

Low Emission Freight and Logistics Trial Results Dissemination



Gnewt and GLA Commercial EV Trial

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gnewt
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Project Overview

1. Aim of trial

To compare larger (7.5-13m³ capacity) commercial electric vehicles with equivalent diesels against a range of logistical, environmental and economic performance factors

Trial EV performance was compared to baseline data from equivalent diesel vehicles as well as data from existing smaller Evs

2. Project partners

Lead partner :



Partner :



Data Analysis and reporting:



3. Overview of vehicles/technologies trialled

- No. of vehicles: 26
- All Battery Electric Vehicles
- 3 types of modified electric van (2 converted from Nissan eVN200):



4. Overview of operational characteristics

- Central London roads – low speed, continuous stop start operation
- Average journey lengths/day: Voltia: 39km, BD Auto: 35km, Vic Young 37km
- Payload volumes Voltia: 7.5m³, BD Auto: 13m³ and Vic Young: 8m³
- Battery capacity Voltia: 22kWh, BD Auto: 62kWh, Vic Young 40kWh
- Depot based smart charging infrastructure (supplied by EO Charging)

1. Summary of in-service data collected

- Fleetcarma (FC) telematics system: real time data – static reports exported from web interface for desired time-period
- Data collected from FC included: energy usage and efficiency, distance travelled and greenhouse gas emissions
- Data from Gnewt's Management Information extracted: number of parcels delivered
- Data collected between November 2017 and end September 2019

2. Comparability and accuracy of LEFT vehicle and diesel baseline data

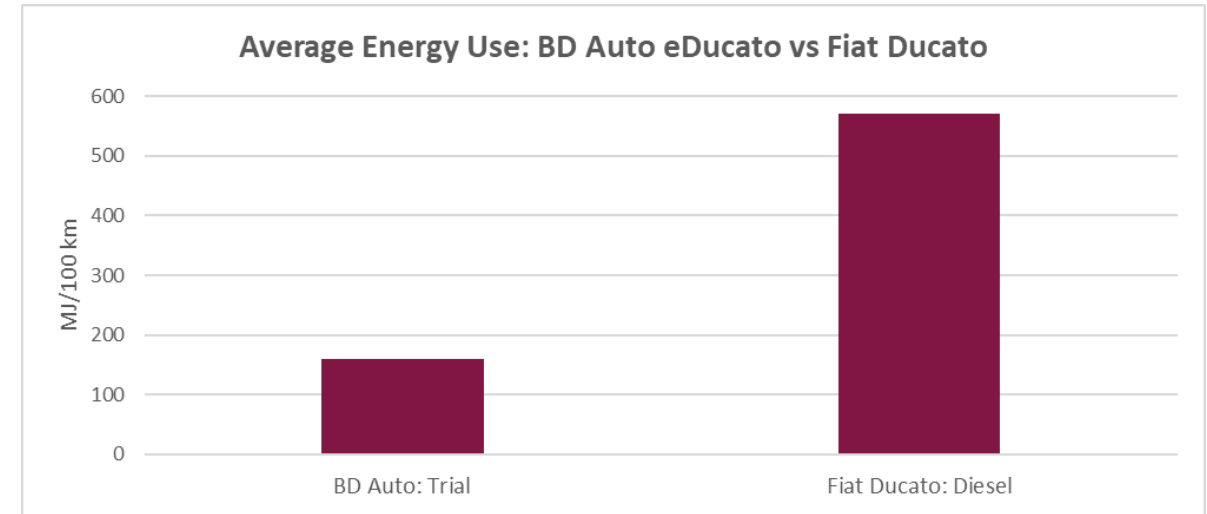
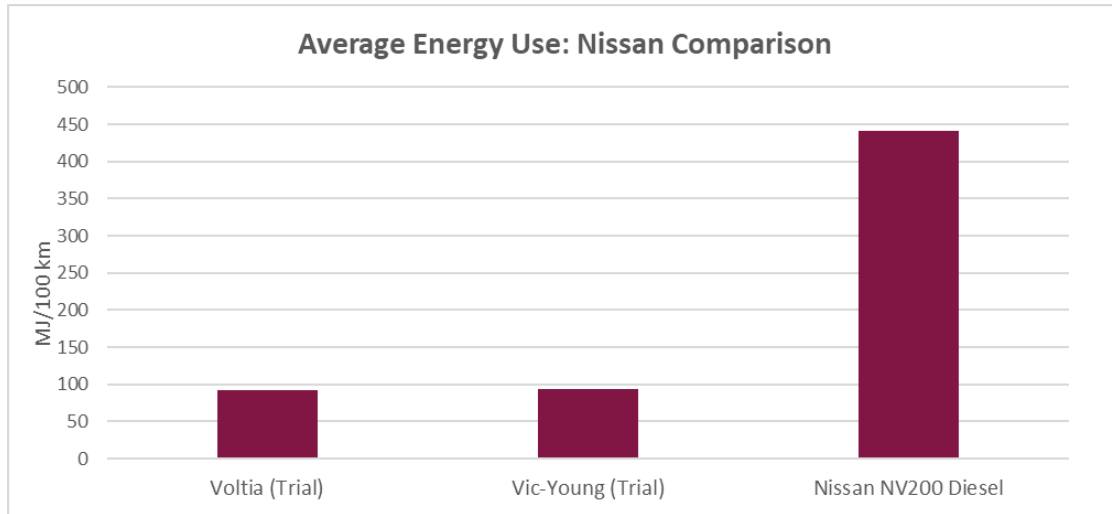
- Main comparators between EVs and diesels were: tailpipe CO₂e emissions, energy usage, weekly distance travelled and no. of parcels delivered per week (productivity)

Some data issues found with FC:

- GPS data from short journeys not always captured (so average used for missing data)
- Concern over the accuracy of Fleetcarma data for measuring Fiat Ducato diesel consumption – LowCVP commissioned independent real-world testing
- Average weekly distance and volume capacity was lower with diesel NV200 cc: modified eNV200s

In-service results summary

1. Headline results from in-service trials – fuel/energy consumption



2. Tailpipe greenhouse gas emissions and pollutants affecting air quality

Emission type	Total savings for trial period (November 2017 to September 2019)
PM ₁₀ g	1,136.8
NO _x kg	481.3
CO ₂ t	77.9

See all results and reports on our trial website:
www.London.gov.uk/EV-delivery-trial

Results from one technology presented here:

Tech 9 = Battery Electric Van = BE VAN



- **Tests on dyno and test track at 60% payload**
- **Tests covered range of duty cycles**
 - **City centre**
 - **Urban**
 - **Regional**
 - **Long Haul**
- **LEFT vehicles compared with standard Euro 6 equivalent vehicles at same payload, same test cycles**

Emissions testing – Fuel/Energy

Tech 9 - BE VAN

	Diesel l/100 km	LEFT kWh/km	Diesel kWh/km	Energy % change
Long Haul	7.2	0.33	0.72	-54%
Regional	6.9	0.28	0.68	-59%
Urban	6.2	0.18	0.61	-71%
City Centre	7.8	0.16	0.77	-80%

- Substantial energy savings in all cycles, most marked in low speed urban/city operations
- Savings could be even greater, depending on charging efficiency (74% used here)

50-80% energy savings
City/Urban best for these vehicles

Emissions testing – GHG emissions

Tech 9 - BE VAN

	LEFT Tailpipe g/km	Diesel Tailpipe g/km	LEFT WTW (Defra factors)	Diesel WTW (Defra factors)	WTW % change
Long Haul	0	192	104	236	-56%
Regional	0	181	87	226	-61%
Urban	0	166	56	204	-73%
City Centre	0	210	49	258	-81%

- Based on standard factors (for grid average electricity vs pump-average diesel), the BE VAN emits substantially lower GHG emissions in all cycles
- If renewable electricity use is assumed, there would be even greater savings on all cycles, in the range 91-96%

90%+ GHG savings with renewable electricity

80%+ with grid electricity, in best applications

Emissions testing – Pollutant emissions

Tech 9 - BE VAN

	LEFT NOx mg/km	Diesel NOx mg/km	LEFT PN (x10 ¹¹ /km)	Diesel PN (x10 ¹¹ /km)	Other pollutants
Long Haul	0	991	0		
Regional	0	976	0		
Urban	0	945	0		
City Centre	0	787	0		

- PN emissions for diesel comparator only measured over whole test cycle so individual cycle figures not available

Zero tailpipe emissions from BEVs

In-service results – other findings

1. Other key findings from in-service trials

- Operationally the trial EVs **delivered on average 30% more parcels per week** than the smaller EV fleet
- Results of driver surveys:
 - Drivers rated the overall satisfaction for the Voltia as a **4.2/5**
 - Drivers rated the overall satisfaction for the Vic Young as a **3.5/5**
 - Drivers rated the overall satisfaction for the BD Auto eDucato as **4.4/5**
- Smart charging reduced the peak load and avoided the need for costly grid upgrades

2. Trial findings – economic comparison

- The **fuel costs** (Electricity costs for EVs) **for the trial electric LGVs were 75% less than diesel LGVs**
- Total operating costs on average about the same – though high trial vehicle and infrastructure costs due to trial conditions

3. What are the barriers you perceive to more widespread adoption of your technology? How has your LEFT trial helped?

- Main barriers: Availability and higher capital costs of vehicles
- Other barriers: lack of charging infrastructure, uncertainty over future electricity costs, legislation/policy and range anxiety. Solutions to some barriers are given in the Barriers report
- LEFT trial – has helped to promote benefits based on results from real world testing of vehicles (e.g. to reduce perceptions around high running costs and range anxiety - on average, the vehicles arrived back at the depot with 62% charge remaining)

Lessons Learnt and Benefits to Gnewt/Menzies

1. Learnings for similar future trials:

- Baseline data needed to be checked and verified much earlier on in the trial period – caused delays and rework

2. Benefits to Gnewt / Menzies Distribution

- **Reputation and PR** - Gnewt and the GLA were involved in 45 dissemination activities (events, articles, social media etc.) during the 2.5yr duration of the trial.
- **Reputation and PR** – Awards include: IoC (Clean Air Award), Corp 2020 (Sustainable Logistics Company of the Year), Trans Tech Awards (Last Mile Innovator Award), NMA Awards (Sustainability strategy of the year – highly commended), What Van? (Green Fleet of the Year – shortlisted), Evies (Fleet Electrification Strategy of the Year – shortlisted), Commercial Fleet (Eco Innovator of the Year – shortlisted) and the list goes on!

Lessons learnt and Benefits to Gnewt/Menzies

- ***New business*** – Won large contract (ASOS) during trial and forms part of overall proposition
- ***Operations*** – Efficiency: able to deliver more per route / day
- ***Operations*** – Introduced EVs onto newstrade routes out of Bow and South East London
- ***Operations*** – Proof of effectiveness of Voltia EVs – 48 more were purchased at the end of the trial and introduced across the UK. First company to have EVs in the Highlands of Scotland in Oban.
- ***Driver morale*** – “The new Nissan e-nv200s have fitted into our operation extremely well. The drive is smooth and comfortable, I’m considering going electric when I next buy a car.”
- ***Further projects*** – Portering and V2G charging