

New Energy Transport Fund

Interim Report

On

Trial of Electric Light Goods Vehicle for

Mechanical Engineering Industry

(Grandasy Engineering Company Limited)

(19 July 2022)

PREPARED BY:
Mr. Rick MO

The Monitoring and Evaluation Team's views expressed in this report do not necessarily reflect the views of the Environmental Protection Department, HKSAR.

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

**New Energy Transport Fund
Trial of Electric Light Goods Vehicle for Mechanical Engineering Industry
(Grandasy Engineering Company Limited)**

**Interim Report
(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. Grandasy Engineering Company Limited (Grandasy) 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, Grandasy procured one Joylong EW5, 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. Grandasy 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, Joylong EW5 electric light goods vehicle, has a gross vehicle weight of 4,300 kg capable of carrying a driver with four passengers and goods. It has a 73.4 kWh Lithium-ion battery pack and the driving range is 330 km with the air conditioning off. There is one designated driver assigned to drive the EV. The DV, Isuzu TFS86JD-V-AT diesel light goods vehicle with a gross vehicle weight of 3,000 kg and a cylinder capacity of 2,499 c.c., was used as the conventional counterpart for comparison in this trial. The vehicles were used mainly for delivering maintenance tools to different construction sites in Hong Kong.

2.2 Grandasy has installed a 30 kW DC charger 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. Grandasy 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 six 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)		5,343	12,759
Average daily distance travelled (km/working day)		37.6	89.9
Average fuel economy	(km/kWh)	3.71	-
	(km/litre)	-	9.82
	(km/MJ)	1.03	0.27 ^[1]
Average fuel cost (HK\$/km)		0.35 ^[2]	2.07 ^[3]
Average total operating cost (HK\$/km)		1.10	2.56
Downtime (working day) ^[4]		2	2

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

^[2] Electricity cost was based on HK\$1.289/kWh for 2022 in accordance with CLP.

^[3] The market fuel 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 144 working days. The total distance travelled and the average daily distance travelled of the EV were 5,343 km and 37.6 km/day, respectively while those of the DV were 12,759 km and 89.9 km/day, respectively. The average fuel cost of the EV was HK\$1.72/km (about 83%) 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\$1.46/km (about 57%) lower than that of the DV.

4.3 The EV had 1 scheduled maintenance and 1 unscheduled maintenance while the DV had 1 scheduled maintenance in the first six months of the trial period. Both the EV and the DV had 2 days of maintenance related downtime. Therefore, the utilization rates of the EV and the DV were both 98.6%.

5. Summary

5.1 In the first six months of the trial, the average daily distance travelled of the EV was 37.6 km, while that of the DV was 89.9 km.

5.2 The average fuel cost of the EV was HK\$1.72/km (about 83%) lower than that of the DV. The average total operating cost of the EV was HK\$1.46/km (about 57%) 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 both 98.6%.

5.4 The driver of the EV had no problem in operating the EV but commented that the need of recharging and the limited driving range of the EV affected his works.

5.5 The findings only reflect the performance of the EV in the first six months of the trial. The performance and reliability of the EV will be continuously monitored in the 12 months of the trial.

Appendix 1: Key Features of Vehicles and Charging Facility

1. Trial EV and Charging Facility

(a) EV

Registration mark:	RE923
Make:	Joylong
Model:	EW5
Class:	Light goods vehicle
Gross vehicle weight:	4,300 kg
Payload:	1,300 kg
Seating capacity:	Driver + 4 passengers
Rated power:	100 kW
Travel range:	330 km
Battery material:	Lithium-ion
Battery capacity:	73.4 kWh
Year of manufacture:	2019

(b) EV Charging Facility






Make:	Only Power Supply
Model:	ANDC5-500V/60A-1
Power:	30 kW, 500V DC / max 60A
Charging standard:	GB mode

2. DV Used for Comparison





Registration mark	SS8021
Make:	Isuzu
Model:	TFS86JD-V-AT
Class:	Light goods vehicle
Gross vehicle weight:	3,000 kg
Payload:	1,200 kg
Seating capacity:	Driver + 4 passengers
Cylinder capacity:	2,499 c.c.
Year of manufacture:	2014

Appendix 2: Photos of Vehicles and Charging Facility

1. Trial EV (RE923) and Charging Facility

	
Front view of EV	Rear view of EV
	
Left side view of EV	Right side view of EV
	
30 kW DC charging facility	

2. DV (SS8021) for Comparison

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