

New Energy Transport Fund

Final Report
On
Trial of Electric Light Goods Vehicle for
Electronic Product and Electrical Appliances Trading
(Success Trading (HK) Company 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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Electronic Product and Electrical Appliances Trading
(Success Trading (HK) Company Limited)**

**Final Report
(Reporting Period: 1 June 2022 – 31 May 2023)**

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. Success Trading (HK) Company Limited (Success Trading) was approved under the Fund for trial of one electric light goods vehicle for electronic product and electrical appliance trading. Success Trading, through the tendering procedures stipulated in the Agreement entered into with the Government, procured a Nissan e-NV200 electric light goods vehicle (EV) for trial.

1.2 Hong Kong Productivity Council has been commissioned by the Environmental Protection Department¹ as an independent third party assessor (the Assessor) to monitor the trial and evaluate the performance of the trial vehicle. Success Trading assigned a Kia K2900 CRDI 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, Nissan e-NV200 electric light goods vehicle, has a gross vehicle weight of 2,250 kg capable of carrying a driver with four passengers and goods. It has a 40 kWh lithium-ion battery pack and a driving range of 317 km with its battery fully charged and air-conditioning off. The DV, Kia K2900 CRDI diesel light goods vehicle with a gross vehicle weight of 3,240 kg and a diesel engine with a cylinder capacity of 2,902 c.c., was used as the conventional counterpart for comparison in this trial. The EV and the DV were used for the delivering electronic products and appliances collected from clients to the workshop in Tuen Mun.

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.

2.2 Success Trading installed a designated 7.4 kW single-phase AC charging facility in the car park at Recours La Serre, Ping Shan 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 2022 and lasted for 12 months. Success Trading 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 driver and Success Trading 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\$1.90/km (about 89%) lower than that of the DV. The average total operating cost of the EV was HK\$2.06/km (about 90%) lower than that of the DV, taking the maintenance cost into account.

Table 1: Key operation statistics of each vehicle (1 June 2022 – 31 May 2023)

	EV	DV
Total distance travelled (km)	48,388	20,161
Average daily mileage (km/working day)	164	68
Average fuel economy	(km/kWh)	6.00
	(km/litre)	-
	(km/MJ)	0.27 ^[1]
Average fuel cost (HK\$/km)	0.24 ^[2]	2.14 ^[3]
Average total operating cost (HK\$/km) ^[4]	0.24	2.30
Downtime (working day) ^{[4][5]}	0.5	1.5

^[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\$1.289/kWh (Jun 2022 – Oct 2022); HK\$1.451/kWh (Nov 2022 – Dec 2022); HK\$1.544/kWh (Jan 2023 – Feb 2023); HK\$1.552/kWh (Mar 2023 – Apr 2023) and; HK\$1.565/kWh (May 2023) as claimed 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. The EV had two scheduled maintenances while the DV had four scheduled maintenances in the 12 months of the trial period. The scheduled maintenances of the EV included government annual vehicle inspection and replacement of tyres. The scheduled maintenances of the DV included regular service of engine oil and filter, government annual vehicle inspection and replacement of tyres.

4.3 In the 12 months of the trial period, the EV had 0.5 days of maintenance related downtime while the DV had 1.5 days of maintenance related downtime. Hence, the utilisation rates of the EV and the DV were 99.8% and 99.5%, respectively. Based on the above, the average daily driving distances of the EV and the DV were 164 km and 68 km, respectively.

4.4 The driver of the EV liked driving the EV and had no problem in operating the EV. He agreed that the EV is quieter and its performance has not deteriorated. Overall, he was satisfied with the performance of the EV. Success Trading was satisfied with the EV since the EV could meet the operational requirements and save the operation cost.

4.5 The amount of electricity stored in the battery after a full charging operation could be maintained at the level of 40 kWh after the 12-month trial. 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 3,144 kg and 13,535 kg respectively. Hence, there was a 10,391 kg (about 77%) 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\$1.90/km (about 89%) lower than that of the DV. Taking the maintenance fee for both the EV and the DV into account, the average total operating cost of the EV was HK\$2.06/km (about 90%) lower than that of the DV. The utilisation rates of the EV and the DV were 99.8% and 99.5%, respectively. There was a 10,391 kg (about 77%) reduction of CO_{2e}, with the replacement of the DV by the EV in the trial.

5.2 The amount of electricity stored in the battery after a full charging operation could be maintained at the level of 40 kWh after the 12-month trial. Thus, the deterioration in battery capacity within the 12-month trial period was insignificant, if any.

5.3 The driver of the EV liked driving the EV and had no problem in operating the EV. Overall, he was satisfied with the performance of the EV. Success Trading was satisfied with the EV since the EV could meet the operational requirements and save the operation cost.

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

EV

Registration mark:	SA806
Make:	Nissan
Model:	e-NV200 Half Panel Van
Class:	Light goods vehicle
Gross vehicle weight:	2,250 kg
Payload:	658 kg
Seating capacity:	Driver + 4 passengers
Rated power:	80 kW
Driving range:	317 km (air conditioning off)
Battery material:	Lithium-ion
Battery capacity:	40 kWh
Year of manufacture:	2021

EV Charging Facility

Make:	Wallbox
Model:	Pulsar
Power:	7.4 kW, 220V AC / max 32 A single phase
Charging standard:	SAE J1772 Type 1

2. DV Used for Comparison

Registration mark:	TW182
Make:	Kia
Model:	K2900 CRDI
Class:	Light goods vehicle
Gross vehicle weight:	3,240 kg
Payload:	1,400 kg
Seating capacity:	Driver + 2 passengers
Cylinder capacity:	2,902 c.c.
Year of manufacture:	2011

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV (SA806) and Charging Facility

	
Front view of EV	Rear view of EV
	
Left side view of EV	Right side view of EV
	
7.4 kW single-phase AC charging facility	

2. DV (TW182) used for Comparison



Front view of DV



Rear view of DV



Left side view of DV



Right side view of DV