

**Pilot Green Transport Fund**

**Final Report**

**On**

**Trial of Electric Light Goods Vehicle for**

**Vehicle Maintenance Service**

**(New Creat Auto Engineering Company Limited)**

(20 March 2023)

PREPARED BY:  
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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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**Pilot Green Transport Fund**  
**Trial of Electric Light Goods Vehicle for Vehicle Maintenance Service**  
**(New Creat Auto Engineering Company Limited)**

**Final Report**  
**(Trial Period: 1 April 2020 – 31 March 2022)**

**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. New Creat Auto Engineering Company Limited (New Creat) 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, New Creat procured one Joylong EW4, electric light goods vehicle (EV) for trial.

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. New Creat assigned a diesel light goods vehicle (DV) providing same service as the conventional counterpart for comparison.

1.3 Due to New Creat's commercial decision, an original counterpart – Ssangyong STAVIC diesel light goods vehicle (DV1) was disposed to stop service on 31 March 2021. New Creat has assigned a Toyota diesel light goods vehicle (DV2) to replace DV1 as the conventional counterpart for comparison with the EV since 1 April 2021. New Creat was required to record all the operational data of the trial and conventional vehicles during the trial for comparison purpose.

1.4 This Final Report summarizes the performance of the EV in the 24 months of the trial as compared with its conventional counterpart.

**2. Trial and Conventional Vehicles**

2.1 The trial EV, Joylong EW4 electric light goods vehicle, has a gross vehicle weight (GVW) of 3,700 kg capable of carrying a driver with five passengers and goods. It has a 73 kWh lithium-ion battery pack and the driving range is 300 km with air-conditioning off. No designated driver used the EV.

2.2 New Creat assigned a Ssangyong STAVIC SV270 diesel light goods vehicle (DV1) which had a GVW of 2,750 kg and a cylinder capacity of 2,696 cc for comparison purpose. DV1 was in operation from 1 April 2020 to 31 March 2021, but it was disposed to stop service thereafter. New Creat assigned a Toyota diesel light goods vehicle (DV2) with a GVW of 2,800 kg and a cylinder capacity of 2,982 c.c. to replace DV1 for comparison with the EV from 1 April 2021 to 31 March 2022.

2.3 The vehicles were mainly used to provide vehicle maintenance parts transportation service in the New Territories and Kowloon areas.

2.4 New Creat has installed a 30 kW, 3-phase DC charger at its carpark. Key features of the EV, charging facility and the DV are in Appendix 1 and their photos are shown in Appendix 2.

### 3. Trial Information

3.1 The trial commenced on 1 April 2020 and lasted for 24 months. New Creat 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 and New Creat 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.

Table 1: Key operation statistics of each vehicle (1 April 2020 – 31 March 2022)

		EV	DV <sup>[1]</sup>
Total mileage (km)		20,683	36,566
Average daily distance travelled (km/working day)		35	62
Average fuel economy	(km/kWh)	3.61	-
	(km/litre)	-	8.33
	(km/MJ)	1.00	0.23 <sup>[2]</sup>
Average fuel cost (HK\$/km) <sup>[3]</sup>		0.34	1.96
Average total operating cost per km (HK\$/km)		0.37	2.02
Downtime (working day) <sup>[4]</sup>		9	3

<sup>[1]</sup> DV1 provided vehicle maintenance parts delivering service from 1 April 2020 to 31 March 2021. Due to New Creat's business operation arrangement, DV1 was disposed and its service was replaced by DV2 from 1 April 2021.

<sup>[2]</sup> Assuming lower heating value of 36.13 MJ/litre for diesel fuel.

<sup>[3]</sup> The market fuel price was used for calculation.

<sup>[4]</sup> Downtime refers to the working days that 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.

4.2. During the 24 months of the trial, there were 592 working days. The total mileage and the average daily mileage of the EV were 20,683 km and 35 km/day, respectively while those of the DV were 36,566 km and 62 km/day, respectively. The average fuel cost of the EV was HK\$1.62/km (83%) lower than that of the DV. Taking maintenance fee for both the EV and the DV into account, the average total operating cost of the EV was HK\$1.65/km (82%) lower than that of the DV.

4.3 The utilization rates of the EV and DV were 98.5% and 99.5%, respectively.

4.4 To remove the effect of seasonal fluctuations, the 12-month moving averages were used to evaluate the trend of the EV's fuel economy. These values varied narrowly from 3.43 to 3.77 km/kWh, which showed no significant deterioration of the EV over the trial period.

4.5 Based on the total mileage of the EV and the fuel economy of the DV, the carbon dioxide equivalent (CO<sub>2e</sub>) emission from the DV could be estimated for comparison purpose. The CO<sub>2e</sub> emission from the EV and DV were 2,190 kg and 6,885 kg, respectively and hence the EV emitted 4,695 kg CO<sub>2e</sub> (68%) less than the DV in this trial.

4.6 The operation of the EV was smooth. The EV drivers had no problem in operating the EV and considered it was clean and quiet. Both the drivers and New Creat were satisfied with the EV performance.

## **5. Summary**

5.1 In this trial, the average daily mileages of the EV and the DV were 35 km and 62 km, respectively.

5.2 The EV had lower fuel cost than the DV, with an average fuel cost saving of 83%. Accounting the maintenance costs incurred for both the EV and the DV, the average total operating cost of the EV was also 82% lower than that of the DV.

5.3 The utilization rates of the EV and the DV were 98.5% and 99.5%, respectively. In the trial period, there was no significant deterioration of the EV.

5.4 Compared with the DV, there was 68% CO<sub>2e</sub> emission reduction by using the EV.

5.5 The drivers had no problem in operating the EV and considered it was clean and quiet. New Creat was also satisfied with the EV performance in general.

5.6 The findings showed that the use of EV is becoming more affordable and acceptable to the transport trade for saving operating cost and reducing CO<sub>2</sub> emission.

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

### 1. Trial EV and Charging Facility

#### (a) EV

<b>Registration mark:</b>	<b>WG5264</b>
Make:	Joylong
Model:	HKL5040XXYBEV1 (EW4)
Class:	Light goods vehicle
Gross vehicle weight:	3,700 kg
Seating capacity:	Driver + 5 passengers
Rated power:	50 kW
Travel range:	300 km (air conditioning off)
Maximum speed:	100 km/h
Battery material:	Lithium-ion
Battery capacity:	73 kWh
Year of manufacture:	2019

#### (b) EV Charging Facility

Make:	Only Power
Model:	ANDC5-500V/60A-1
Power:	30 kW, 3-phase DC
Charging standard:	GB mode
Weight:	90 kg
Year of manufacture:	2019

### 2. DV for Comparison

	<b>1 Apr 2020 to 31 Mar 2021</b>	<b>1 Apr 2021 to 31 Mar 2022</b>
<b>Registration mark</b>	<b>DV1: NF4498</b> <sup>[1]</sup>	<b>DV2: NK3145</b> <sup>[2]</sup>
Make:	Ssangyong	Toyota
Model:	STAVIC SV270	KDH201RSSPNY
Class:	Light goods vehicle	Light goods vehicle
Gross vehicle weight:	2,750 kg	2,800 kg
Seating capacity:	Driver + 4 passengers	Driver + 5 passengers
Cylinder capacity:	2,696 cc	2,982 cc
Year of manufacture:	2008	2008

<sup>[1]</sup> DV1 provided vehicle maintenance parts delivering service from 1 Apr 2020 to 31 Mar 2021.

<sup>[2]</sup> Due to New Creat's business operation arrangement, DV1 was disposed and its service was replaced by DV2 from 1 Apr 2021.

## Appendix 2: Photos of Vehicles and Charging Facility





### 1. Trial EV and Charging Facility

	
Front view of EV	Rear view of EV
	
Left side view of EV	Right side view of EV
	
30 kW, 3-phase DC charger	



## 2. DV for Comparison

DV1: NF4498, Ssangyong (1 Apr 2020 to 31 Mar 2021)

	
Front view of DV1	Rear view of DV1
	
Left side view of DV1	Right side view of DV1



**DV2: NK3145, Toyota (1 Apr 2021 to 31 Mar 2022)**



Front view of DV2



Rear view of DV2



Left side view of DV2



Right side view of DV2