New Energy Transport Fund

Interim Report
On
Trial of Electric Light Goods Vehicle for Transportation Service
(Sun Cheong Transportation Hong Kong Company Limited)

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PREPARED BY:
Mr. Rick MO

List of Monitoring and Evaluation Team Members

Mr. Rick MO (Team Leader)
Smart City Division
Hong Kong Productivity Council

Ms. Rachel CHAN
Smart City Division
Hong Kong Productivity Council

Mr. Michael WU
Smart City Division
Hong Kong Productivity Council

Mr. K.S. LI
Smart City Division
Hong Kong Productivity Council

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(Trial Period: 1 January 2022 – 30 June 2022)

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. Sun Cheong Transportation Hong Kong Company Limited (Sun Cheong) 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, Sun Cheong procured one Nissan e-NV200, electric light goods vehicle (EV) for trial.

1.2 Hong Kong Productivity Council 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 vehicle. Sun Cheong assigned a diesel light goods vehicle (DV) providing the same services as the conventional counterpart for comparison.

1.3 This Interim Report summarizes the performance of the EV in the first six months of the trial as compared with its conventional counterpart.

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 the driving range is 317 km with air-conditioning off. There are 2 designated drivers assigned to drive the EV and the DV. The DV, Land Rover Defender 110 AD diesel light goods vehicle with a gross vehicle weight of 3,050 kg and a cylinder capacity of 2,198 c.c., was used as the conventional counterpart for comparison in this trial. The vehicles were used mainly for delivering maintenance tools and money boxes for Sun Cheong's public light buses on Hong Kong Island.

2.2 Sun Cheong has installed a 7.4 kW single phase AC charger at its own cost for charging the EV. Key features of the EV and the DV as well as the EV charging facility are presented in Appendix 1. The photos of vehicles and the EV charging facility are shown in Appendix 2.

3. Trial Information

3.1 The trial commenced on 1 January 2022 and would last for 12 months. Sun Cheong 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 maintenances of the EV. 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 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 the DV in the first 6 months of the trial period.

Table 1: Key operation statistics of each vehicle (1 January 2022 – 30 June 2022)

		EV	**DV**
Total distance travelled (km)		3,931	1,359
Average daily distance travelled (km/working day)		21.8	7.5
Average fuel economy	(km/kWh)	4.28	-
	(km/litre)	-	6.73
	(km/MJ)	1.19	0.19 [1]
Average fuel/energy cost (HK$/km)		0.32 [2]	3.02 [3]
Average total operating cost (HK$/km)		0.95	3.02
Downtime (working day) [4]		1	0

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

[2] The electricity cost is taken as HK$1.353/kWh as claimed by HKE for 2022. The market fuel/energy price was used for calculation.

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

[4] 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 six months of the trial, there were 181 working days. The total distance travelled and the average daily distance travelled of the EV were 3,931 km and 21.8 km/day, respectively while those of the DV were 1,359 km and 7.5 km/day, respectively. The average fuel cost of the EV was HK$2.70/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$2.07/km (about 69%) lower than that of the DV.

4.3 The EV had one scheduled maintenance while the DV had no maintenance in the first 6 months of the trial period. The EV had one day of maintenance related downtime. Therefore, the utilization rates of the EV and the DV were 99.4% and 100%, respectively.

5. Summary

5.1 In the first six months of the trial, the average daily distance travelled of the EV was 21.8 km, while that of the DV was 7.5 km.

5.2 The average fuel cost of the EV was HK$2.70/km (about 89%) lower than that of the DV. The average total operating cost of the EV was HK$2.07/km (about 69%) lower than that of the DV, taking the maintenance fee for both the EV and the DV into account.

5.3 The utilization rates of the EV and the DV were 99.4% and 100% respectively.

5.4 The drivers of the EV had no problem in operating the vehicle.

5.5 The above findings only reflect the performance of the EV in the first 6 months of the trial. The performance and reliability of the EV will be continuously monitored in the remaining period of the trial.

Appendix 1: Key Features of Vehicles and Charging Facility

1. Trial EV and Charging Facility

(a) EV

Registration mark:	**XP7072**
Make:	Nissan
Model:	e-NV200
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 material:	Lithium-ion
Battery capacity:	40 kWh
Year of manufacture:	2018

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

Make:	Wallbox
Model:	Pulsar Plus
Power:	7.4 kW, single phase AC
Charging standard:	SAE J1772 Type 1

2. DV Used for Comparison

Registration mark	**AA7868**
Make:	Land Rover
Model:	Defender 110 AD
Class:	Light goods vehicle
Gross vehicle weight:	3,050 kg
Seating capacity:	Driver + 4 passengers
Cylinder capacity:	2,198 c.c.
Year of manufacture:	2015

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV (XP7072) and Charging Facility

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<tr><td>Front view of EV</td><td>Rear view of EV</td></tr>
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<tr><td>Left side view of EV</td><td>Right side view of EV</td></tr>
<tr><td>  </td><td></td></tr>
<tr><td>7.4 kW AC charging facility
(At Recipient’s own cost)</td><td></td></tr>
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2. DV (AA7868) for Comparison

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