THE ZENITH GUIDE TO LOW CARBON FUELS

Zenith
Commercial

WORKING TOGETHER FOR A SUSTAINABLE FUTURE

The road transport sector is facing its biggest challenge to date as it strives to make huge changes amid the ongoing climate crisis. As a major contributor to greenhouse gas emissions, accounting for 28 per cent of all UK emissions, it's widely accepted there is much work to be done to meet the Government's net zero target for 2050 and improve the health of both people and the environment.

Decarbonisation has been a priority in the industry for some time, with low carbon fuels playing an important part in helping to reduce harmful emissions. Over the past decade we've seen more fleet operators willing to make the transition from diesel to alternative fuels, however, the landscape remains complex to navigate with several barriers to market, including cost and availability.

Diesel is still a major part of most HGV operators' powertrain strategy. As a result, significant investment is going into diesel assets which have an expected lifespan of seven to 12 years. The role of alternative fuels is going to be vitally important, and the interesting question the Government will have to answer is will they have a role beyond transition?

As we wait for the Government to publish its low carbon fuels strategy, the fundamental issues for HGVs are the prohibitive capital cost of the vehicles and the lack of appropriate refuelling and recharging infrastructure. We need a clear roadmap which sets out precisely how this infrastructure is going to be delivered.

We have customers, who despite uncertainty, have adopted an early position and strongly embraced the shift away from diesel. We're finding there is much more interest in sustainability than ever before, so the desire to change is there.

As an industry, we need more funding and pilot schemes available to support smaller businesses with the financial and practical implications of transitioning to renewable fuels. In addition, we need more incentives for businesses to continue the good work they're already doing. By lobbying for change to the current legislation around emissions reporting, we're fighting for businesses to get recognition for using low carbon fuels in place of diesel.

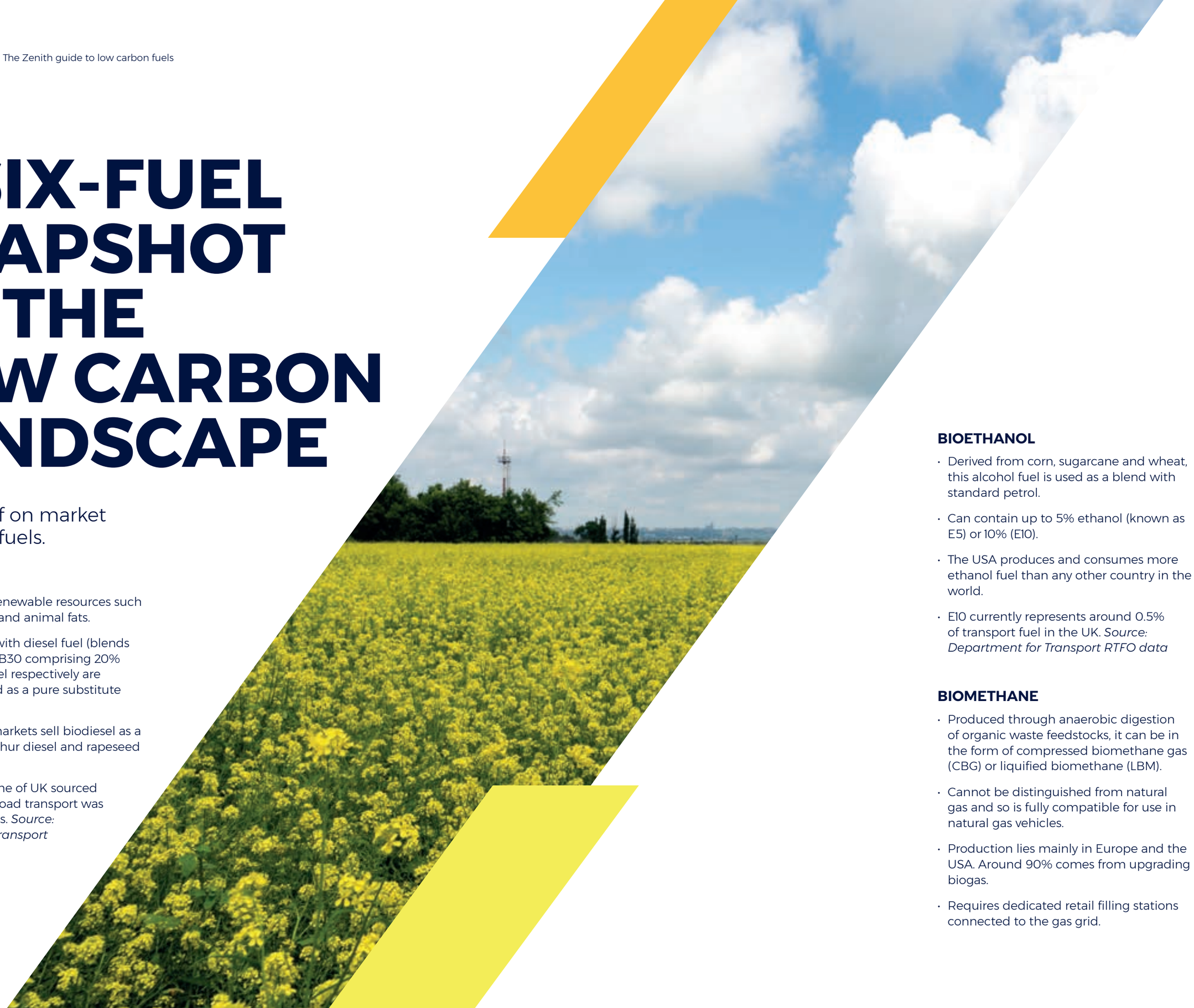
As leaders in fleet management, we're proud to be driving change in our sector. We're keen to help our clients embrace new opportunities and be ready for future challenges, which is why we've prepared this guide to address some of the complexities surrounding alternative fuels. We've outlined the six main types of low carbon fuels available right now on the UK market, with the exception of hydrogen.

Using our independent expertise, we can help you to better understand the options available, and support you on your journey to a cleaner, greener fleet of the future.

Martin Jenkins

CEO Zenith Commercial and
Group Strategy Director, Zenith

A SIX-FUEL SNAPSHOT OF THE LOW CARBON LANDSCAPE



Summary of on market low carbon fuels.

BIODIESEL

- Produced from renewable resources such as vegetable oils and animal fats.
- Widely blended with diesel fuel (blends such as B20 and B30 comprising 20% and 30% biodiesel respectively are common) or used as a pure substitute (known as B100).
- Some UK supermarkets sell biodiesel as a blend of low sulphur diesel and rapeseed oil on forecourts.
- In 2020 the volume of UK sourced biodiesel for UK road transport was at 126 million litres. *Source: Department of Transport RTFO data*

BIOETHANOL

- Derived from corn, sugarcane and wheat, this alcohol fuel is used as a blend with standard petrol.
- Can contain up to 5% ethanol (known as E5) or 10% (E10).
- The USA produces and consumes more ethanol fuel than any other country in the world.
- E10 currently represents around 0.5% of transport fuel in the UK. *Source: Department for Transport RTFO data*

BIOMETHANE

- Produced through anaerobic digestion of organic waste feedstocks, it can be in the form of compressed biomethane gas (CBG) or liquified biomethane (LBM).
- Cannot be distinguished from natural gas and so is fully compatible for use in natural gas vehicles.
- Production lies mainly in Europe and the USA. Around 90% comes from upgrading biogas.
- Requires dedicated retail filling stations connected to the gas grid.

HYDROTREATED VEGETABLE OIL (HVO)

- Also known as renewable diesel, HVO is a diesel substitute resulting from the hydrogenation of vegetable oils and animal fats.
- Can be used as a drop-in fuel for diesel vehicles, there is no replacement engine or infrastructure required.
- Not yet widely available in the UK and is normally purchased in large quantities through specialist suppliers.
- Degrades much more slowly than diesel, with storage possible for up to 10 years.

BIOPROPANE

- Chemically identical to conventional fossil fuel LPG, Biopropane is a by-product of the HVO process.
- Can be used in any ratio with fossil fuel propane and is a drop-in fuel.
- Also known as BioLPG, Biopropane is easily blended with LPG and so provides an easy transition to a cleaner fuel.
- Relatively new to the UK market and so current availability is limited.

NATURAL GAS

- Supplied as either liquified natural gas (LNG) or compressed natural gas (CNG), it is a lower carbon equivalent to diesel.
- A dedicated gas engine is required for the sole use of natural gas. It is possible to acquire bi-fuel or dual fuel engines which use petrol or diesel interchangeably.
- Lack of large-scale refuelling stations in the UK.
- Although classed as low carbon, it is not classed as a renewable energy source.

FUEL FACTSHEET: BIODIESEL

PROS

Renewable, biodegradable fuel, that is considered a 'drop-in,' as it requires no significant modification to conventional diesel engines and can be used in current infrastructure including pumps and pipelines.

Readily blended with diesel, commercially available and commonly delivered to fleet depots along with diesel.

Due to these factors, it may be seen as an attractive and accessible low carbon fuel to transition to.

In a Well-to-Wheel (WTW) assessment, Biodiesel typically has Greenhouse Gas (GHG) emission savings of 76-83% compared to retail diesel.

CONS

High level biodiesel blends can often present management and storage issues.

Pure biodiesel (known as B100) requires careful handling as it has a propensity to 'gel' in low temperatures and can potentially increase nitrogen oxide emissions. This can be mitigated by appropriate equipment modification.

High blend biodiesel is not available on retail forecourts and so may present a barrier in its uptake.

COSTS

Biodiesel is supply chain dependent (which can present its own set of risks regarding availability) but broadly speaking, blended biodiesel does offer some cost parity with fossil fuels.

Costs can be incurred if vehicle engine upgrades are required. During production, it's likely to be relatively low, but if done retrospectively, it could cost in the region of £2,000 per vehicle.

Costs are higher for pure biodiesel (B100), where factory modifications and retrofit conversion can typically cost around £6,500 to £8,000 per vehicle.

CHECKLIST

Is it a drop-in fuel?	Yes
Is it classed as renewable?	Yes
Does it lower reported emissions?	Yes
Does it require large investment in vehicles?	Potentially
Is it expensive to adopt this fuel for large fleets?	Potentially
Does it rely on agricultural production?	No
Is it available across the UK?	Yes
Where can you refuel?	Depot only

FUEL FACTSHEET: BIOETHANOL

PROS

Renewable, biodegradable fuel derived from natural waste materials such as low-grade grains and sugars.

It helps to reduce greenhouse gas emissions, air pollution and our reliance on crude oil and fossil fuels.

Considered a ‘drop-in’ fuel, meaning it typically requires no modification to conventional engines and can be blended with standard petrol fuels in varying quantities to produce E5 (5% ethanol) and E10 (10% ethanol) petrol which have been rolled out across the UK and Europe.

CONS

The high ethanol content in E10, which has typically replaced E5 in forecourts, can cause compatibility issues in some older vehicles and potentially damage rubber, alloy and plastic parts. This can be mitigated by switching to a ‘super’ or ‘premium’ fuel version, but at a higher cost.

Can also cause problems starting in low temperatures which could be detrimental to fleet operations in some parts of the UK.

Since 2018, production of bioethanol in the UK has slowed with producers citing low prices and lack of clarity around government policy as the reasoning.
Source: The Future of the British Bioethanol Industry, CDP 2019/0004 House of Commons, 2019

COSTS

No impact on vehicle cost as no modifications are required, and there is no discernible impact on fuel costs where standard fuels are used.

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Is it classed as renewable?	Yes
Does it lower reported emissions?	Yes
Does it require large investment in vehicles?	No
Is it expensive to adopt this fuel for large fleets?	Yes
Does it rely on agricultural production?	Yes
Is it available across the UK?	Yes
Where can you refuel?	Public refuelling and depot

FUEL FACTSHEET: BIOEMETHANE

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Does it require large investment in vehicles?	Yes
Is it expensive to adopt this fuel for large fleets?	Yes
Does it rely on agricultural production?	No
Is it available across the UK?	Yes
Where can you refuel?	Public refuelling and depot

FUEL FACTSHEET: HYDROTREATED VEGETABLE OIL (HVO)

PROS

Quickly gaining traction as a viable renewable biofuel. The use of hydrogen as a catalyst in production means the fuel burns a lot cleaner than some alternatives and leads to a WTW reduction of around 81-91% in harmful GHG emissions.

Serves as a drop-in fuel, so no changes to infrastructure required.

The worldwide rise in its popularity means that there is increasing availability, with new supply chains expected to enter the UK within the next two years.

CONS

The UK has no domestic HVO production at present, so fuel is imported from Europe, Asia and US, somewhat negating the gains made from lower GHG emissions.

Challenges around cost as HVO has a higher operating expenditure than diesel.

COSTS

While there are no cost implications to vehicles as HVO remains a replacement or drop-in fuel, there are some operational costs incurred, with fuel prices 15-30% higher than diesel. Fleet managers will need to examine whether fuel costs are offset by savings made through keeping current infrastructure.

CHECKLIST

Is it a drop-in fuel?	Yes
Is it classed as renewable?	Yes
Does it lower reported emissions?	Yes
Does it require large investment in vehicles?	No
Is it expensive to adopt this fuel for large fleets?	Yes
Does it rely on agricultural production?	No
Is it available across the UK?	No
Where can you refuel?	Depot only

FUEL FACTSHEET: BIOPROPANE

PROS

Biopropane, also known as BioLPG is a renewable, clean-burning fuel that is identical to the conventional fossil fuel LPG. As such, it can be substituted as a drop-In fuel with no impact on infrastructure.

Compared to diesel, it can achieve WTW GHG emission savings of 57-67%.

Emits much lower levels of nitrous oxides and particulate matter than diesel or petrol.

Transition is relatively straightforward with the use of rented retrofit systems to Euro IV, V and VI diesel HGVs – so no capital investment is required.

Long haul operations are estimated to see costs break even at around 17,000 miles per annum.

CONS

Biopropane is a relatively new product in the UK and at present, there are only small volumes available for vehicle consumption.

COSTS

In terms of vehicle costs, retrofit systems are available as rental-only at a cost of around £150 per month. Biopropane benefits from a preferential rate of fuel duty and running costs on average are 60% cheaper than diesel.

CHECKLIST

Is it a drop-in fuel?	Yes
Is it classed as renewable?	Yes
Does it lower reported emissions?	Yes
Does it require large investment in vehicles?	Potentially
Is it expensive to adopt this fuel for large fleets?	Potentially
Does it rely on agricultural production?	No
Is it available across the UK?	No
Where can you refuel?	Public refuelling and depot

FUEL FACTSHEET: NATURAL GAS

PROS

Supplied as either liquified natural gas (LNG) or compressed natural gas (CNG) this fuel presents a cleaner, low carbon fuel alternative to diesel.

As it burns much cleaner than diesel, there is no build up which results in less engine corrosion and lower maintenance costs.

Tailpipe emissions are reduced by around 5-10% in comparison with diesel.

CONS

Although natural gas is a lower carbon alternative, it is still classed as a fossil fuel and as such is likely to be subjected to the same treatment in terms of legislation.

WTW GHG Is potentially higher than diesel due to methane leakage across the supply chain.

COSTS

There are initial costs incurred with acquiring gas HGVs, which can cost around 25% more than standard diesel vehicles, although in terms of operational costs, natural gas fuel is cheaper than diesel on a PPM basis. The Treasury has committed to maintaining the fuel duty differential between methane and diesel which should help to offset those costs.

CHECKLIST

Is it a drop-in fuel?	No
Is it classed as renewable?	No
Does it lower reported emissions?	Somewhat
Does it require large investment in vehicles?	Yes
Is it expensive to adopt this fuel for large fleets?	No
Does it rely on agricultural production?	No
Is it available across the UK?	Yes
Where can you refuel?	Public refuelling and depot

DOES REPORTING NEED RETHINKING?

At present, UK companies must measure and report Greenhouse Gas (GHG) emissions as part of their annual director report, as legislated in the Streamlined Energy and Carbon Reporting policy (or SECR) which came into effect in 2019. This applies to any 'quoted' company, a company listed on a public exchange, large unquoted companies, and large limited liability partnerships (LLPs). Businesses are considered large if they meet two of the following criteria:

- A turnover of £36 million or more
- A balance sheet of £18 million or more
- 250+ employees

HOW GHG EMISSIONS ARE REPORTED

The recognised international standard used for reporting is the Greenhouse Gas Protocol, which provides a framework for businesses and governments to measure and report their emissions. This is broken down into three broad scopes:

Scope 1: All direct GHG emissions, from sources that are owned by the reporting company. This could be the petrol in company cars or diesel in company trucks for example.

Scope 2: Indirect GHG emissions come as a direct consequence of the activities covered in scope 1, but are controlled by another entity, for example electricity.

Scope 3: Other indirect GHG emissions that come from the extraction and production of fuels not immediately covered in scope 2.

All reporting businesses will be measured against Scope 1 and 2. Reporting Scope 3 emissions is voluntary. If companies want to be considered carbon neutral, they must offset carbon emissions laid down in Scopes 1 and 2. To achieve Net Zero status in alignment with the United Nation's Sustainable Development Goals, the emissions in Scope 1, 2 and 3 need to be reduced.

To report GHG emissions, UK Government asks that data is converted into activity data which can include:

- Distance travelled
- Litres of fuel used
- Tonnes of waste disposed of

A new set of conversion factors are set out each year, along with a methodology paper explaining the changes and how the conversion factors are to be calculated.

THE ISSUE WITH CURRENT REPORTING METHODOLOGY

The current methodology which includes factors set out under DEFRA/BEIS means that HGVs are classified as diesel only, despite a proportional number switching to alternative low carbon fuels. There are emission factors applied for various low carbon fuels, but this is not applied against the commercial vehicle industry.

At Zenith, we believe this needs to change. We need further recognition and formal reporting implemented over the use of low carbon fuels, to not only acknowledge their use in our industry, but so companies can see the calculated benefits by fuel type and make strategic decisions towards decarbonisation. If we are to meet the UK Government's net zero target for 2050, we need transparency around this issue as a matter of priority.

HOW CAN THE GOVERNMENT SUPPORT THE INDUSTRY?

The last decade has seen the government focus on the development and rollout of electric vehicles, although outside of the last mile segment, uptake of EVs in the commercial vehicle sector remains low. Viable vehicles are only just starting to gain traction through the introduction of trial schemes. There needs to be a refocus to include more low carbon fuel options.

While we wait for the Government to publish their strategy around LCFs, we've outlined the current initiatives that support and incentivise the transition to alternative fuels and aim to drive decarbonisation in our industry.

NEW LEGISLATION

The Renewable Transport Fuel Obligation (RTFO) was set up by the Department for Transport (DfT) over a decade ago to support the reduction in GHG emissions by encouraging the production and use of renewable fuels.

The RTFO is an annual obligation on fossil fuel suppliers to provide a certain percentage of renewable fuel to the UK market, largely biofuels. This sat at 9.6% in 2021 and is expected to increase to 14.6% by 2032.

Key facts

- Currently, 7% of total road fuel supplied in the UK comprises of renewable fuel.
- By 2032 a 14% renewable fuel content will be mandatory.

THE UK GOVERNMENT'S NET ZERO STRATEGY

Published in 2021, the Government's Net Zero strategy sets out policies for the decarbonisation of all sectors of the UK economy to meet its ambitious net zero target by 2050. It acknowledges that low carbon fuels are an important pathway to decarbonising heavy duty vehicles as revealed in plans for a low carbon fuel strategy.

LOW CARBON FUEL STRATEGY

The Government's Transport Decarbonisation Plan published in July 2021 sets out their expected long-term vision for decarbonising transport modes including buses, coaches, and trucks via low carbon fuels up to 2050. The objectives of the planned strategy are to provide certainty to both industry leaders and investors on the road to 2050, to identify the risks and opportunities of the transition from fossil fuels and to ensure carbon savings from the switch are maximised in a sustainable way.

WHAT CHANGES ARE WE HOPING TO SEE?

As leaders in commercial vehicle management, we understand the challenges presented by decarbonisation better than most. We know there are many areas around alternative fuels that need further clarification and reassurance. Here is what our customers are asking the government for:

GOVERNMENT VISION

As an industry we need to know the government has a clear vision and roadmap for decarbonisation. We need sight of the end goal as well as a clearly defined pathway on how to get there. We know it's not going to happen overnight, which is why we need to identify short, medium, and long-term opportunities for low carbon fuels across all transport modes.

TARGETS AND AWARENESS

We know that RTFO targets have been set up until 2032, but we need an extension of this to provide long term security for investors and leaders alike.

There is still much confusion around LCFs and factors impacting our sector, not least the introduction of factors including low emission zones and what this means for businesses long term. The LCF strategy should include education initiatives to raise awareness of the issues and educate businesses as well as the public on the credentials of biofuels, so that we can make informed choices.

FUNDING

Fiscal incentives are urgently needed to stimulate the market and create demand for low carbon fuels. We know that more needs to be done to scale up low carbon fuel production and create pilot plants and infrastructure in the UK to mitigate the issues associated with importing fuel, which will make the transition more attractive to investors. New and smaller businesses need financial support to adopt new technologies with incentivised schemes and government backed loans to de-risk investment.

FUEL DUTY

While some low carbon fuels currently benefit from lower duties, the future remains uncertain as to whether they will continue to have cost parity with fossil fuels. There needs to be a simple and joined-up approach to how fuel duty is applied to provide financial reassurance and incentivise investment.

LONG-TERM LCF PLAN

Further legislation is needed on how the government plan to support the take up of low carbon fuels over the next decade. We need to know what the low carbon fuel landscape will look like in 2050 and the future of biofuels.

NEUTRAL APPROACH

The Government should stimulate a level playing field for innovation and investment by adopting a technology neutral approach based on WTW GHG emissions reduction.

PROMOTE THE UK

We need to make sure that the UK remains an attractive location for investment and stimulate domestic LCF production for fuel security. There needs to be improvements made to facilitate the production of feedstocks and making sure that the scale of these investments match those in international markets.

CONVERSION FACTORS

Current legislation around emission reporting methodology needs to change to recognise the environmental benefits of low carbon fuels in road transport, enabling operators to meet decarbonisation targets and improve public health.

Zenith remains committed to exploring new routes to net zero and providing a representational voice for the road transport industry. If you'd like more advice on any of the points discussed in this guide, from low carbon fuel options to how to implement your fleet's move away from diesel, talk to our team.

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