

ALTERNATIVE FUELS

How to challenge common misconceptions



BACKGROUND

LoCITY was established to help mitigate commercial vehicle emissions in London, one of the causes of poor air quality.

The programme brings together vehicle manufacturers, fuel infrastructure providers and commercial fleet operators to ensure we have the right technology, the right vehicles and the right fuels to reduce the impact of commercial vehicles on the environment.

It works to stimulate the uptake of low emission commercial vehicles and improve the availability of the infrastructure these vehicles require – making it easier for you to invest in new technology.

LoCITY operates three workstreams:



Workstream 1:

Helping increase the availability and affordability of viable low emission commercial vehicles.



Workstream 2:

Establishing alternative fuel and supply chain infrastructure to support the uptake of cleaner commercial vehicles.



Workstream 3:

Improving understanding through jargon-free communications, highlighting the bold steps organisations are already taking, and informing future fleet buying decisions.

WHAT'S THIS DOCUMENT FOR?

There is an increasing range of alternative fuels and technologies available to reduce vehicle emissions when compared to a Euro VI/6 diesel.

It can be challenging to find concise information in a market that is evolving quickly with new policies, technology and vehicles being continually released. LoCITY feels it is important we provide clear advice to any organisation interested in cleaning up their vehicle emissions.

The impact of any change will be most felt in London where people and vehicles share the same space on a daily basis.

Overall fleet penetration remains relatively low despite growing evidence that alternatively fuelled vehicles can make commercial, environmental and operational sense. This document will evolve over time. Its principle objective is to address perceived problems with alternative fuels, especially those that are not based on their real-world performance, legislation or best practice.

This document explores three categories of common misunderstanding:

“It’s too risky”

Covering regulatory issues and health and safety

“It won’t work or is too expensive”

Looking at real-world economic, environmental and operational performance

“I don’t have enough information”

Addressing the availability of alternatively fuelled vehicles and the impact of initiatives like Clean Air Zones

WHAT RESEARCH WAS COMPLETED?

This document combines evidence gained from engagement with vehicle operators and fuel suppliers, desktop research and information from independent bodies such as the Energy Saving Trust. A list of the most significant misconceptions was refined and prioritised by LoCITY working groups. Interviews were conducted with four fleets operating commercial vehicles in and around London:

- Gnewt Cargo (battery electric vans)
- Howard Tenens (dedicated gas HGVs)
- Hackney Council (FAME and HVO-derived biodiesel)
- Commercial Group (diesel-hydrogen hybrid vans)



"IT'S TOO RISKY"

Switching to alternative fuels like gas and electricity from diesel or petrol inevitably involves a degree of change.

This can lead to concerns about safety, with drivers sometimes highlighting issues around refuelling or recharging vehicles.

But with the right safety, mitigation and operation strategies in place, using alternative fuels becomes normal operating procedure – and is just as safe as using traditional fuels.

To mitigate any perceived risk from switching to alternative fuels, the best-practice steps to follow are:



Implementing

a risk management strategy as part of health and safety at work procedures to ensure safe alternative fuel use.



Informing

drivers that refuelling and recharging facilities are built according to rigorous standards and regulations.



Engaging

with drivers to ensure they are fully informed about the properties of the fuels they are using to get their buy-in and trust.



Training

drivers in the use of refuelling facilities to embed safe usage.

Gas vehicles are safe to refuel

Vehicles fuelled by natural gas, including compressed natural gas (CNG) and liquefied gas (LNG), have been operational for a long time. The technology has been rigorously tested and is especially common abroad.

In fact, there were over 1.3 million natural gas vehicles and 3,400 gas stations in Europe in 2016, compared to only 310 vehicles and 38 stations in the UK.¹

Thanks to their widespread use around the world, regulations and safety standards are well established for refuelling stations.

Refuelling gas vehicles is a safe process. As an example, Howard Tenens in Swindon carries out up to 80 refuellings every day at its CNG station – with no safety incidents to date.

Electric vehicles are safe to recharge

Electric vehicle (EV) recharging has evolved greatly since the first public stations were installed in the UK in the mid-2000s. Importantly, so too have regulations and safety standards, meaning the process of recharging is essentially the same as plugging in any other electric device provided the charge point is properly installed and maintained.

Charge points that provide AC or DC energy to an EV contain a variety of safety and functional components that protect the user, monitor the equipment and help the driver obtain a charge.

All workplace and public charging is now 'Mode 3' or 'Mode 4' – i.e. it is from a dedicated cable and socket with integrated vehicle-to-charge point communication and current protection.²

In Mode 3 or 4 charging, no current will flow in the charging cable unless full, secure communication is established between the electric vehicle and the charge point – so it is irrelevant whether the driver or vehicle is standing in a puddle, or whether it is raining.

¹ Statistical Report 2017, Natural Gas Vehicle Association Europe. Available from: www.ngva.eu

² UK Electric Vehicle Supply Equipment Association, Making the right connections: General procurement guidance for electric vehicle charge points, April 2014. Available from: www.ukevse.org.uk

"IT WON'T WORK"

There are a variety of alternative fuels and vehicle technologies available that offer economic and environmental benefits to your fleet when compared to diesel engines.

This section explores the technology and fuel choices you can make to obtain these benefits, highlighting the key areas of:

- Choosing the right vehicle and fuel for your business and duty cycle
- Engaging with your drivers to ensure they are aware of any potential limitations (in terms of range, etc.) of the chosen fuel and technology

Will alternative fuels work for a business?

The exact application or duty cycle for a business and the type of vehicles it requires determines whether a viable technology currently exists. LoCITY has a number of tools that can help explore the current options and whether it makes financial sense to switch at this stage.

If it does not make sense at this stage, it definitely will in the future as the market is evolving in response to government policy – the expectation is that we will all be operating zero-emission road transport by the middle of this century.

LoCITY has identified four technology and fuel options that meet Euro VI/6 emission standards. These are operationally viable based on fleet testimonials from at least two operators, and may be capable of operating at a similar cost to a diesel commercial vehicle. These are:

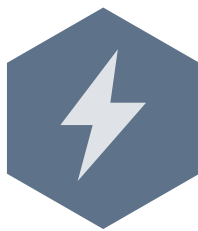
- Battery electric, plug-in hybrid and extended-range electric
- Hydrogen fuel cell
- Dedicated gas, including compressed and liquefied natural gas (CNG and LNG), their biofuel equivalents, and liquefied petroleum gas (LPG)
- Renewable fuels such as hydrotreated vegetable oil (HVO) and gas-to-liquid (FTL)³

There are several factors to consider when it comes to commercial vehicle operation economics, including vehicle cost, annual mileage, ownership periods and fuel costs.

³ The economics of operating these fuels is highly dependent on their price, and at present they are likely to be more expensive to operate than diesel.

This is illustrated below, with the areas marked green showing where whole-life payback for a given vehicle type and fuel combination is possible.

For any business, the right combination of vehicle, fuel and duty cycle can offer a compelling economic and environmental case to switch to alternative fuels, but it is important to undertake the right research before making a purchasing or leasing decision.



Electric

Small electric and plug-in hybrid vans show good environmental and economic performance in London due to Congestion Charge Zone exemption. Meanwhile, the limited availability and high costs of larger vans mean high mileage and longer ownership periods are required for payback.



Natural Gas

Gas trucks show similar CO² emissions, but evidence of reduced nitrogen dioxide compared to Euro VI diesel. High annual mileages and high-capacity gas stations providing low-cost gas supply are required for good economic performance.



Biodiesel

Reduced wheel-to-wheel CO² emission savings with similar air quality performance for fatty acid methyl ester (FAME) biodiesel, but promising indications of lower nitrogen oxide emissions for hydrotreated vegetable oil (HVO) biodiesel. FAME biodiesel use can raise fleet costs due to increased vehicle and storage tank maintenance.



Hackney Council has been using a wide range of vehicles fuelled by biodiesel since 2008, from small vans to refuse collection vehicles. The council has run vehicles on blends ranging from 30% biodiesel/70% fossil diesel (B30) to 100% biodiesel (B100).

Norman Harding
Corporate Fleet Manager, Hackney Council

Electric vehicles need sufficient range

Small electric vans offer a compelling economic and environmental case within congested urban environments like central London, but they also need to fit in with the operational pattern of your fleet – and that means they also need to provide sufficient range and load-carrying ability.

Electric vans can handle many daily van duties on a single charge. But if your vehicles need to carry heavy loads or potentially cover distances of over 60 miles a day, you will need to consider a top-up rapid charging regime.

More detailed factors to consider when looking at the suitability of electric vans for your operation include:



1. How far does your vehicle travel each day?

According to the Low Carbon Vehicle Partnership⁴, electric vans can offer up to an 80-mile (small van) or 100-mile (large van) range in the real world.

Research conducted on behalf of the Department for Transport⁵ showed that the majority of UK van mileage is below 60 miles per day, meaning electric vans can handle the majority of daily van mileage – although this can be impacted by recharging, vehicle load, driving behaviour and seasonal effects as described below.



2. Recharging options

At present, most electric vans recharge overnight at base or at home, meaning their daily range is limited to the amount that can be obtained from a single battery change.

However, the growing number of rapid public charging stations, which give a full vehicle recharge in around half an hour, will allow top-up charging during the day – thereby considerably extending daily vehicle range and meaning less downtime and more flexible shift patterns.



3. EV battery size

Most small electric vans currently on the market have batteries that are the same size as those in electric cars. Manufacturers are beginning to offer variants with 50% larger batteries – and therefore 50% longer range – to extend the real-world range to at least 120 miles between charges. These may impact carrying capacity, so a balance needs to be reached between range and payload requirements.

⁴ The Low Emission Van Guide, Low Carbon Vehicle Partnership, November 2016. Available from: www.lowcvp.org.uk

⁵ Ultra-Low Emission Vans Study, Element Energy, January 2012. Available from: www.assets.publishing.service.gov.uk



4. Seasonal factors

Driving in winter has an impact on the efficiency of any vehicle – whether combustion or electric – and essentially increases fuel consumption. For electric vehicles, this impact is through reduced battery efficiency at low temperatures and the increased use of auxiliary loads like heating and lighting.



5. Load-carrying ability and auxiliary equipment

This has a significant potential impact on whether an electric vehicle is feasible. The payload for a small battery electric panel van typically reduces by around five to 15%, but it can be up to 25% for a larger panel van due to battery weight. If your vehicle is required to power additional units such as tools, refrigeration, etc. then you may be limited by the technology, but this will also reduce the range of the vehicle. If you are not confident in how much additional power could be used each day then you should seek an expert fleet review to assess your typical requirements.



6. Driving style

This has a large impact on whether a vehicle makes operational sense. Range can be extended significantly if drivers are aware of the most efficient use of electric vehicles, like maximising energy recovery by using regenerative braking in urban areas. LoCITY has specific training courses on this topic.



7. Stem miles and route planning

When planning the logistics for operating an electric vehicle, it is important to factor stem mileage – i.e. the mileage from the depot to the first delivery – into your total daily range. Range can be increased by using specialist routing software to optimise daily journeys although anecdotal case study evidence suggests this a less significant factor in central London, where greater benefits are found from a driver's ability to react to traffic flows.

Gnewt's vehicles drive between five and 15 miles a day in carrying out deliveries, and around 25 miles in total when including stem mileage – well within the single-charge range of modern electric vans.

"I DON'T HAVE ENOUGH INFORMATION"

In an emerging market, it is often the amount of different opinions that causes misconceptions to develop.

Conflicting information about different technologies and finding a way to compare how they may operate in the real world are challenging for those new to the subject.

LoCITY has produced tools based on reliable, independent sources. We are technology neutral but focused on the long-term goal of zero-carbon road transport. Our aim is to provide accessible support and to help signpost the best sources of high-quality information on emerging technology, vehicles, and transport policy.

There are suitable vehicles available

There are a number of alternatively fuelled vehicles on the market, with manufacturers launching new models regularly.

Finding a vehicle that could be suitable for you is easier with information from recognised sources. For low emission vans, these sources include:

- LoCITY Commercial Vehicle Finder

Provides a list of alternatively fuelled vans and trucks available in the UK.

- Eligibility for Plug-in Van Grant

Offers a list of vans that emit less than 75g of CO₂/km from the tailpipe and have a zero-emission range of at least 10 miles, making them eligible for a government purchase price subsidy of up to £8,000 or 20% of their total cost.

- LowCVP Low Emission Van Guide and Tool

Features detailed information on the availability of low emission vans and their suitability for given duty cycles.

Business are already using alternatively fuelled vehicles in London

Many organisations based in London have trialled new vehicles and then shared their experiences via LoCITY's three working groups, which combine operators, manufacturers, and policymakers.

These industry forums cover vans, HGVs, and specialist waste and construction vehicles. Each of these open groups is at a different stage of implementation as vehicle technology is developed.

We feel it is productive to share both the positive and negative experiences. Honest peer-to-peer advice is crucial for any organisation to make an initial commitment towards a new fuel type.

LoCITY also has other ways in which it helps demonstrate the steps early adopters are taking in this area. We produce a monthly newsletter, have video case studies and host regular industry roadshows. These all help to form a collective awareness that organisations in London must adapt to reduce their environmental impact.

London is going to become a zero-carbon city

The latest Mayor's Transport Strategy (MTS) outlines a clear commitment to decarbonise London's transport network. This document was published in 2018 and sets out the Mayor's policies and proposals over the next two decades, including a pathway to zero-emission road transport.

Key environmental targets for London include compliance with legal NO² concentration limits as soon as possible, to meet World Health Organisation limits for PM2.5 concentrations by 2030, and overall for London to be zero carbon by 2050.

Commercial fleets will play a major role in achieving those targets. Any change will be carefully managed to ensure London's businesses remain economically competitive. Proposals that may need businesses to adjust include the MTS encouraging zero-emission zones in town centres from 2020 and seeking to deliver one in central London from 2025.

