Lowering the carbon emissions of fork lift trucks

An industry survey

Calor Report 2020

Foreword

David Goss
Technical Manager,
British Industrial Truck Association

More than ever before, UK businesses and industrial sectors are reviewing how their daily operations are impacting the concerted national effort to reduce carbon emissions.

The Government's target to achieve net zero carbon emissions by 2050 has focused minds and it is incumbent on all organisations to seek out new, more energy efficient and less environmentally harmful ways of undertaking everyday business activities.

Within the non-road machinery sector, this is driving discussion and collaboration about how the Materials Handling industry can respond accordingly to the carbon challenge and investigate the role 'greener fuel' sources can play.

The importance of the issue is clear.

According to research among FLT end users, 38% of those surveyed said that they were coming under increasing pressure to reduce carbon from their FLT fleets.

'Lowering the carbon emissions of fork lift trucks: An industry survey' report commissioned by Calor seeks to highlight some of the current thinking about the issues the industry faces, share the barriers to change and reveal the experiences and thoughts of FLT end users across a broad spectrum of industries.

Acting as an enabler for future discussions, BITA welcomes this report as a helpful addition to an important ongoing debate that is critical for the future of the FLT industry.

At present no single dominant technical fuels solution prevails. This has resulted in the current balanced mix of existing technologies used by the marketplace. The case for the selection of either diesel, electric or LPG/biofuel power for FLT fleets is largely dependent upon several factors.

Each fuel choice has its own advocates, but the final purchase or equipment hire decision is currently influenced by complex drivers that are led by economic and commercial viability and operational suitability »

The environmental case needs to become an even more important part of the conversation if the FLT sector is to make enhanced progress towards a greener, carbon neutral future.

BITA is in active, constructive and ongoing dialogue with government and appropriate regulatory bodies to help inform and shape policy decisions that will guide the direction of travel in the coming years.

The road to net zero carbon emissions is a challenging one and the FLT industry is looking to the UK Government for strategic leadership to support all stakeholders as they continue to make meaningful contributions to the greener fuel and energy efficiency debate.

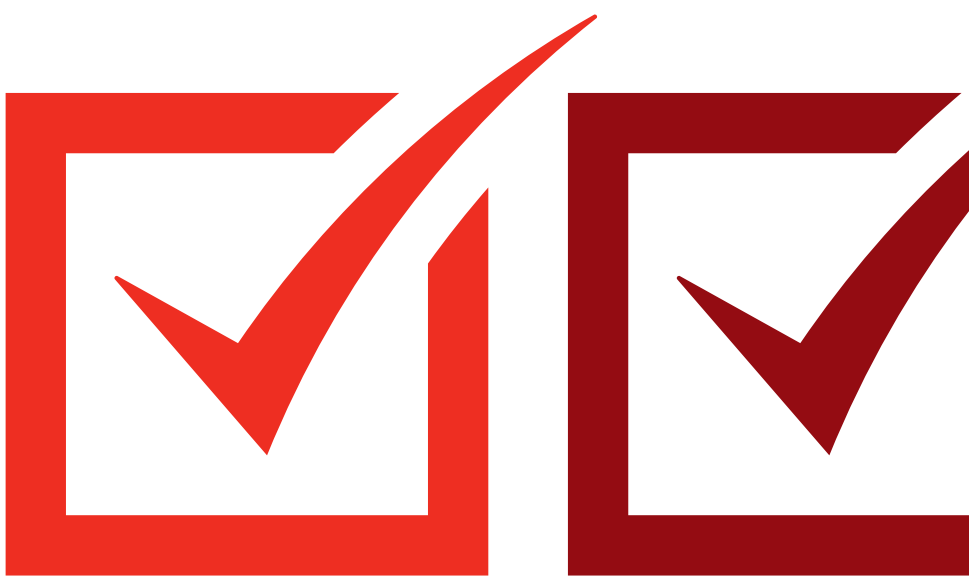
It is only by better understanding the issues to be overcome that we can move forward together to deliver the effective green fuel solutions that can satisfy commercial, economic, operational and environmental demands ■

The British Industrial Truck Association (BITA) is the leading trade association for the UK materials handling industry, representing a membership of 80 forklift truck manufacturers, suppliers, service providers and media. BITA is the voice of the industry in matters technical and legislative at the highest levels in Europe and internationally. It also produces a wide range of specialist publications, encompassing best practice and health and safety assurance, as well as technical guidance notes and unique market insight. For more information on BITA, visit www.bita.org.uk

Ticking all the boxes

Organisations that are scrutinising their whole value-added network are increasingly putting their non-road machinery under the microscope and taking steps to use these assets more sustainably. In fact, 38% of those surveyed said their business was now putting them under a lot of pressure to reduce carbon from its FLT fleet. But in such a competitive sector, achieving carbon reduction whilst remaining cost-effective and operationally efficient is no easy task.

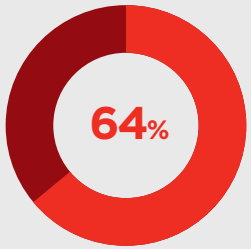
» 38% of those surveyed said their business was now putting them under a lot of pressure to reduce carbon from its FLT fleet «



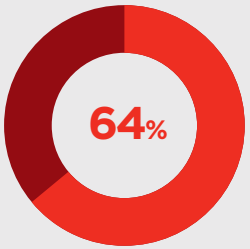
Operational and financial priorities

Although 54% of those surveyed recognised that carbon reduction is a very important consideration when choosing how their FLT fleets should be fuelled, the truth is, this has to be juggled with other operational and commercial priorities. More respondents said that cost (64%), fuel efficiency, (64%) minimising downtime (63%), security of supply (59%), and level of customer service from the fuel provider (57%) are very important when it comes to FLT fuel selection. Surprisingly, only 51% of respondents rated cleanliness as a very important issue when it comes to the choice of fuel for their fork lift trucks, despite closer public scrutiny of pollutants from diesel engines and the introduction of the EU Stage V standards for non-road mobile machinery ■

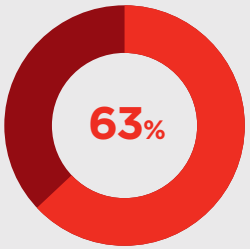
Cost



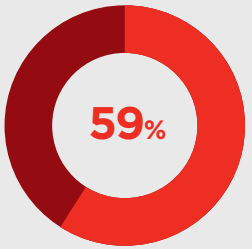
Fuel Efficiency



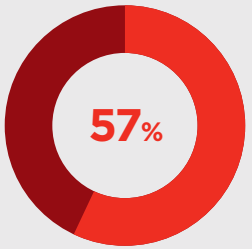
Minimising Downtime



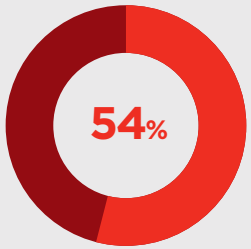
Security of Supply



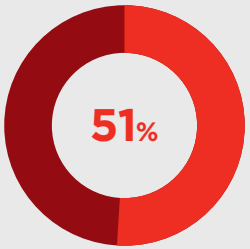
Customer Service



Carbon Reduction



Cleanliness



There are differences between what industries prioritise, suggesting that wider factors are influencing their fuel choices. 83% of survey participants working in the retail, leisure and catering industries highlighted that the efficiency of their FLT fuel was very important. In a sector that handles a lot of perishable goods and where consumers expect very fast delivery, minimal downtime was also considered as an essential requirement by 75% of these respondents. But in prioritising fuel efficiency and minimising downtime, their ability to reduce emissions have been impacted.

Only 8% of those surveyed in these industries have said that their business had been very effective in lowering its carbon emissions over the last 12 months.

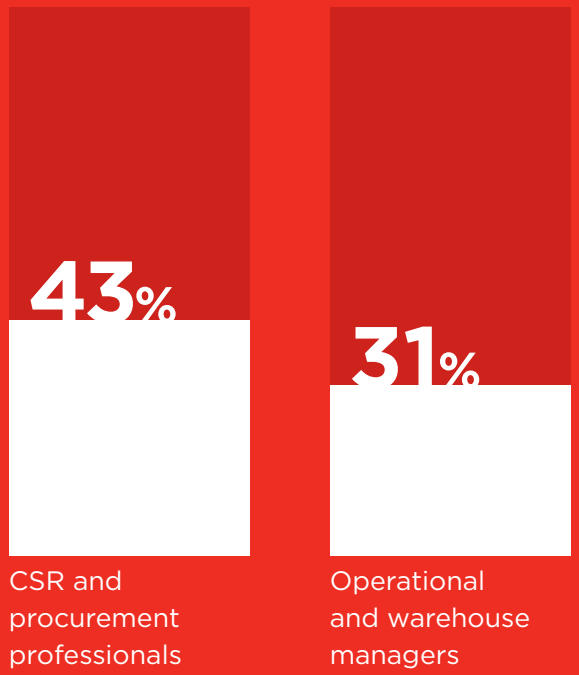
Respondents working in logistics and warehousing companies – a sector which is subject to supply chain pressures arising from dominant players (e.g. major retailers) exerting control in a competitive environment[1]. 1,75% said that cost is a very important consideration when thinking about how their fleet of FLTs should be fuelled. This is unsurprising in a highly competitive sector where margins are being cut and contracts are being won or lost based on cost.

In our survey, energy-intensive industries, such as manufacturing and utilities, which traditionally use more fossil fuels are more conscious of the need to reduce their carbon emissions. 60% of respondents in these sectors said that carbon reduction is a very important factor in their choice of FLT fuels. However, the energy required for their processes, the limitations of electric and battery technology, and the grid's current inability to fully satisfy demand at peak times, combine to pose serious challenges to efforts to reduce their carbon footprint. With only 20% of respondents working in these sectors saying that their businesses have been very effective in reducing their carbon emissions over the last year, and 19% believing that they haven't been particularly effective in this endeavour, manufacturers and utility companies face much tougher technological barriers to carbon reduction ■

1. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/814589/Warehousing_Sector_Director_of_labour_market_enforcement_July_2019_IFF_research.pdf

WHOSE RESPONSIBILITY IS SUSTAINABILITY?

The survey results highlighted above give a glimpse into the challenges of juggling operational and commercial objectives with the need to reduce CO^2 emissions from non-road materials handling fleets. A decade ago, the responsibility of ensuring that all the necessary criteria are met when making purchasing decisions related to FLTs – including carbon reduction - sat very much with operational and warehouse managers. Nowadays, with supply chains becoming ever more complex, Corporate Social Responsibility (CSR) and procurement professionals are stepping into the fore to develop sustainability strategies for materials handling. 43% of our survey participants said that the former are responsible for driving carbon reduction plans in their organisations, and 31% said that this is done by the latter group■



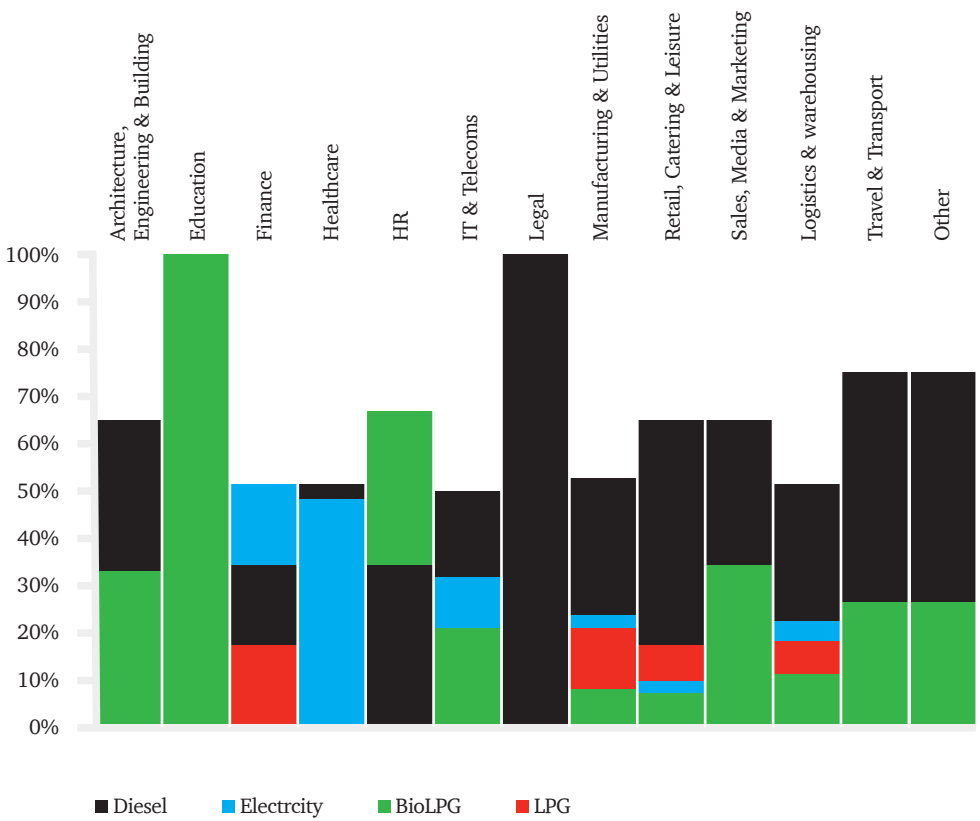
Whilst it is encouraging to see businesses with key personnel appointed to spearhead and implement sustainable practices, our survey has identified differences in opinion between procurement and warehouse managers when it comes to meeting real operational needs on the 'shop floor'. For example, 43% of warehouse managers surveyed who use electric vehicles in their warehouses strongly agreed that the lack of charging points impacts on their productivity, but only 15% of procurement professionals held the same strength of opinion on this matter. Likewise, whilst 67% of warehouse managers said they have had to alter their production/work schedules to fit around charging times, only 38% of procurement professionals thought this was the case. Regardless of who is responsible for driving sustainability in their warehousing operations or how fork lift trucks are powered, more can clearly be done to promote understanding between operational and procurement or CSR personnel, and to ensure that the sustainable solutions chosen can truly deliver carbon reductions without compromising on operational or commercial requirements ■

FACT: As BioLPG is chemically identical to conventional LPG there's no need to change existing equipment, vehicles or supply infrastructure for existing LPG users. Its identical chemical make-up also means that those who already use LPG for their FLTs would get the same vehicle performance and fuel efficiency out of their fleet if they used BioLPG.

Going Electric

As part of efforts to run warehouse operations more sustainably, many companies are turning to electric FLTs for their warehousing operations. Whilst renewable energy sources are set to take over from fossil fuel to generate electricity for the UK's grid, the adoption of electric fleets to handle materials as a mass-market solution is still limited. Looking at the differences in the take-up of electric FLTs between different regions and industries, it is clear that going electric would only work if the performance of the vehicles can meet operational needs, and if there is sufficient grid capacity with enough charging facilities to keep them running »

Selective adoption of electric FLTs



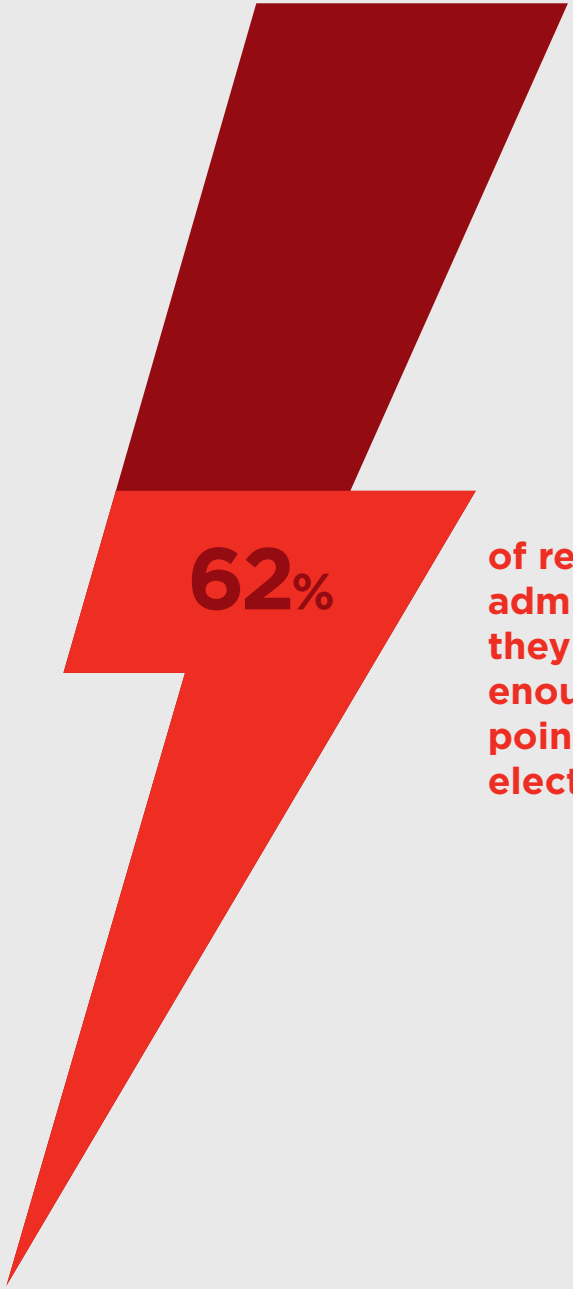
Looking at the overall picture across the UK, the use of electric FLTs is highly dependent on the business's location and its operations. Whilst 57% of respondents in the South East depend on electricity as their dominant source of power supply for materials handling, the adoption of the technology is mixed in other parts of the country.

In Northern and South Western regions, along with Scotland, diesel still rules with very little appetite to run on electric FLTs. [Q3 graph, split by region]. Considering that the electricity grid may not be robust enough to fully satisfy demand at peak times in these areas, the popularity of diesel is unsurprising. The cost of upgrading the network in these areas, which are more rural and less populated, is higher due to less opportunities for economies of scale. So without a clear indication of how, where and when the grid will be upgraded, FLT operators are cautious of making electricity the main source of power for their fleet due to the risk of downtime, should outage occur during peak grid demand.

The take-up of electric FLTs is also markedly different between industries. The requirement to comply with stringent hygiene standards combined with greater use of indoor operations mean that businesses which supply and handle healthcare products are able to embrace electrification more than other sectors, with 50% of respondents working in these companies stating that electricity is the main power source for their fleets. The IT and telecoms industry is close behind, with 30% of survey participants from these sectors using electricity to power their materials handling. Manufacturers and utility companies, along with retailers, catering and leisure organisations, who need vehicles with enough torque to lift and shift heavier products and materials, have been the least able to use electric FLTs – which are known to underperform under such conditions. Utility companies, whose fleets often need to operate outdoors, also find that electric vehicles are not suitable for their needs, as the damp atmosphere can cause issues with wiring circuitry and electrical components

Operational impact of going electric

It is not just the risk of outage which could impact operations employing electric FLTs. Our survey responses also highlighted issues around charging which are affecting operational efficiency. As electric fork lift trucks can only hold their charge to last a full shift at the most (dependent on the age of the battery and how hard the vehicle is working), they need to be recharged daily - which can take between 2-10 hours. They also have to be left to cool for a number of hours before use. What's more, with the demand for industrial real estate outstripping supply[2], space is at a premium, leaving limited room to house battery charging stations »



of respondents admitted that they don't have enough charging points for their electric FLTs.

2. https://www.jll.co.uk/en/trends-and-insights/research/uk-industrial-market-tracker-report-2019

The requirement for dedicated charging facilities, combined with long battery recharge times whilst the truck is parked up and out of use clearly affects productivity, with 64% saying they have to reduce outputs at certain times of the day, or alter production/work schedules to fit around charging times. In particular, respondents working in London and Northwest feel the pinch of reduced productivity the most, with 74% and 73% respectively stating that this is an issue for their business. Considering that the Northwest region is the second largest region for the warehousing sector[3], restricted productivity could have a significant knock-on effect on business operations further down the value chain. And with over 85% stating that reducing downtime to a minimum is critical to their business and FLT selection, it's surprising that other fuel sources are not preferred ■

FACT: Steeper gradients are not a problem for LPG/ BioLPG FLTs. Their performance characteristics – such as travel speeds, rate of acceleration and lift speeds – are usually superior to electric models, due to a better power-to-weight ratio and more responsive engines.

3. The Size and Make up of the UK warehousing Sector, UKWA / Savills, 2015

A direction of travel

The overwhelming majority (94%) of FLT end users believe that ‘more can be done’ to cut carbon emissions that result from the use of forklift trucks. This demonstrates the widespread belief among those who purchase and hire non-road machinery that the sector is just at the beginning of its journey towards attaining more sustainable and low carbon fuel solutions in the future.

Many factors will influence this pathway including industry collaboration, financial incentives and investment in new fuel technologies. Although substantial progress has already been made, there is still much more that can be done to lessen the impact that this industry has on the environment.

Collaboration

According to BITA, there is already a groundswell of collaborative, industry-wide discussions and action plans underway to set out the issues and barriers to clean fuel adoption and begin to investigate potential solutions. These include proactive talks with UK government policy makers.

The collaborative work undertaken over the last decade to deliver cleaner engines is evidence that the industry is happy to invest and work together to find the most appropriate emission reducing solutions that meet legislative requirements. These collective efforts must continue to drive further enhancements for existing technologies »

Financial dynamics

The complex dynamics of the FLT acquisition process needs to be clearly understood if solutions are to resonate with the marketplace.

The motivation behind end user decisions to purchase or hire FLT fleets are influenced by commercial reality and cost above all else, and any proposed incentive schemes devised to stimulate further take up of greener solutions must take this reality into account.

Scrutiny of whole life costs versus daily hire and fuel expense that separate outright purchase from leasing strategies has got to inform financial policy making around any potential future tax incentives. Likewise, the relatively high level of cost associated with current electric FLT fleet solutions needs to be made more commercially viable to negate one of the primary barriers to its widespread adoption.

Clear financial incentives for developing, introducing and using more efficient, low carbon emission solutions would be welcomed by many. This view is backed by 30% of the industry who in the survey say they believe that businesses should receive tax breaks if they can demonstrate annual carbon reduction achievements. Similarly, businesses who fail to achieve carbon reduction targets could have penalties imposed upon them, to form a “carrot and stick” approach. Nearly a third (31%) of those surveyed were in support of this.

Government action in this area is already proving capable of influencing a change of end user behaviour. The budget announcement that will see the removal of the Red Diesel tax benefit from 2022 (except for use in the agricultural sector) is expected by many to drive former diesel engine users towards alternatives such as LPG power solutions. It is an example of the power that government-led financial decision-making holds when it comes to shaping the market and swaying marketplace trends »

FACT: According to BEIS[5], the UK's total greenhouse emissions dropped by 45.2% between 1990 – 2019. Emissions from businesses fell by 42.1% within that same period.

Emerging technologies

The continued emergence of new, greener fuel technologies is also set to underpin low emission ambitions.

As the operating performance capability and cost effectiveness of electric solutions continues to be closely observed, alternatives like biofuels and green gases are also generating much interest.

Although a relatively new entrant to the market, BioLPG is gaining traction within the materials handling sector. Made from a blend of waste, residues and sustainably sourced materials, it is chemically identical to its fossil fuel cousin, but will lower your carbon emissions by 20-32% compared to conventional LPG[4]. As part of its commitment to supply 100% renewable energy by 2040, Calor is taking steps to switch all customers over to its BioLPG tariff.

Establishing domestic sources of production is the next key step in increasing the uptake of BioLPG. The majority of BioLPG production pathways lend themselves to local production facilities located in the off-gas grid market, such as anaerobic digestion (AD) or production based on the processing of household waste. This would facilitate the decentralisation of energy provision and bring production much closer to areas of demand.

The use of hydrogen fuel cell technology is another route that is being explored. However, work is needed to deliver this objective, as the abiding message from the marketplace is clear: any new fuel development must be economically attractive above all other considerations.

There is currently no "one size fits all" solution for decarbonising the materials handling sector, but there are encouraging signs of progress in many areas. A long road lies ahead, but with industry collaborating and government backing, a carbon neutral future may soon be the reality ■

4. Emissions saving compared to conventional LPG based on allocation of 40% BioLPG and 60% conventional LPG. Fuel costs savings calculated using typical cost & performance parameters for 1.5 and 2.5 tonne forklift trucks, running 8 and 16-hour shifts. Figures supplied by leading forklift trucks OEMs.

5.https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/875482/2019_UK_greenhouse_gas_emissions_provisional_figures_statistical_summary.pdf

Case study: Carrylift Group

One of the largest materials handling suppliers in the UK is furthering its commitment to support customers with reducing carbon emissions, by using Calor's BioLPG across its extensive short term hire fleet and to end users with direct supply.

Carrylift Group is one of five material handing equipment companies within the CorpAcq Group, providing excellent coverage throughout the UK supported by sister companies from a total of 12 regional locations[6].

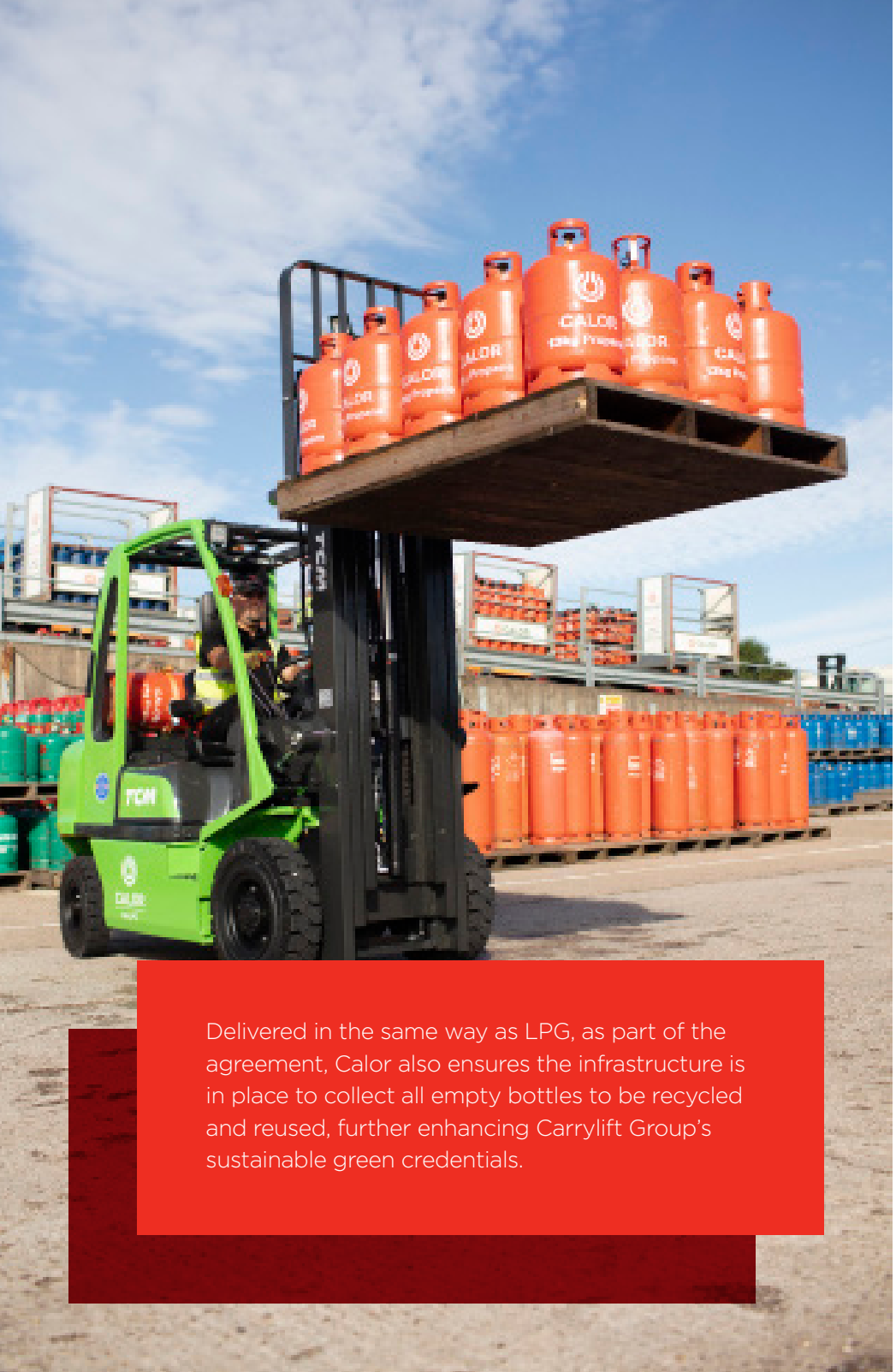
Sean Roberts, Group Commercial Manager at Carrylift Group explains how the partnership with Calor supports the business' own commitment. He says: "We've worked alongside Calor for more than 15 years, and during this time we've always remained inquisitive as a business as to how we can strengthen our offering to customers and the services we provide. Offering LPG, diesel and electric FLT rentals, we're seeing more customers now actively seeking out other sustainable alternatives, as a result, we were able to identify a clear business need for greener and more sustainable fuel options.

"Calor's BioLPG is the ideal solution as it is chemically identical to conventional LPG, meaning that we were able to use it in our fleet of circa 1,000 short term rental FLTs straight away without the need for any form of conversion on our existing fleet. Put simply, as soon as we'd received our first supply of BioLPG, our fleet was ready to go straight away without the need for any downtime."

The Green Gas Certificate obtained from Calor is displayed at all eight of the Carrylift Group locations across the UK, which guarantees BioLPG is supplied to each depot and subsequently to its customers

All Carrylift Group customers are made fully aware that their short-term rental FLTs are running on BioLPG, while, most importantly, remaining fully confident that the performance of the FLT remains as efficient as if it was using conventional LPG »

With the UK pledging to achieve net zero carbon emissions by 2050[7], Carrylift Group is dedicated to helping its customers work towards this target by exploring more sustainable options when it comes to fuelling its fleet of rental FLTs.



Delivered in the same way as LPG, as part of the agreement, Calor also ensures the infrastructure is in place to collect all empty bottles to be recycled and reused, further enhancing Carrylift Group's sustainable green credentials.

Sean continues: "As an ISO 9001:2015 accredited business, quality management is something we're increasingly passionate about, both in terms of our own business, but also how we can use this to further support our customers.

"The transition to Calor's BioLPG has been incredibly easy for us as a business, meaning we have been able to immediately offer a more sustainable FLT fuel alternative to our customers. In addition to this, it has also seen our sales team start to have conversations with our customers on how they can benefit from using BioLPG within their own businesses."

Andy Kellett, National Accounts Manager for FLT at Calor says: "Carrylift Group is a very forward-thinking business that we have worked in close partnership with for more than 15 years. Throughout this time, we've seen them continually explore new and innovative ways that they can operate more sustainably, and in doing so, help their customers on their own journeys to a greener future.

"One of the ways we've been able to work with them to do this is through the use of our BioLPG as an alternative and sustainable fuel source for its short-term rental FLTs. This a really important development within the market, as not only is it able to work perfectly with all LPG products, it is a fully sustainable solution which crucially doesn't compromise on performance."

In addition, it is a sustainable energy source and is International Sustainability and Carbon Certification scheme approved[8]. And, as it works just like conventional LPG there's no need to change existing equipment, vehicles or supply infrastructure ■

6. Sister companies: Hessle Fork Trucks Ltd, Douglas Gillespie Materials Handling Ltd, Gray Material Handling Ltd, GM Leitch Materials Handling Ltd.
7. www.theguardian.com/environment/2020/feb/03/pm-urges-major-economies-to-go-carbon-neutral-by-2050
8. www.greengas.org.uk/scheme

Tel: +44 (0) 121 456 5600
Fax: +44 (0) 121 456 6040
Email: calorcommercial@bright-consultancy.co.uk