# Pilot Green Transport Fund

# Interim Report
# On
# Trial of Electric Light Goods Vehicles for Vehicle Maintenance and Freight Services (Wing Ming (Car Rental) Company Limited)

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PREPARED BY:
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**Pilot Green Transport Fund**
**Trial of Electric Light Goods Vehicles for Vehicle Maintenance and Freight Services**
**(Wing Ming (Car Rental) Company Limited)**

**Interim Report**
**(Trial Period: 1 June 2019 – 31 May 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. Wing Ming (Car Rental) Company Limited (Wing Ming) was approved under the Fund for trial of two electric light goods vehicles for supporting vehicle maintenance and freight services. Through the tendering procedure stipulated in the Subsidy Agreement, Wing Ming procured two JOYLONG EW4 electric light goods vehicles (hereafter called EVs) 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. Wing Ming assigned two diesel light goods vehicles (DVs) 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 with the charging facilities and DVs are in Appendix 1 and photos of the vehicles and charging facilities are in Appendix 2. Each of these four vehicles served different purposes depending on Wing Ming's business. EV-1 was operated by Wing Ming in the first five month of the trial and served to carry equipment to locations where maintenance for vehicles was needed, but it was deployed to the Tuen Mun River Trade Pier (TMRTP) to carry freight (mainly construction materials) starting from November 2019. EV-2 mainly served to carry freight (mainly construction materials) in TMRTP. According to the EV manufacturer, the EV model has a gross vehicle weight of 3,700 kg and a driving range of 290 km (air conditioning off).

2.2 Wing Ming has purchased one 32-ampere movable charger for charging EV-1 at the Fotan depot where EV-1 was parked. However, there was no independent power meter to record the amount of electricity consumed for EV-1. The electricity consumption was estimated with the percentage of battery charged and the battery capacity. Same 32-ampere movable charger with an independent electricity meter was provided at the TMRTP for charging EV-2 and EV-1 when it was deployed there.

## 3. Trial Information

3.1 The trial started on 1 June 2019 and would last for 24 months. Wing Ming was required to collect and provide trial information including the mileage reading of the EVs 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. Similar sets of data from the DVs were also required. In addition to the cost information, reports on maintenance work, operational difficulties and opinions of the drivers and Wing Ming 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 saving of EVs was HK$1.14/km (about 69%) lower than that of the DVs. EV-1 had one scheduled and one unscheduled maintenance which incurred 8 days of downtime, EV-2 had one scheduled and four unscheduled maintenances (one incurred 4 days of downtime and three did not relate to its performance and the downtimes were not counted) causing 8 days of downtime. The two DVs had one scheduled maintenance each while DV-1 had one unscheduled maintenance, causing 4 days of downtime for DV-1 and 3 day of downtimes for DV-2. The saving in fleet average total operating cost of the EVs over that of the DVs was HK$1.08/km (about 55%).

Table 1: Summary of operational statistics (1 June 2019 – 31 May 2020)

| | | **EV-1** | **EV-2** | **DV-1** | **DV-2** |
|---|---|---|---|---|---|
| Total distance travelled (km) | | 4,656 | 24,362 | 37,524 | 54,279 |
| Average daily distance traveled (km/day) | | 14 | 67 | 103 | 182 |
| Average fuel economy | (km/kWh) | 2.90 | 1.91 | - | - |
| | (km/litre) | - | - | 8.38 | 8.95 |
| | (km/MJ) | 0.81 | 0.53 | 0.23[3] | 0.25[3] |
| Average fuel cost (HK$/km) | | 0.41 [5] | 0.62 [5] | 1.71 [4] | 1.60 [4] |
| Fleet average fuel cost (HK$/km) | | 0.52 | | 1.65 | |
| Average total operating cost (HK$/km) [1] | | 0.99 | 0.76 | 2.14 | 1.79 |
| Fleet average total operating cost (HK$/km) | | 0.88 | | 1.96 | |
| Downtime (working day) [1] [2] | | 8 | 8 | 4 | 3 |
| Utilization rate (%) | | 98 | 98 | 99 | 99 |

[1] Maintenance due to incident not relate to the performance of the vehicle was not included for comparing the performance.
[2] 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] Assuming lower heating value of 36.13 MJ/litre for diesel fuel
[4] The market fuel price was used for calculation
[5] Electricity cost is based on HK$1.177/kWh in 2019 and HK$1.218/kWh in 2020

3.3 In this reporting period, the utilization rates were 98%, 98%, 99% and 99% for EV-1, EV-2, DV-1 and DV-2 respectively.

## 4. Summary

4.1 In the first twelve months of the trial, the average daily distance traveled of the EV-1 and EV-2 were 14 km and 67 km, respectively while that of DV-1 and DV-2 were 103 km and 182 km, respectively. The fleet average fuel cost and the fleet average total operating cost of the EVs were HK$1.14/km (about 69%) and HK$1.08/km (about 55%) lower than those of the DVs respectively. The fleet average utilization rate of the two EVs and the two DVs were 98% and 99% respectively.

4.2 The EV drivers had no problem in operating the EV and were satisfied with the

performance of the EVs but felt that the performance of anti-vibration system was not as good as the DVs' systems. Wing Ming was satisfied with the performance of the EVs.

4.3 In this reporting period, the average fuel economy as well as the charging frequencies of the EVs did not indicate any deterioration in the performance of the EVs and their batteries. The performance and reliability of the EVs will be continuously monitored in the 24 months of the trial.

## Appendix 1: Key Features of Vehicles and Charging Facility

### 1. Trial EVs and Charging Facilities

Trial EVs

| | |
|---|---|
| **Registration Mark:** | **WB6695 (EV-1) and WB7182 (EV-2)** |
| Make: | JOYLONG |
| Model: | EW4 - HKL5040XXYBEV1 |
| Class: | Light goods vehicle |
| Gross vehicle weight: | 3,700 kg |
| Seating capacity: | driver + 5 passengers |
| Rated power: | 50 kW |
| Travel range: | 290 km (air conditioning off) |
| Battery type | Lithium-ion |
| Battery capacity: | 64 kWh |
| Year of manufacture: | 2018 |
| **Charging Facilities** | |
| No. of charging facility: | 2 |
| Make: | Inovance |
| Model: | IDCH-T030AM |
| Charging standard: | GB mode |
| Charging mode: | 30 kW, 3-phase, AC |

### 2. DVs used for comparison

| | |
|---|---|
| **Registration Mark:** | **RY6428 (DV-1)** |
| Make: | NISSAN |
| Model: | NV350 URVAN |
| Class: | Light goods vehicle |
| Gross vehicle weight: | 3,300 kg |
| Seating capacity: | driver + 5 passengers |
| Cylinder capacity: | 2,488 cc |
| Year of manufacture: | 2013 |
| **Registration Mark:** | **SG1471 (DV-2)** |
| Make: | TOYOTA |
| Model: | KDH201RSSPNY |
| Class: | Light goods vehicle |
| Gross vehicle weight: | 2,800 kg |
| Seating capacity: | driver + 5 passengers |
| Cylinder capacity: | 2,982 cc |
| **Year of manufacture:** | **2008** |

**Appendix 2: Photos of the Trial Vehicles**

**Trial EVs and Charging Facilities**

**Trial EVs**

<table>
<tr><td colspan="2">(EV-1) – WB6695</td></tr>
<tr><td> 
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<tr><td>Front view of EV-1</td><td>Left side view of EV-1</td></tr>
<tr><td> 
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<tr><td>Right side view of EV-1</td><td>Rear view of EV-1</td></tr>
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| (EV-2) – WB7182* | |
|---|---|
|   |   |
| Front view of EV-2 | Left side view of EV-2 |
|  |   |
| Right Side view of EV-2 | Rear view of EV-2 |

*EV-2 has a number plate number OPN2 during operation at the Tuen Mun River Trade Terminal

**Charging Facilities**

Charging Facility of EV-1 (Jun 2019 – Oct 2019)

| | |
|---|---|
|  |  |
| Charging Facility for EV-1 | Charging facility for EV-1 |

Charging Facilities for EV-2 (shared with EV-1 starting from Nov 2019)

| | |
|---|---|
|  |  |
| Charging facility for EV-2 | Electricity meter for EV-2 |

DVs used for comparison

DV-1 (RY6428)

| | |
|---|---|
|  |  |
| Front view of DV-1 | Odometer of DV-1 |

DV-2 (SG1471)

| | |
|---|---|
|  |  |
| Front view of DV-2 | Odometer of DV-2 |