

Overview of higher blend biodiesel and HVO markets in the UK

Background to Zemo

Zemo Partnership¹ is an independent membership organization that influences the transition to net zero emission mobility in the UK. This is executed through initiatives aimed at accelerating the supply and demand of sustainable low carbon fuels, and zero emission vehicles in the road transport sector. The organization has 210 members from a broad range of sectors including central and regional Government, renewable and fossil fuel suppliers, industry trade bodies, finance companies, automotive manufacturers, technology suppliers, transport fleet operators, academia and NGOs.

Zemo is jointly funded by its members and UK Government. It has been existence since 2003 and has successfully influenced UK low carbon transport policy related to passenger cars, buses, trucks and low carbon fuels. Zemo engages with its stakeholder community through various working groups, including a Renewable Fuels Working group, comprising of seventy organisations. Zemo is unique in the way the organization collaborates with various stakeholders to influence Government policy, and overcome key market barriers to low carbon vehicle technology and fuel deployment.

Renewable Fuels Activities

Over the last three years Zemo's Renewable Fuels Working Group has led several work streams to influence the wider adoption of renewable fuels in commercial vehicle fleets (buses, coaches and trucks). This specifically relates to biomethane, HVO and biodiesel, including blends of biodiesel above the normal retail blend of 7% (B7), ie B20, B30 and B100 – collectively known as higher blend biodiesels. Zemo work has covered the following areas²:

1. Determining the market adoption of biodiesel and HVO in heavy duty vehicle fleets
2. Identifying barriers precluding the take up of renewable fuels
3. Producing guidance for fleet operators which includes case studies of companies using higher blends of biodiesel and HVO
4. Exploring measures to encourage greater adopter of higher blend biodiesel and HVO, in particular fiscal interventions.

Zemo's work is heavily focused on engaging with UK renewable fuel suppliers, vehicle manufacturers and commercial fleet operators (end users) which include bus and truck operators. We also have some exposure to the off-high way Non-Road Mobile Machinery (NRMM) sector, as this community is increasingly turning to HVO as a low carbon alternative to diesel.

Market overview.

Higher blends of biodiesel, mainly B20 and B30, and HVO (100%) are concurrently being deployed by fleet operators across the UK as a route to decarbonization. These fuels (higher blend biodiesel and HVO) comprise the main opportunity for further increasing the renewable proportion of transport fuel consumed in UK, which is an important Government objective.

The market is however quite niche; Zemo estimates circa 4000 heavy-duty vehicles are running on higher blends of biodiesel and HVO. B20 for has had the most exposure in the bus market, with B30

¹ <http://zemo.org.uk>

² Market opportunities to decarbonise heavy duty vehicles using renewable fuels (2021)
Renewable Fuels Guide (2020) and Low Emission Bus Guide (2016)

more prevalent in freight/logistic fleet sectors. HVO is increasingly being adopted by freight operators, and in the off-highway sector to power construction equipment. HVO entered the UK market as a low carbon commercial vehicle fuel later than biodiesel. This has resulted in some companies that were using pure biodiesel (B100) switching to HVO, Zemo is aware of two examples the London Borough of Hackney and Wolseley UK.

Market research carried out by Zemo has revealed that bus and truck operators are motivated to use HVO due to the ease of fuel substitution. HVO does not impinge on the operational performance of heavy-duty vehicles nor require any alternations to fuel storage infrastructure. Furthermore, the major heavy-duty vehicle manufacturers approve the use of HVO, covering this fuel in their vehicle warranty. The key factor precluding fleet operators from adopting HVO has been identified through Zemo market research as the much higher cost price compared to diesel. Several UK bus operators (Go-Ahead, Metroliner and Stagecoach) have informed Zemo, through stakeholder engagement exercises, that they would be willing to adopt HVO, however the higher fuel cost is prohibitive. In some cases, they would switch from using B20 to HVO. Of the numerous freight operators Zemo has interviewed, for various biofuel studies, 30 have highlighted that the high cost of HVO discourages the business case for this renewable fuel.

It is worthwhile pointing out that for higher blends of biodiesel, B30 and B100, the financial cost of deploying these low carbon fuels can also be financially challenging for fleet operators. The increased cost is due to various factors including the requirement for increased vehicle maintenance, and in the case of B100 new equipment must be fitted to heavy duty vehicles to enable engine compatibility. Investment is also needed in adapting fuel storage tanks, as B100 needs to be heated in cold weather to prevent it gelling.

Whole life cost analysis

Zemo is currently undertaking a study involving the development of a fiscal incentive for low carbon liquid fuels to help stimulate wider market penetration. This includes HVO and biodiesel at blends above retail market blend (B7). As part of this work Zemo quantified the additional costs for a fleet operator using higher blends of biodiesel and HVO compared to diesel. This was ascertained by calculating the whole life costs of a diesel truck using various blends of biodiesel and HVO. Incentive scenarios were then developed to help lower operational costs. This work commenced in early November 2021.

Zemo has obtained whole life cost data from the following sources:

- Fuel price data (B7, biodiesel, HVO) from renewable fuel suppliers including Argent Energy Ltd, Phillips 66, Greenergy Fuels Ltd, Green Biofuels Ltd and two fleet operators. Data related to the year 2021, a mid-value was selected from a range of pricing data supplied.
- HGV maintenance and conversion cost plus infrastructure upgrades for B30, B100. HVO incurs no additional costs) – Argent Energy Ltd, Greenergy Fuels Ltd, Scania, three fleet operators and Zemo internal data (sourced from previous stakeholder engagement).
- Vehicle fuel consumption and lifetime mileage – Zemo internal data.

Biodiesel and HVO fuel price ranges 2021 inclusive of fuel duty

The table below presents the range of prices reported since the study commenced in early November 2021 i.e. actual prices currently being paid by fleet operators.

	Biodiesel (B20/B30/B100)	HVO (100%)
Range	108 – 115ppl (51-58)	110 – 120ppl (53-63)
Mid value	111ppl (54)	115ppl (58)

- *Parenthesis value excludes fuel duty.*

Illustrative examples of the additional whole life costs for a truck running on different biodiesel and HVO blends. This includes both fuel cost and maintenance and conversion in the case of B100, B30.

B100	B30	B20	HVO 100	HVO 30	HVO 20
£46,430	£16,846	£3,227	£16,307	£4,769	£3,187

Assumptions: Vehicles have a lifetime of 9 years, operating over a regional duty cycle.

The price differential between HVO and biodiesel found Zemo's latest research (2021) is less than it has historically been. Several renewable fuel suppliers have indicated that the price of HVO is likely to increase during 2022; suggesting in the order of 15%-20%. The elevated cost of certain biomass feedstocks was given as the reason behind this price rise. This is also likely to materialise for biodiesel, as FAME production involves similar feedbacks. Pricing forecasts from one renewable fuel supplier indicates the wholesale costs of both biodiesel and HVO will rise in 2022.