MAYOR OF LONDON

Mayor of London / Gnewt Cargo Electric Vehicle Trial

Operational Costs and Environmental Benefits Assessment Update Report
November 2019

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Executive Summary

The Mayor of London / Gnewt Cargo trial project (which ran from July 2017 to December 2019), examined the performance of a set of modified, larger electric vehicles (EVs) used for delivery and logistics purposes in London.

The project is divided into the following reports:

- Baseline Report
- Operational Costs and Environmental Benefits
- Key Barriers Report
- Charging Infrastructure Grid Report
- Q1 Environmental Update Report
- Q2 Environmental Update Report
- Q3 Environmental Update Report
- Q4 Environmental Update Report
- Q5 Environmental Update Report
- Q6 Environmental Update Report
- Q7 Environmental Update Report
- **Operational Costs and Environmental Benefits refresh**
- Charging Infrastructure Grid Report refresh
- Final Data Analysis Report
- Final Report

This report provides an update to the initial assessment in March 2018 of the relative commercial costs and socio-environmental benefits of operating electric Light Goods Vehicles (LGVs) across different business models.

Headline findings are that overall fuel[1] costs for electric LGVs (trial and non-trial) are 75% less than diesel LGVs, based on 2019 projections.

There are significant socio-environmental benefits associated with electric LGVs replacing diesel equivalents. These include the value of noise and emission reductions. These equate to an estimated 1.8p to 2.6p benefit, per kilometre driven, to Greater London. This benefit is predominantly linked to a reduction in greenhouse gas emissions. These benefits do not directly translate into cash value; rather, they reflect the value Government places on a reduction of GHG emissions, noise and local air pollution. These values are driven by

[1] Electricity costs to charge for EV's

an expectation of the avoided healthcare and climate change mitigation costs associated with these emissions.

Whilst the analysis of total operating costs for the trial electric LGVs shows them to be on average slightly more expensive to operate than their diesel equivalents, the smaller EVs used by Gnewt Cargo, such as the eNV200 and Renault Kangoo EV, were about 20% less expensive to operate than their diesel equivalents. This, however, is as a direct result of the unique trial conditions (i.e. short lease period) . These conditions are explained in detail within this report.

We have not included the capital cost of charging infrastructure in our assessment, given the large variation in cost based on different products, methods of implementation and operating model.

Introduction and Context

The Mayor of London / Gnewt Cargo electric vehicle (EV) trial project, which ran from July 2017 to December 2019, examined the impact of electric vans used for delivery and logistics purposes in London using a range of logistical, environmental and economic performance factors.

Gnewt Cargo specialises in the delivery of goods using EVs. At present, commercial EV fleets engaged in logistics activity within London tend to comprise purpose-built small cars and vans (maximum capacity 4.2 m^3) with a limited uptake of larger (minimum capacity 8 m^3) electric vans.

This trial was designed to understand the operational and commercial implications, charging infrastructure options, impacts on the electrical network and avoided emissions associated with a transition to a fleet of larger EVs.

Gnewt Cargo trialled 15 Nissan Voltia eNV200s, 7 Nissan eNV200s modified by Vic-Young and 4 BD eDucatos to deliver goods in conjunction with their existing EV fleet of 4 Nissan eNV200s and 39[2] Renault Kangoo light goods vehicles (LGVs).

Table 1 below highlights the EV types assessed in this trial.

[2] Correct as of time of analysis, the number of Renault Kangoo EVs has fluctuated throughout the data collection period.

Table 1: Trial and current fleet EV comparison table

Vehicle Information	Trial larger EV			Current smaller EV	
	BD eDucato	**Nissan – Vic-Young modified eNV200**	**Nissan - Voltia eNV200**	**Renault Kangoo**	**Nissan eNV200**
					
Make	BD	Nissan – Vic-Young	Nissan - Voltia	Renault	Nissan
Model	eDucato Cargo	eNV200 (Vic-Young modified)	eNV200 (Voltia modified)	Kangoo Z.E.	eNV200
Overall dimensions – length / width / height (mm)	5998 / 2050 / 2522	5195 / 1800 / 2400	5030 / 1760 / 2420	4282 / 2138 / 1844	4560 / 1755 / 1858
Gross weight (kg)	3500	2000	2200	2146	2220
Payload volume (m^3)	13	7.5	8.0	3.4	4.2
Battery Size (kWh)	62	40	22	33	40

This report provides an update to the initial assessment of the relative operational costs and socio-environmental benefits of electric LGVs. For further background and a detailed methodology, please refer to the initial Operational Costs and Environmental Benefits Report dated March 2018.

Our approach involved estimating the per kilometre cost of operation and emissions of Gnewt Cargo's electric fleet and the comparative costs of trial and equivalent diesel vehicles.

Conclusions are based on data received during the Gnewt Cargo trial period (data collection period August 2017 – September 2019).

It is important to emphasise that the costs used for the trial electric LGV comparisons are the exact costs for the trial vehicles over the duration of the trial. This relatively short leasing period has adversely impacted the leasing costs per month affecting the non-energy costs per trial vehicle (see Lease costs explanation on page 12 for further detail).

In a typical business scenario, a longer lease term would be negotiated. We have not made any adjustments to the analysis due to the many variables (number of vehicles being leased, desired term, special fit-out requirements and so on) which would be unique to each case.

Parameters and Methodology

A detailed methodology section can be found in the original Operational Costs and Environmental Benefits Report dated March 2018. The section below focuses on alterations made for the purposes of this update.

A summary of updates to parameters used in this update report is included in Table 2 below. These updates informed our revision of the costs and benefits model. This was necessary to reflect current DfT and HM Treasury guidance.

Table 2: Parameter changes for update report model

Parameter	Original Report	Update Report	Explanation
Social Discount Rate	5.0%	3.5%	Based on Green Book revisions and guidance
Price of Diesel (*p*/MJ)	3.1*p* (Y1 of appraisal period = 2017)	3.6*p* (Y1 of appraisal period = 2019)	Revisions based on Gov.uk Fuel Price Data
Price of Electricity (*p*/MJ)	3.1*p* (Y1 of appraisal period = 2017)	2.8*p* (Y1 of appraisal period = 2019)	Revisions based on Gov.uk Non-Domestic Energy Prices
Average diesel LGV energy use (MJ/km)	0.10 (or 10km per litre). This equates to 3.596 MJ per km or 0.0028 km per MJ.	0.08 (or 12.5 km per litre). This equates to 2.877 MJ per km or 0.0022 km per MJ.	Additional phase of baseline testing of NV200 by LowCVP in September 2019
Price of carbon dioxide equivalent emissions	1 scenario, with an average price of carbon emissions at around £69 per tonne of CO_{2e} emitted	2 scenarios, Medium (£64) and High (£96) price of carbon per tonne CO_{2e} emitted	Based on DfT revisions and guidance[3]
Noise production (*p*/km)	0.3*p*/km in 2020	0.4*p*/km in 2020	Based on DfT revisions and guidance[4]
Local air quality (*p*/km)	0.08*p*/km in 2020	1.1*p*/km in 2020	Based on DfT revisions and guidance[5]

[3] DfT TAG Data Book A3.4.

[4] DfT TAG Data Book A5.4.2.

[5] DfT TAG Data Book A5.4.2.

Energy Cost and Efficiency
To incorporate the predicted changes in energy use and cost over time, we rely on the energy price and vehicle efficiency forecasts provided by the DfT Transport Analysis Guidance (TAG) data book[6] for both electric and diesel vehicles.

Non-Energy Vehicle Operation and Capital Costs
These include vehicle tax, itemised running costs, maintenance costs, insurance and lease costs, which we include as a proxy for capital costs over the appraisal period.

These costs were updated based on new inputs provided by Gnewt Cargo for this report. Included in the running costs is the London congestion charge (£11.50 per day)[7] which is not applicable to EVs. For more information on the updated various costs associated with different vehicle types, see **Appendix A**.

Socio-Environmental Considerations
A keystone benefit of the increased market penetration of EVs is the reduction in the level of greenhouse gas (GHG)[8] emissions during operation. The DfT TAG data book provides current and forecast GHG emissions (expressed in grams of CO_2 equivalent, CO_{2e}) based on the energy type and consumption of vehicles.[9]

These values have been updated to reflect the most recent DfT forecasts in the refreshed model and translated into energy use (Mega Joules or MJ) per km to enable comparison between diesel and electric vehicles.

[6] DfT WebTAG Data Book (A1.3.10).

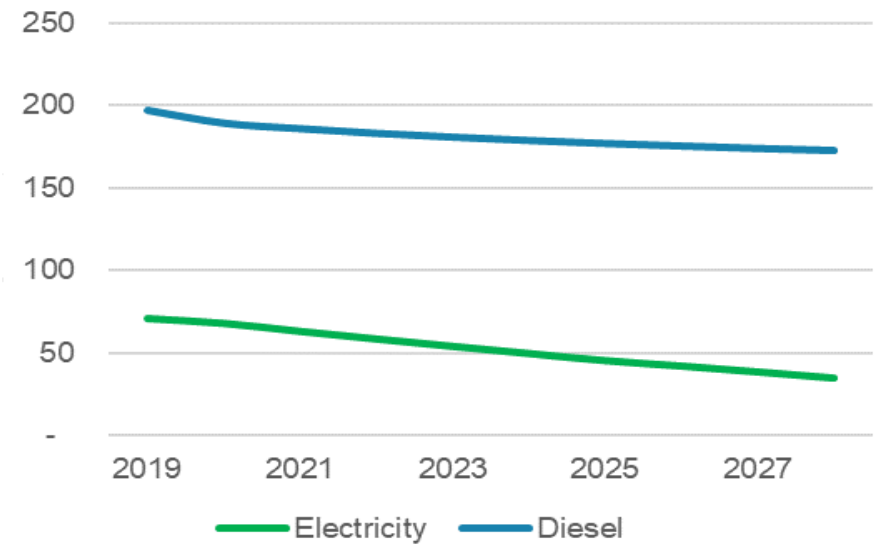
[7] This has remained constant over the trial period.

[8] DfT TAG provides factors for calculating total GHG emissions based on the level of energy consumption. These factors include nitrous oxide (N_2O) and methane (CH_4) emitted as well as carbon dioxide (CO_2).

[9] This report adopts the DfT TAG methodology which reports vehicle exhaust emissions as carbon dioxide equivalent. Avoided emissions are calculated based on the gCO_{2e} per litre of diesel and the energy use by the NV200 and Ducato. The Baseline report and Environmental Updates split vehicle exhaust emissions into carbon dioxide, nitrogen oxides and particulates. In all reports, avoided emissions are calculated based on distance travelled.

Using the DfT forecast GHG emissions and energy use for LGVs in the Gnewt Cargo trial allows us to determine the average GHG emissions from diesel and electric vehicles expressed as grams of CO_{2e} per kilometre over time (see Figure 1).

Figure 1: Average Energy Associated CO_{2e} Emissions per Kilometre



Assessment

This section reports the results of the analysis on energy costs, non-energy costs and socio-environmental benefits.

The largest differences in the non-energy costs of diesel and electric vehicles can be seen in the lease cost. The lease costs for the trial electric LGVs are unique to this trial and need to be clearly understood to give the results important context.

Lease costs explanation
The vehicle supply partners for this trial were requested to provide vehicles on leases ranging from 18-24 months and therefore the monthly lease costs were apportioned accordingly. Following widespread stakeholder engagement, the consensus is that most fleet operators would typically negotiate a 5-year initial lease period resulting in lower monthly lease costs once the total cost is spread across a longer term.

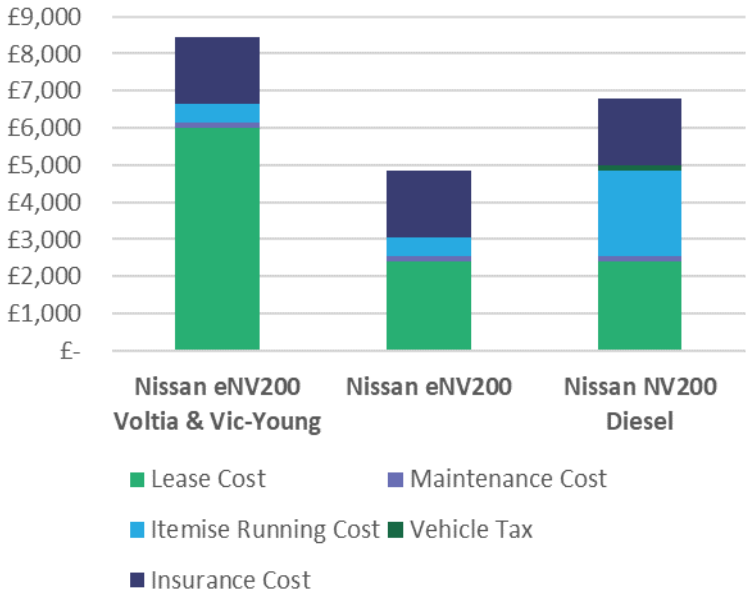
The trial electric LGVs were bespoke conversions, fabricated to an agreed specification and were chosen due to the limited availability of similar sized EVs in the UK to fulfil the trial requirements (see Key Barriers Report for more details).

We have used the actual trial costs in this work, but each fleet operator will negotiate a lease contract based on their specific vehicle needs.

Results
A breakdown is provided by type of vehicle (see Figures 2-4):

- The Nissan NV200 (diesel) LGV compared with its electric counterparts: the Nissan Voltia eNV200, the Nissan Vic-Young modified eNV200 and the Nissan eNV200;
- The Renault Kangoo (diesel) LGV compared with electric Renault Kangoo;
- The Fiat Ducato (diesel) LGV compared with electric BD Auto eDucato.

Figure 2: Annual Non-Energy Costs per type of LGV (Nissan NV200 Electric and Diesel)*



** It is Important to note that the eNV200 Voltia and Vic-Young have the same footprint but have greater capacity and are more expensive to purchase than the eNV200.*

Figure 3: Annual Non-Energy Costs per type of LGV (Renault Kangoo Electric and Diesel)

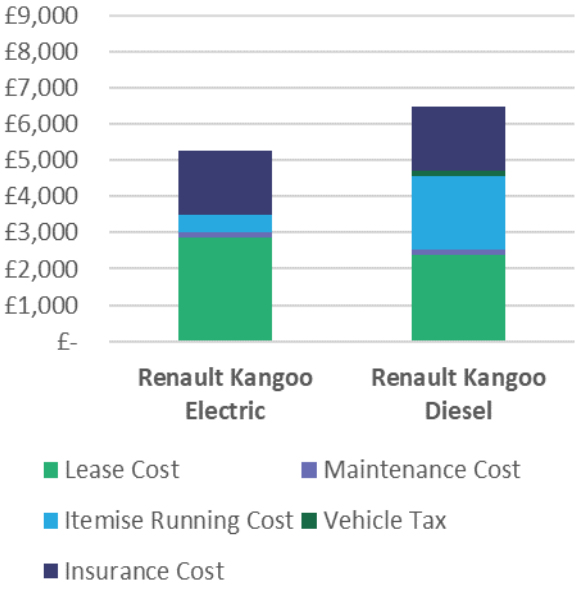
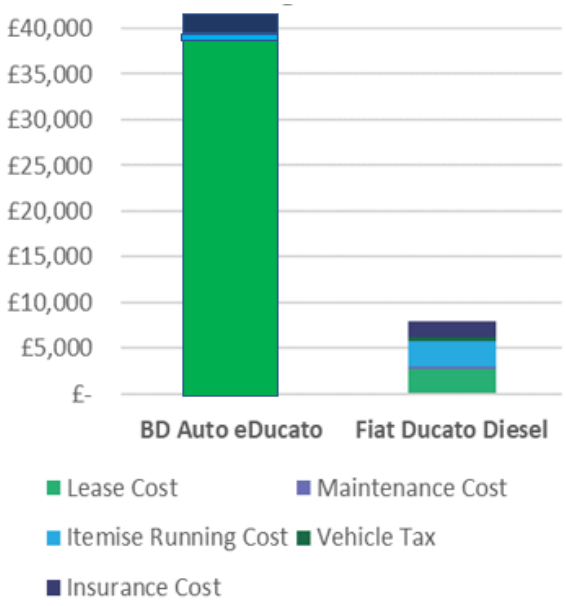


Figure 4: Annual Non-Energy Costs per type of LGV (BD Auto eDucato and Fiat Ducato)**



*** The significant difference in lease costs between the unique vehicles is related to the bespoke vehicle type and short-term lease developed for the Gnewt trial.*

The above Figures show that the non-energy costs for the smaller Nissan eNV200 and Renault Kangoo EVs are lower than their diesel equivalents. This is not true of the larger trial EVs for reasons previously stated.

Using the trial data provided by Gnewt Cargo, in conjunction with the DfT parameters and forecasts, we have undertaken assessments which compare the costs and associated socio-environmental benefits of operating diesel and electric LGVs in London.

Per Kilometre Assessment
The total cost per kilometre of electric and diesel vehicles allows us to understand the operational expenditure difference between vehicle types. This assessment is carried out initially using an average of all Gnewt Cargo EVs and is later broken down by vehicle type.

The per kilometre assessment is split into three categories:

- energy cost
- non-energy costs
- environmental impact benefits

The first two cost categories make up the total commercial cost, directly applicable to operators, whereas the third cost category, environmental impact benefits, are a monetised socio-environmental benefit.

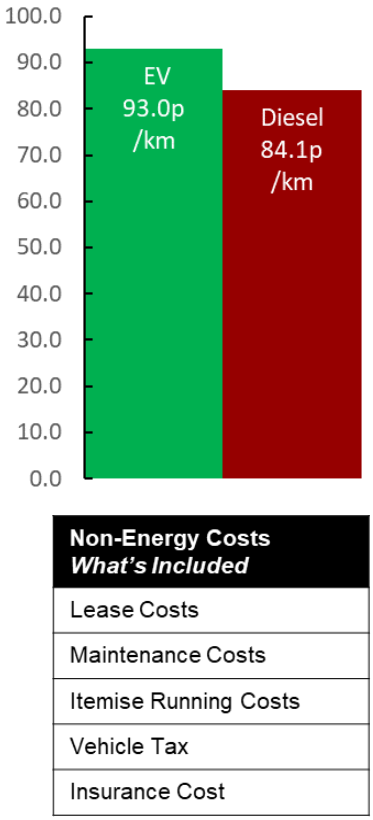
Energy Costs Per Kilometre
The projected energy costs of diesel and electric LGVs per kilometre in 2019 are 10.5p and 2.6p respectively[10]. The significant difference in per kilometre cost suggests a **75% reduction in overall energy costs by transitioning from diesel to electric LGVs.**

Non-Energy Vehicle Costs per Kilometre
Although the difference in energy costs per km between the diesel and electric LGVs is significant, according to the trial data provided by Gnewt Cargo, energy costs represent at most 11% of the overall operating expenditure associated with an LGV (11% for diesel and 3% for electric).

[10] Based on a weighted average of fuel consumption per km (l/diesel, kwh) of the Gnewt fleet

Based on the number of vehicles and the total kilometres driven by all diesel and electric vehicles, there is a non-energy cost of 84.1p per km for diesel LGVs and 93.0p per kilometre for electric LGVs. Therefore, in 2019, the non-energy costs for EVs is 11% above the equivalent cost for diesel vehicles, illustrated in Figure 6.

Figure 5: LGV Non-Energy Costs 2019



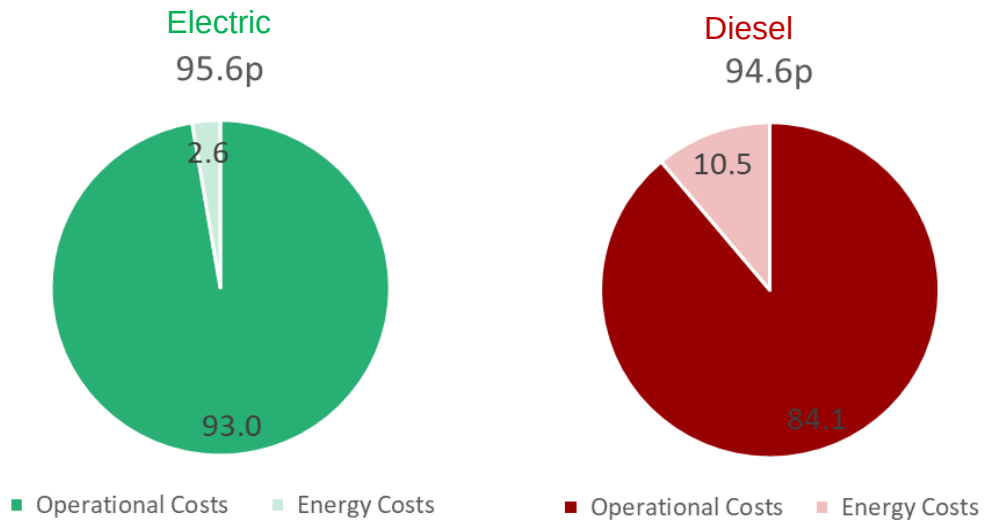
Non-Energy Costs *What's Included*
Lease Costs
Maintenance Costs
Itemise Running Costs
Vehicle Tax
Insurance Cost

The higher costs per kilometre of large EVs (as shown in Figure 2 and Figure 4) is largely tied to the higher lease costs (see Appendix B for lease costs per trial EV). The breakdown of costs per km associated with each type of vehicle is analysed in the following sections.

Total Commercial Cost Per km

Using 2019 values, the total commercial cost (energy costs + non-energy costs) per kilometre of operating a commercial diesel LGV in London is 1% lower than for an EV at 94.6p vs. 95.6p (see Figure 6 below).

Figure 6: Total Commercial Cost Per km 2019

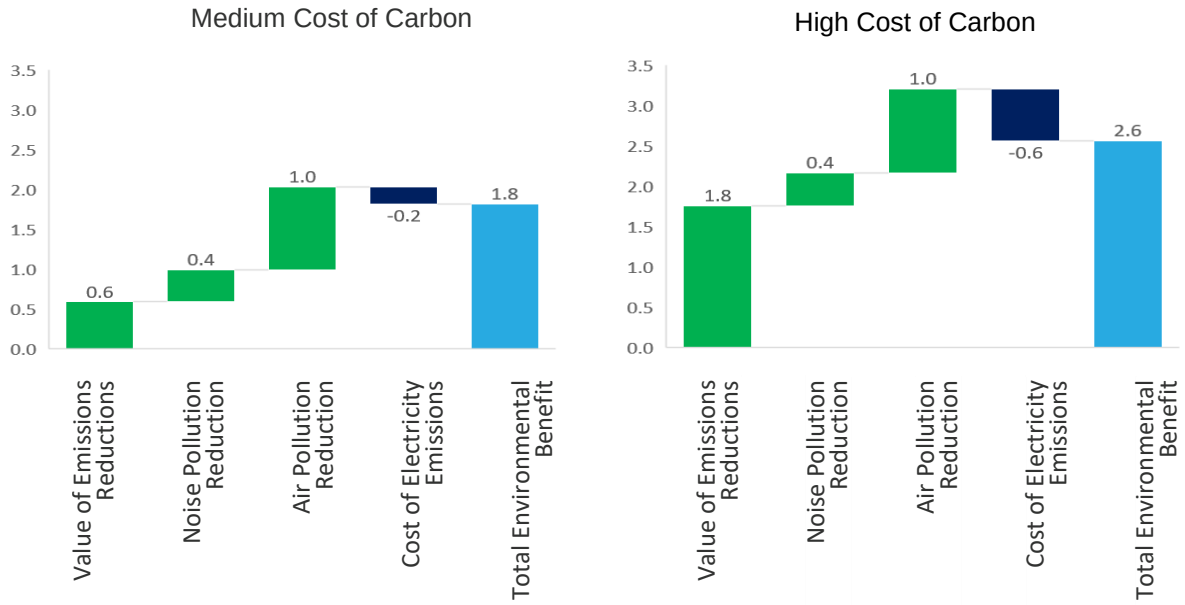


Socio-Environmental Improvement Benefits

There are socio-environmental implications of operating an EV rather than a diesel vehicle in an urban environment. These include the value of noise and emission reductions. Based on the energy consumption values used in our assessment, the benefits to the wider society and economy are between 1.8p and 2.6p per kilometre of EV LGV operations in

London.[11] The breakdown of environmental improvement per km due to avoided societal impacts in both a medium and a high price of carbon scenario has been illustrated in Figure 7 below.

Figure 7: Total Socio-Environmental Improvement Breakdown (p/km)



These benefits do not directly translate into cash value; rather, they reflect the value Government places on a reduction of GHG emissions, noise and local air pollution. These values are driven by an expectation of the avoided healthcare and climate change mitigation costs associated with these emissions.

[11] Reflects the associated costs provided by DfT guidance for vehicle noise, air pollution and carbon emissions. DfT TAG Data Book (2017). These numbers vary according to medium and high price of carbon scenarios described in Table 2.

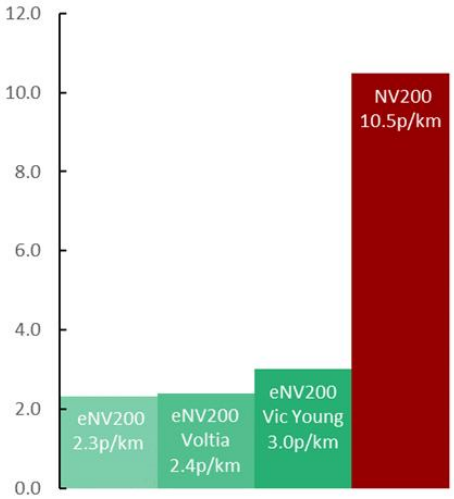
Vehicle Comparisons (see Appendix C for full breakdown)

Nissan NV200 vs Nissan eNV200s

Energy Costs Per Kilometre

On average, the eNV200 LGVs have 70-80% lower energy costs than their Diesel alternative (see Figure 8). Nissan eNV200 vehicles' energy costs represent approximately 3% of total commercial costs.

Figure 8 Nissan NV200 Energy Costs per km 2019



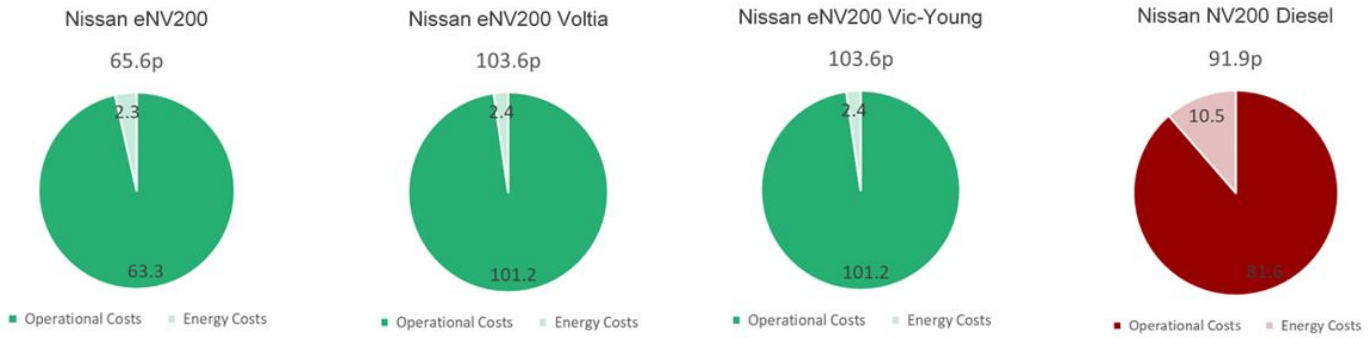
Non-Energy Vehicle Costs Per Kilometre

As seen in Figure 12 below, in 2019, the non-energy costs for the Nissan eNV200 (non-trial) are 22% **below** the related cost for the diesel comparator. Whereas, the non-energy costs for the trial eNV200 Voltia and Vic-Young LGVs are 24% **above** the diesel NV200, mainly due to their higher leasing costs.

Total Vehicle Costs Per Kilometre (Figure 9)

- eNV200 has the lowest total cost, at 65.6p/km vs. diesel cost of 91.9p/km.
- eNV200 Voltia & Vic-Young LGVs are 13% more expensive to operate than the Diesel NV200, at 101.2p/km vs 81.6p/km.

Figure 9: Nissan NV200 Diesel & Electric Total Cost per km 2019

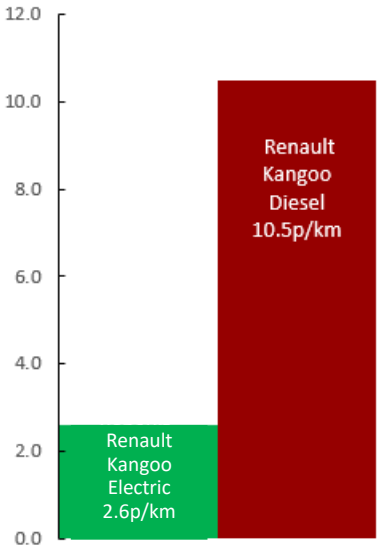


Renault Kangoo vs electric Renault Kangoo

Energy Costs Per Kilometre

The Kangoo electric LGVs have approximately 75% lower energy costs than their diesel alternatives (see Figure 10). Energy costs represent 12% of total diesel Kangoo LGV costs, and approximately 4% of costs for the electric Kangoo.

Figure 10 Renault Kangoo Energy Costs per km 2019



Non-Energy Vehicle Costs Per Kilometre

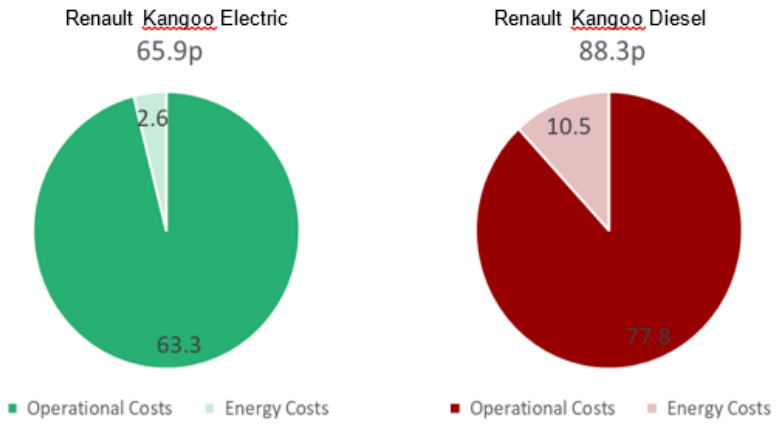
There is an operational and capital cost of 78.0p per km for diesel Kangoo LGVs and 63.0p per kilometre for the electric Kangoo LGVs.

Therefore, in 2019, the non-energy cost for the electric Kangoo is 25% below the related cost for the diesel Kangoo

Total Vehicle Costs Per Kilometre (Figure 11)

- The Renault Kangoo is approximately 25% **below** the total commercial cost of operating an equivalent diesel vehicle in 2019.

Figure 11 Renault Kangoo Diesel & Electric Total Cost per km 2019



Fiat Ducato vs BD Auto eDucato

Energy Costs Per Kilometre
Electric Ducato LGVs have approximately 76% **lower** energy costs than their diesel alternatives.

Energy costs represent 10% of total diesel Ducato LGV commercial costs, and only 1% of the commercial costs of the BD Auto eDucato, due to very high lease costs.

Non-Energy Vehicle Costs Per Kilometre
The non-energy costs for the eDucato are 4.3 times higher than the equivalent cost for the diesel Ducato. This is the result of high lease costs observed for the eDucato during the length of the trial.[12]

Total Vehicle Costs Per Kilometre (Figure 13)

- The high lease costs push the total commercial cost for the eDucato to over £4.0 per km (3.9 times higher than the diesel comparator).

Figure 12 Ducato Energy Costs per km 2019

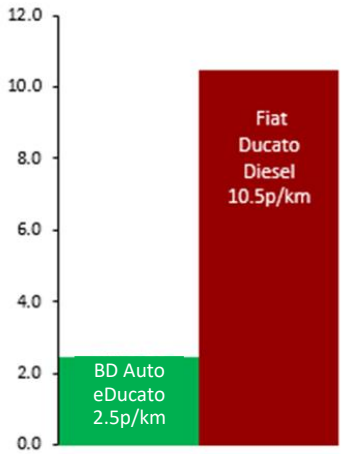
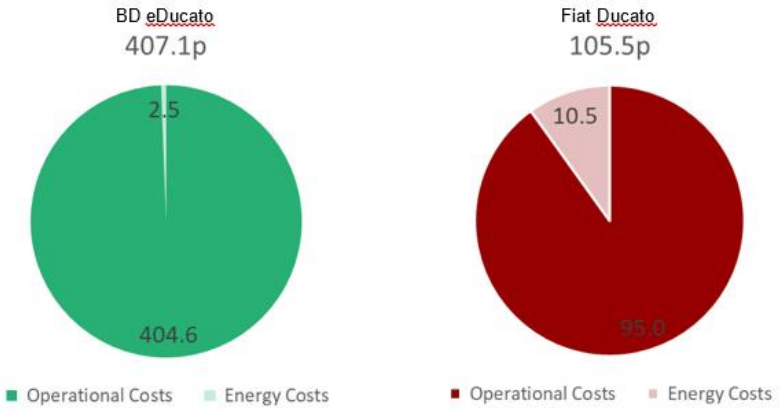


Figure 13: Fiat Ducato Diesel & BD Auto eDucato Electric Total Cost per km 2019



[12] As previously noted these high costs are related by the bespoke vehicle type created for the trial and the short-term lease agreement which meant significantly higher costs than the leasing costs associated with a comparable diesel vehicle.

Socio-environmental considerations

There is a cumulative environmental benefit of operating an electric LGV fleet. While this added benefit is not directly felt by the commercial operator in monetary terms, there is a positive impact that each fleet operator can have on improving the socio-environmental conditions within London.

Switching to an electric LGV fleet might therefore come at a marginal cost to the operator (charging infrastructure and so on) but brings large benefits to the city in which it operates. The socio-environmental improvements also benefit the operator's staff and customers who may live in and travel through the city to get to work.

Relevant Caveats of our Assessment

The findings are based on driving patterns and usage levels of the Gnewt fleet and may not be reflective of all LGV operators. However, it is assumed a vehicle operator will accrue the same vehicle kilometres in an electric or diesel LGV to complete their necessary commercial obligations.

The assessment presented focuses explicitly on comparing the relevant operational expenses of diesel and electric vehicles. The lease cost did vary from 18 to 24 months depending on the model of trial vehicle. The analysis does not consider the relative capital costs of purchasing different vehicle types outright. It is presumed that all associated labour costs and most significant infrastructure costs (including depot space, building services costs, maintenance and repair facilities) would not be significantly affected by the transition from a diesel to an electric vehicle fleet. Therefore, we do not consider the associated labour costs associated with operating an LGV fleet. Furthermore, the assessment does not explore other vehicle types including petrol, hybrid, or those using alternative fuels.

We have not included the capital cost of charging infrastructure in our assessment, given the large variation in cost based on different products, methods of implementation and operating model. For example, some operators may choose to provide a charging point for each vehicle to allow adequate capacity to simultaneously charge their entire fleet, while other operators may choose to rotate their fleet through a smaller number of chargers to reduce the capital cost of charging infrastructure. Similarly, at a city-wide level, there are different charging products and policies that local governments can adopt to roll-out charging infrastructure and support a transition away from fossil fuel-based transport. The investment requirements of these charging products vary significantly from one to another since they are rapidly evolving technologies.

The diesel Nissan NV200 uses 288 MJ per 100 km with an approximate range of 652 km on a single tank of fuel. Conversely, the Nissan eNV200 used by Gnewt Cargo has a range of 170 km on a single charge according to manufacturing specifications. The shorter EV range may affect the ability for commercial operators to complete a single business day’s activity on a single charge. The assessment does not consider some of these potential structural business complications which arise with the transition to electric LGVs.

Summary of Findings

The Gnewt Cargo EV trial provides an insight into the practical performance and economic feasibility of the ongoing push toward cleaner and more efficient vehicle traffic in London. Given the Government's plan to cease the sale of conventionally powered vehicles by 2040 and eliminate fossil fuel vehicles from UK roads altogether by 2050, the findings derived from this trial help quantify the implications for LGVs in London over the next decade as the adoption of EVs increases.[13]

The proportion of small and large EVs in the electric fleet influences how much more or less expensive it will be to operate than a full diesel fleet. For example, smaller EVs, such as the eNV200 and Renault Kangoo EV were about 20% less expensive to operate than their diesel equivalents. The larger trial EVs were more expensive to operate than their diesel equivalents due in the main to the lease costs linked to the duration of the trial and a fleet operator considering switching from diesel to EV may be able to negotiate a longer lease period, thereby reducing costs.

Beyond operating benefits, the socio-environmental benefits associated with electric LGVs replacing diesel equivalents provide a 1.8p to 2.6p benefit to Greater London per kilometre driven.

It is important to understand these conclusions are drawn from the Gnewt Cargo trial data which compared specific models of electric and diesel vehicles. Further exploration is required to understand the potential implications for London when incorporating a far broader range of data from LGVs of varying sizes and manufacturers.

Furthermore, the conclusions drawn are based entirely on the driving patterns and operations of the Gnewt Cargo trial fleet. The estimated socio-environmental benefits may change given variations in how LGVs are operated, the necessary range required, and the payload contained.

[13] Department for Environment Food & Rural Affairs: UK plan for tackling roadside nitrogen dioxide concentrations 2017.

Appendix A

Gnewt Cargo Vehicle Matrix

		CURRENT ELECTRIC VEHICLES		TRIAL DIESEL VEHICLES		TRIAL ELECTRIC VEHICLES		
Vehicle Info	Vehicle Ref.	Renault Kangoo	Nissan eNV200	FIAT DUCATO	NISSAN NV200	Nissan Voltia e-NV200	Nissan – Vic Young modified eNV200	BD Otto e-Ducato
	Trial Period	N/A	N/A	01/08/17 - 31/09/17	01/08/17 - 31/09/17			
	Vehicle Picture							
	Vehicle Registration Number	LY14 HZG	LC64 FKF	SK66 XLJ	BK66 VMO	BK66 VMO	BK66 VMO	N1-L4H2
Vehicle Category & Dimensions	Vehicle class	N1	N1	N1 Light commercial vehicle	N1 Light commercial vehicle	N1	N1	N1
	Make	RENAULT KANGOO	NISSAN	FIAT DUCATO	NISSAN	NISSAN	NISSAN	BD
	Model	Kangoo Z.E.	eNV200	Ducato 35 Multijet	NV 2000	e-NV200	e-NV200	e-Ducato
	Vehicle Gross weight (kg)	2146kg	2220	3000 (kg)	2000 (kg)	2000 (kg)	2220 (Kg)	3500 (Kg)
	Bodywork type	2 AXLE RIGID BODY	2 AXLE RIGID BODY	2 Axle Rigid Body. Panel van with body length and height extension, sliding doors on both sides, rear full height twin doors	2 Axle Rigid Body. Panel van with body length and height extension, sliding doors on both sides, rear full height twin doors	2 Axle Rigid Body. Panel van with body length and height extension, sliding doors on both sides, rear full height 60-40 doors that open 180 degrees.	Nissan eNV200 body but potentially fitted with a range of inerior and rear closure options.	
	Overall vehicle dimensions - Length / width / height (mm)	4282, 2138, 1844	4560, 1755, 1858	4693 / 2050 / 2254	4400 / 1690 / 1860	5030/1760/2420	5195/1800/2400	6366/2050/2522
	Cargo space dimensions - Length / width / height (mm)	1476, 1129, 1251	2040, 1500, 1358	2670 / 1870 / 2524	2040 / 4500 / 1360	2500/1500/1900	4800/1800/2500	4070/1870/1932
	Payload volume (m3)	3.4	4.2	8.0	4.2	7.5	8	13
Supplier Information	OEM/Manufacturer and location	Maubeuge, France	Barcelona, Spain	Val di Sangro, Atessa, Italy	Barcelona, Spain	Bratislava, Slovakia	England , United Kingdom	Istanbul,Turkey
	Build time/Lead time for delivery	3-4 months	3-4 months	2 months	2 months	N/A		N/A
Cost	Purchase Price	£16,313 (+VAT @ 20% £3,262) Total = £19,575	22,6333 (+VAT @ 20% £4,526) Total = £27,160	£18,795 (+VAT @ 20% £3,759) Total = £22,554	£16,185 (+VAT @ 20% £3,237) Total = £19,422	£16,185 (+VAT @ 20% £3,237 + Voltia expansion) Total = £27,000 - £30,000	£16,185 (+VAT @ 20% £3,237 + VY expansion) Total = £25,000 - £30,000	
	First Year VED	£0	£0	£210	£295	£0	£0	
	Lease cost	£240	£240	£230	£200	£500	£500	£3250 pm (exc VAT)
	Minimum lease term	3 years	3 years	3 years	3 years	3 years	3 years	
	Itemise running costs	£480 (est)	£480 (est)	£2,880	£2,300	£480 (est)	£480 (est)	
	Maintenance cost	£120	£120	£160	£160	£160	£160	
	Tax band	E	A	K	E	E	E	
	Insurance Group and cost	13e/£1,800 (per annum)	22/£1,800 (per annum)	5/£1,800 (approx/per annum)	11E/£1,800 (approx/per annum)	11E/£1,800 (approx/per annum)	11E/£1,800 (approx/per annum)	
	Safety features	ABS with EBD (Electronic Brake force, Distribution), Alarm, Airbag - driver, Spare wheel / tyre repair system (Crew, Van Z.E.), Full steel Bulkhead (Not applicable on, Kangoo Crew Vans), Height-adjustable driver's seat, Deadlocking, R.A.I.D (Renault Anti Intruder Device), ESC (Electronic Stability Control) with Hill, Start Assist and Grip Xtend (1), Electronic immobiliser, Remote central locking (2 button key), Front and rear disc brakes, 150 Amp alternator	ABS with EBD (Electronic Brake force, Distribution), Driver airbag, Electronic Traction Control, Immobiliser, Remote central door locking	3-point belts with retractor for cab seats, Head restraints adjustable for height for cab seats, 4-sensor ABS + EBD (brake force distributor), Driver airbag, ASR anti-skid control, MBA mechanical brake assistance (Modular brake assistance), Protective cyclist bar, ESP (Electronic Stability Program), Passenger(s) airbag(s), Front side airbags + window bags	ABS with EBD Brake assist, Vehicle Dynamic Control (VDC), Driver, passenger, side and curtain airbags, Nissan Anti-Theft System Immobiliser, Remote central door locking, Thatcham approved alarm system, super locking, ISOFIX Child-seat anchorage points (2nd row outer seats), Shielded door locks, spare wheel, Tyre Pressure Monitoring System.	ABS with EBD Brake assist, Vehicle Dynamic Control (VDC), Driver, passenger, side and curtain airbags, Nissan Anti-Theft System Immobiliser, Remote central door locking, Thatcham approved alarm system, super locking, ISOFIX Child-seat anchorage points (2nd row outer seats), Shielded door locks, spare wheel, Tyre Pressure Monitoring System. Reversing Camera installed. Anti-slip wooden floor	ABS with EBD Brake assist, Vehicle Dynamic Control (VDC), Driver, passenger, side and curtain airbags, Nissan Anti-Theft System Immobiliser, Remote central door locking, Thatcham approved alarm system, super locking, ISOFIX Child-seat anchorage points (2nd row outer seats), Shielded door locks, spare wheel, Tyre Pressure Monitoring System.	
Engine & Transmission	Engine	Electric motor – Synchronous AC motor	EM57 - AC Synchronous	Euro 6	Euro 6	EM57 - AC Synchronous	EM57 - AC Synchronous	Asynchronous water cooling
	Max Power bhp @ rpm (engine power kW)	44	80	Diesel, 130 @ 3600	Diesel, 90 @ 4000	80	80	140/191 (kW/PS)
	Cylinder Capacity	0	0	2287 cc	1461 cc	0	0	
Transaction Battery & Charging	Type	Lithium-Nickel-Manganese-Cobalt (LiMiNmCoO)	Laminated lithium ion	N/A	N/A	Lithium ion		Lithium-Ion
	Weight (kg)	260	?					
	Capacity (kWh)	33	14			22	40	62
	Charging time (hrs.)	9	7			Rapid: 50min/wall:7.5 h/domestic:21h	Rapid: 50min/wall:7.5 h/domestic:21h	three phase: 7h/single phase: 8-16h

Appendix B

Annual Various Costs per Gnewt Cargo Vehicle – Full Breakdown

	Renault Kangoo Electric	Renault Kangoo Diesel	BD Auto eDucato	Fiat Ducato Diesel	Nissan eNV200 (Voltia and Vic-Young)	Nissan eNV200	Nissan NV200 Diesel	Weighted Average Electric Vehicles	Weighted Average Diesel Vehicles
Lease Cost	£ 2,880.00	£ 2,388.00	£ 39,000.00	£ 2,760.00	£ 6,000.00	£ 2,400.00	£ 2,400.00	£ 5,345.00	£ 2,519.35
Maintenance Cost	£ 120.00	£ 160.00	£ 160.00	£ 160.00	£ 160.00	£ 160.00	£ 160.00	£ 132.57	£ 160.00
Itemise Running Cost	£ 480.00	£ 2000.00	£ 480.00	£ 2,880.00	£ 480.00	£ 480.00	£ 2,300.00	£ 480.00	£ 2,325.41
Vehicle Tax	£ -	£ 145.00	£ -	£ 325.00	£ -	£ -	£ 145.00	£ -	£ 208.24
Insurance Cost	£ 1,800.00	£ 1,800.00	£ 1,800.00	£ 1,800.00	£ 1,800.00	£ 1,800.00	£ 1,800.00	£ 1,800.00	£ 1,800.00
Total	**£ 5,280.00**	**£ 6,493.00**	**£ 41,440.00**	**£ 7,925.00**	**£ 8,440.00**	**£ 4,840.00**	**£ 6,805.00**	**£ 7,757.57**	**£ 7,013.00**

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