Pilot Green Transport Fund

Interim Report On
Trial of Electric Light Goods Vehicle (Van Type) for Industry Support Organization (Hong Kong Productivity Council)

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PREPARED BY:

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Interim Report
(Trial Period: 1 April 2016 – 31 March 2017)

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 Productivity Council (HKPC) was approved under the Fund for trial. Through the tendering procedures stipulated in the Subsidy Agreement HKPC entered into with the Government, HKPC procured one Nissan e-NV200 electric light goods vehicle (van type) (EV) for trial. According to the EV's manufacturer, the model's maximum payload is not less than 620 kg and it has a travel range of 165 km, with its battery fully charged and air-conditioning off.

1.2 PolyU Technology and Consultancy Company Limited has been engaged by the Environmental Protection Department as an independent third party assessor to monitor the trial and evaluate the performance of the trial vehicle. HKPC assigned a petrol vehicle (PV) providing the same type of service as the conventional counterpart for comparing with the EV.

1.3 This Interim Report summarizes the performance of the EV in the first twelve months of the trial as compared with its conventional petrol counterpart, i.e. the PV.

2. Trial Vehicles

2.1 Key features of the EV and PV are in Appendix 1 and photos of the vehicles are in Appendix 2. The vehicles were used mainly for providing industry support service trips from HKPC to different parts of Kowloon and the New Territories. Typical daily journey travelled by the EV was less than 100 km.

2.2 HKPC installed a 13-ampere standard charger and a 32-ampere charger in the HKPC car park. The EV was normally charged in the evening with the standard charger but occasionally charged with the 32-ampere charger for topping-up charging during office hours. HKPC installed a watt-hour meter for recording the electricity consumed for EV charging since 24/6/2016. Due to the low usage rate, the EV was not charged every day.

3. Trial Information

3.1 The trial started on 1 April 2016 and would last for 24 months. HKPC 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 and operation downtime due to charging, cost and downtime associated with scheduled and unscheduled maintenances of the EV and the charging facilities. Similar data of the PV were also required. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the driver were collected to reflect any problems of the EV.

3.2 During this reporting period, the average fuel cost saving of the EV was $2.29/km (91%) lower than that of the PV. The following table summarizes the statistical data of the EV and the PV.

Table 1: Key operation statistics of each vehicle, April 2016 - March 2017

		EV	**PV**
Total mileage (km)		4,944	17,268
Average fuel economy	(km/kWh)	4.79	-
	(km/litre)	-	6.0
	(km/MJ)	1.33	0.188 [1]
Average fuel cost ($/km)		0.233	2.52
Average total operating cost ($/km)		0.391	3.59
Downtime [2] (days)		2	7

[1] Assuming lower heating value of 32 MJ/litre for petrol fuel
[2] Downtime refers to the period the vehicle was not in operation, which counted from the first day it stopped operation till the day it was discharged from the vehicle supplier to the operator

3.3 There were two scheduled maintenances for the EV, and three scheduled maintenances and one unscheduled maintenance for the PV in this reporting period. Taking into account of the maintenance costs, the average total operating cost of the EV was $3.2/km (89%) less than that of the PV.

3.4 Utilization rates were 99 and 97% for the EV and the PV respectively.

4. Summary

4.1 During the first 12 months of the trial, the average fuel cost of the EV was 91% ($2.29/km) less than that of the PV. Taking into account of the maintenance costs, the average total operating cost of the EV was 89% ($3.2/km) less than that of the PV. Utilization rates were 99% and 97% for the EV and the PV, respectively.

4.2 The drivers of the EV had no problem in operating the EV but felt that the recharge could affect the operation so they only used it for short trips and preferred using the PV when the PV was available.

4.3 Overall, HKPC agreed that using electric vehicle was good because it could provide a greener and quieter environment as well as its much lower fuel cost. However, up to this stage, HKPC expressed that the trial had not provided extra information to help them understand the cost components and the operational constraints of running the EV due to the relatively low usage rate. HKPC would re-deploy the EV service routes to increase the usage for obtaining more representative trial results.

4.4 Charging frequency and monthly average fuel economy did not indicate any deterioration in performance of the EV or its battery.

Appendix 1: Key Features of the Vehicles

1. Trial EV

Registration mark	**TY4645**
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:	165 km (air conditioning off)
Maximum speed:	over 120 km/h
Battery material:	lithium-ion
Battery capacity:	24 kWh
Payload load:	620 kg
Year of manufacture:	2015

2. PV Used for Comparison

Registration mark	**SR4452**
Make:	Toyota
Model:	VELLFIRE
Seating Capacity:	driver + 6 passengers
Cylinder capacity:	3,456 cc
Year of manufacture:	2014

Appendix 2: Photos of Vehicles and Charging Facilities

1. Trial EV

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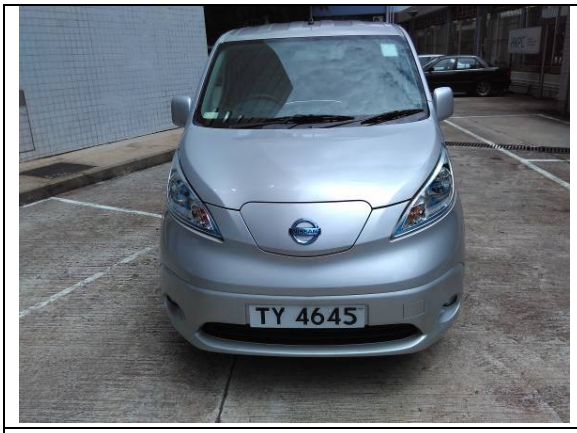
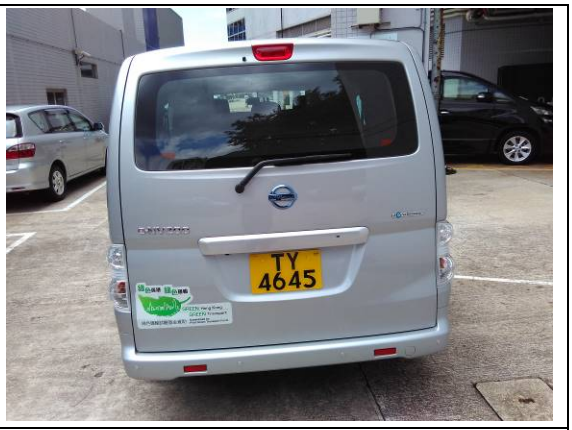
<tr><td> 
</td><td> 
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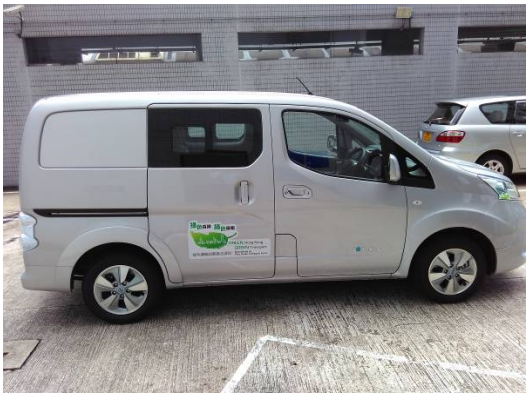
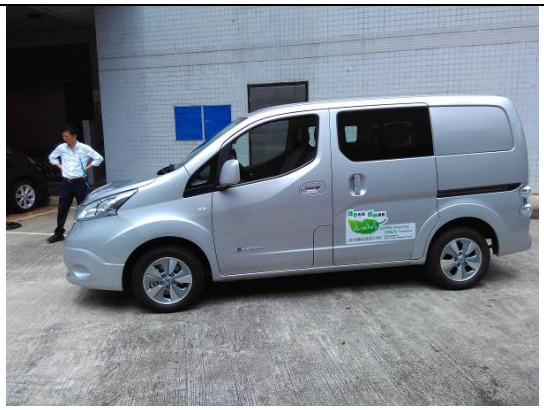
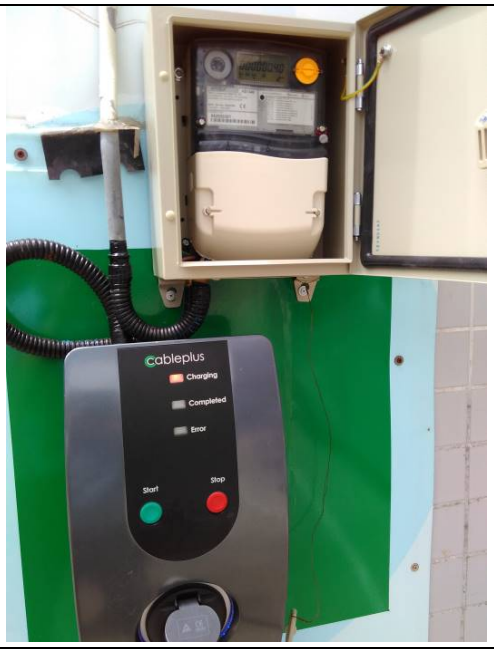
<tr><td>EV – front view</td><td>EV – end view</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>EV – side view 1</td><td>EV – side view 2</td></tr>
<tr><td> 
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<tr><td>Battery charger with watt-hour meter</td><td></td></tr>
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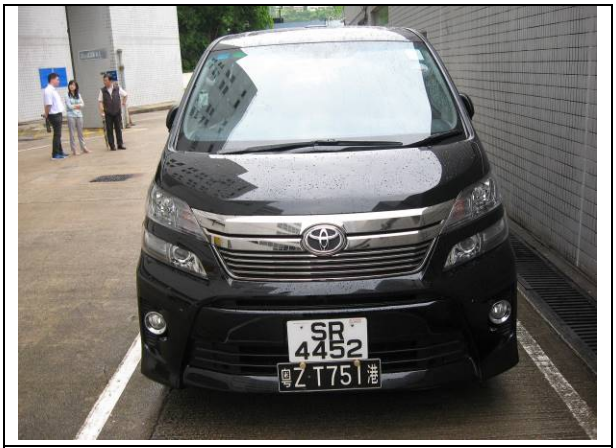
2. Petrol Vehicle (PV) for Comparison



PV – front view