period, the EV had two scheduled maintenances and one unscheduled maintenance while the DV had one scheduled maintenance.

4.3 In the 12 months of the trial period, the EV had 20 days of downtime while the DV had 2 days of downtime. Hence, the utilisation rates of the EV and the DV were 93.3% and 99.3%, respectively. Based on the above, the average daily driving distances of the EV and the DV were 66 km and 121 km, respectively.

4.4 The drivers of the EV liked driving the EV and had no operation difficulties in driving the EV. Overall, they were satisfied with the performance of the EV. Ferrari II was satisfied with the EV since the EV could meet the operational requirements and save the operation cost. Given the opportunity, Ferrari II would encourage other transport operators to try the EVs.

4.5 It is observed that the amount of electricity stored in the battery after a full charging operation could be maintained at the level of 96 kWh after the 12-month trial period. Thus, the deterioration in battery capacity within the 12-month trial period was insignificant, if any.

4.6 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. In the 12-month trial period, the CO_2e emission from the EV and the DV were 4,123 kg and 10,873 kg respectively. Hence, there was a 6,750 kg (about 62%) reduction of CO_2e, with the replacement of the DV by the EV in the trial.

5. Summary

5.1 The average fuel cost of the EV was HK$4.01/km (about 82%) lower than that of the DV. Taking the maintenance fee and other costs into account, the average total operating cost of the EV was HK$4.25/km (about 83%) lower than that of the DV. The utilisation rates of the EV and the DV were 93.3% and 99.3%, respectively. There was a 6,750 kg (about 62%) reduction of CO_2e, with the replacement of the DV by the EV in the trial.

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5.4 The findings showed electric light goods vehicles are becoming more affordable and feasible to the transport trade for saving operating cost and reducing CO_2e emissions, provided that the vehicles can get easy access to charging facilities.

Appendix 1: Key Features of Vehicles and Charging Facility

1. Trial EV and Charging Facility

(a) Trial EV

Registration mark:	YN7136
Make:	JAC
Model:	HFC1073EV1
Class:	Light goods vehicle
Gross vehicle weight:	5,500 kg
Payload:	1,400 kg
Seating capacity:	Driver + 2 passengers
Rated power:	65 kW
Driving range:	210 km (under C-WTVC conditions)
Battery material:	Lithium iron phosphate
Battery capacity:	96 kWh
Year of manufacture:	2022

(b) EV Charging Facility

Make:	EV Power
Model:	EVC-32N
Power:	7.4 kW, 220V AC / max 32A
Charging standard:	IEC62196-2 Type 2

2. DV Used for Comparison

Registration mark:	VS5873
Make:	Isuzu
Model:	NPR75KH-V
Class:	Light goods vehicle
Gross vehicle weight:	5,500 kg
Payload:	1,700 kg
Seating capacity:	Driver + 2 passengers
Cylinder capacity:	5,193 c.c.
Year of manufacture:	2018

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV (YN7136) and Charging Facility

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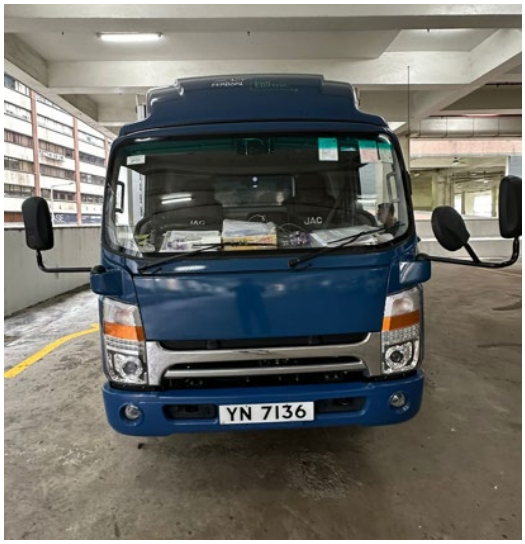
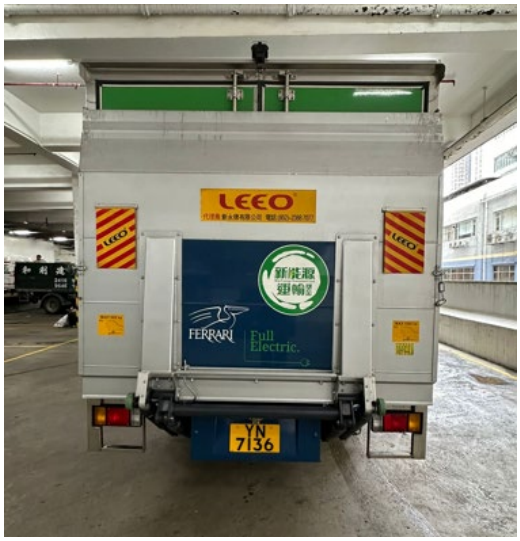
<tr><td> 
</td><td> 
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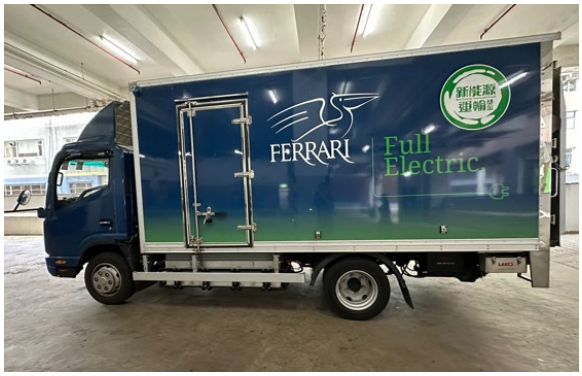
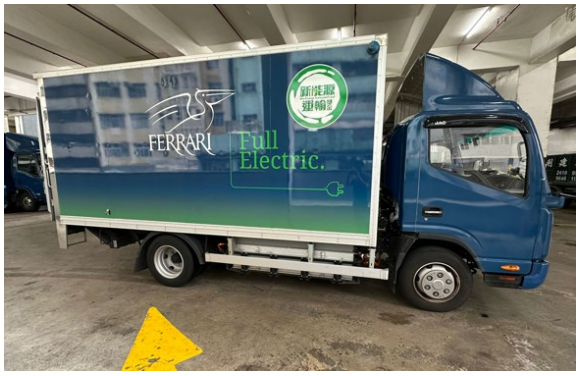
<tr><td> 
</td><td> 
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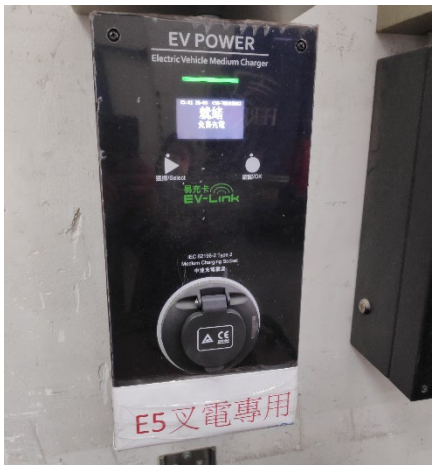
<tr><td> 
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<tr><td>7.4 kW single-phase AC charging facility</td><td></td></tr>
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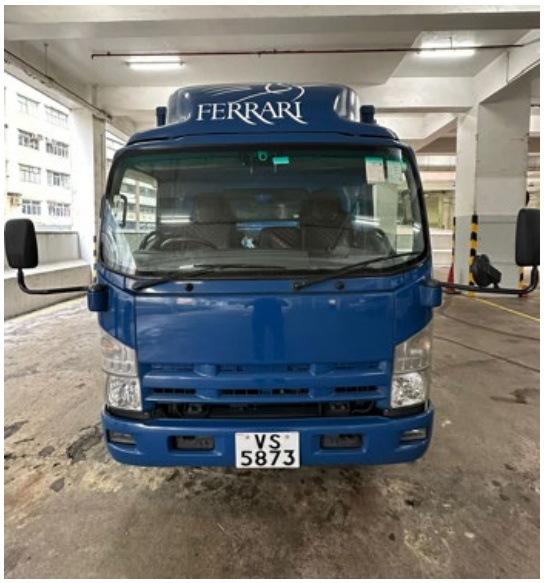
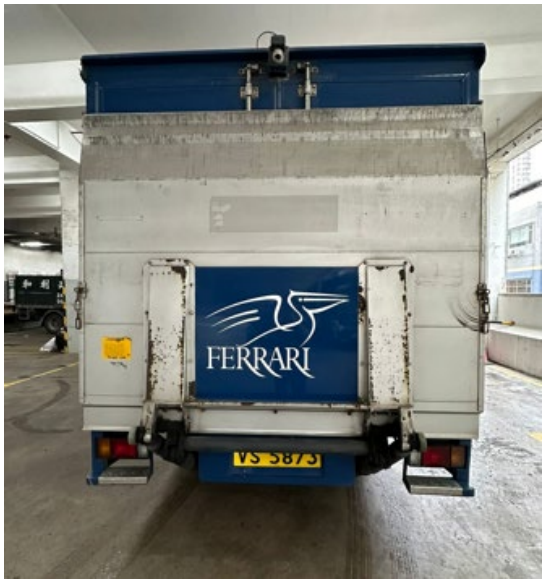
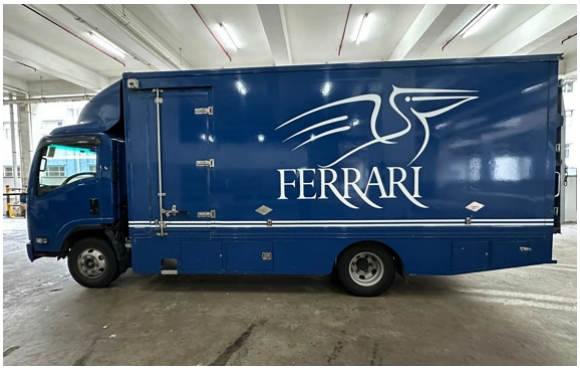
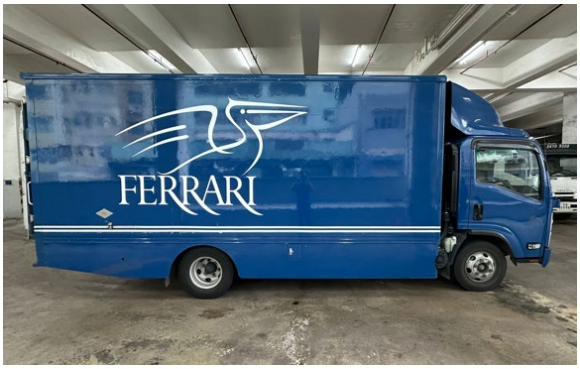
2. DV (VS5873) Used for Comparison

	
Front view of DV	Rear view of DV
	
Left side view of DV	Right side view of DV