

Pilot Green Transport Fund

Interim Report

On

Trial of Electric Light Goods Vehicles for

Telecom Maintenance Services

(Hong Kong Telecommunications (HKT) Limited)

(10 November 2020)

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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 Period: 1 November 2019 – 31 October 2020)

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. Hong Kong Telecommunications Limited (HKT) was approved under the Fund for trial of two electric light goods vehicles for providing telecom installation and maintenance services in the territory. Through the tendering procedure stipulated in the Subsidy Agreement, HKT procured two NISSAN e-NV200 light goods vehicles (EVs: EV-1 and EV-2) for trial.

1.2 PolyU Technology and Consultancy Company Limited has been engaged by the Environmental Protection Department (EPD) as an independent third party assessor (Assessor) to monitor the trial and evaluate the performance of the trial vehicles. HKT assigned two diesel light goods vehicles (DVs: DV-1 and DV-2) providing the same type of services for comparing with the EVs.

1.3 This Interim Report summarizes the performance of the EVs in the first twelve months of the trial as compared with their conventional counterparts, i.e. the DVs.

2. Trial and Conventional Vehicles

2.1 Key features of the EVs, DVs and charging facilities are provided in Appendix 1 and their photos are provided in Appendix 2. All the four vehicles were used for telecom installation and maintenance services. They were stationed at HKT's Ngau Tau Kok depot and served the Hong Kong Island, Kowloon and the New Territories. According to the EV's manufacturer, the EV has a gross vehicle weight of 2,250 kg and has a driving range of 317 km (air conditioning off).

2.2 HKT has set up one dedicated 7 kW/ 32A max, single phase AC charger of ICE standard, at its own cost, for two EVs at its parking space in Ngau Tau Kok depot. The EVs were usually charged after work at alternative night as the two EVs shared the same charger linked with a power meter recording the amount of electricity charged. A backup charger was also installed at the same location for contingency but had not been used so far.

3. Trial Information

3.1 The trial started on 1 November 2019 and would last for 24 months. HKT was required to collect and provide trial information including the EVs 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 EVs and the charging facilities. A similar set of data from the DVs was also required. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the drivers and HKT were collected and provided to reflect any problems of the EVs.

3.2 Table 1 summarizes the statistical data of the EVs and DVs. The fleet average fuel cost of EVs was HK\$1.76 (84%) lower than that of the DVs. The two EVs had two scheduled maintenances but no unscheduled maintenance each while the two DVs had one scheduled maintenance but no unscheduled maintenance each. The fleet average total operating cost of the EVs was HK\$2.86 (about 79%) lower than that of the DVs.

Table 1: Key operation statistics of each vehicle (1 November 2019 – 31 October 2020)

		EV-1	EV-2	DV-1	DV-2
Total distance travelled (km)		16,906	13,959	8,183	7,327
Average daily distance traveled (km/day)		69	57	34	30
Average fuel economy	(km/kWh)	3.63	3.80		
	(km/litre)			6.57	7.06
	(km/MJ)	1.00	1.05	0.18 ^[1]	0.20 ^[1]
Fleet average fuel economy (km/MJ)		1.03		0.19	
Average fuel cost (HK\$/km) ^[2]		0.33	0.32	2.16	2.01
Fleet average fuel cost (HK\$/km)		0.33		2.09	
Average total operating cost (HK\$/km) ^[3]		0.71	0.78	4.17	3.06
Fleet average total operating cost (HK\$/km)		0.75		3.61	
Downtime (working day) ^{[3][4]}		3	3	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.

3.3 During this reporting period, the two EVs had two scheduled maintenances but no unscheduled maintenance each while the two DVs had one scheduled maintenance but no unscheduled maintenance each; the associated downtime was 3 (EV-1), 3 (EV-2), 6 (DV-1) and 6 (DV-2) working days, respectively. The utilization rates were 99% for the EVs and 98% for the DVs.

4. Summary

4.1 In the first twelve months of the trial, the average daily distance traveled by EV-1 and EV-2 were 69 km and 57 km, respectively while those of DV-1 and DV-2 were 34 km and 30 km, respectively. The fleet average fuel cost and the fleet average total operating cost of the EVs were HK\$1.76/km (84%) and HK\$2.86 (79%) lower than those of the DVs respectively. The utilization rates of the EVs and the DVs were 99% and 98% respectively.

4.2 The drivers were happy with the performance of these two EVs and felt that the EVs were clean and quiet; they reported no problem in operating the EVs and the battery capacity was adequate to support the daily operation. HKT was satisfied with the performance of the EVs and detected no deterioration of the performance of the EV's batteries.

4.3 In this reporting period, the monthly fuel economies as well as the charging frequencies of the EVs did not indicate any deterioration in the performance of the EVs and their batteries. The findings only reflect the performance of the EV in the first twelve months of the trial. The performance and reliability of the EV will be continuously monitored in the 24 months of the trial.

Appendix 1: Key Features of Vehicles and Charging Facilities

1. Trial EVs and Charging Facilities

Trial EVs

Registration Mark:	WD2483 (EV-1) and WD1906 (EV-2)
Make:	NISSAN
Model:	E-NV200 Half Panel Van
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:	2018

Charging Facilities

No. of charging facility:	2
Make:	CORNERSTONE Smart Charge
Model:	SLATE 2
Charging Standard:	IEC 61851-1 and IEC61851-22
Charging Mode:	7 kW, 32A max 1-phase

Backup Charger:

Make:	CORNERSTONE Smart Charge
Model:	SLATE 2
Charging Standard:	IEC 61851-1 and IEC61851-22
Charging Mode:	7 kW, 32A max 1-phase

2. DVs used for comparison

Registration Mark:	NG4854 (DV-1) and NG4861 (DV-2)
Make:	NISSAN
Model:	URVAN 3.0 Diesel M/T NPV STD
Class:	Light goods vehicle
Gross vehicle weight:	3,300 kg
Seating Capacity:	driver + 5 passengers
Cylinder capacity:	2,953 cc
Year of manufacture:	2008

Appendix 2: Photos of the Vehicles

Trial EVs and Charging Facilities

Trial EVs

EV-1(WD2483)



Front view of EV-1



Left side view of EV-1



Right side view of EV-1



Rear view of EV-1

EV-2 (WD1906)



Front view of EV-2



Right side view of EV-2



Left side view of EV-2



Rear view of EV-2

Charging Facilities for EVs



Charging Facility



Power Meter

Backup charger



Charging Facility (never been used)

DVs used for comparison

DV-1 (NG4854)



Front view of DV-1



Rear view of DV-1

DV-2 (NG4861)



Front view of DV-2



Rear view of DV-2