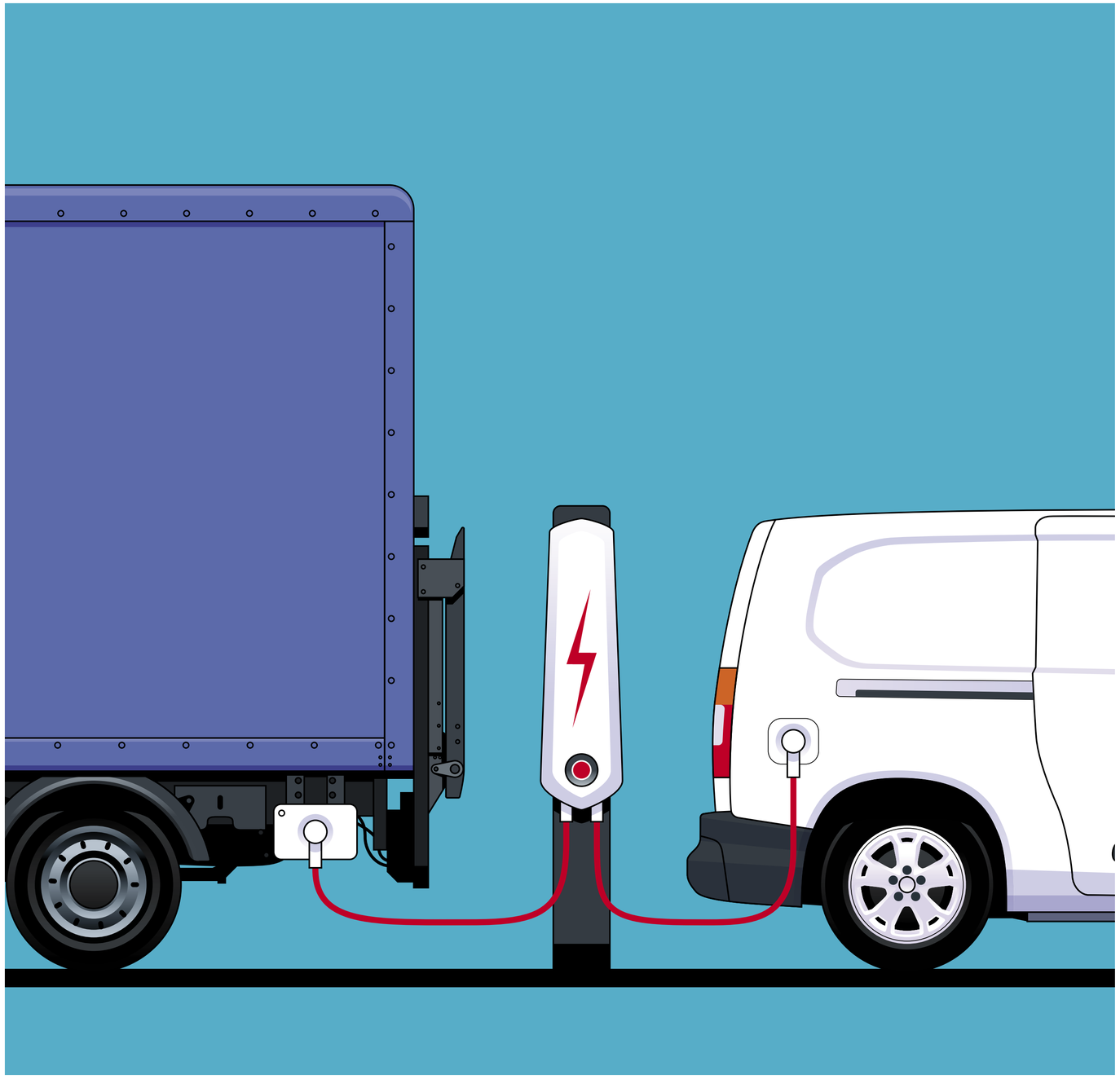
SMMT
DRIVING THE
MOTOR INDUSTRY



FUELLING THE FLEET:
DELIVERING COMMERCIAL VEHICLE DECARBONISATION

August 2021

"Industry shares government's ambition to deliver a zero-emission commercial vehicle sector."

The commercial vehicle (CV) sector is the very lifeblood of the UK economy and an integral part of the UK automotive industry. Heavy goods vehicles (HGVs) and light commercial vehicles (LCVs) are fundamental to the operation of business and society, distributing goods and delivering services across the nation. Our reliance on CVs was brought into sharp relief during 2020, when the Covid-19 pandemic shut down conventional commerce, leading to a huge upsurge in online services with supermarkets alone reporting a doubling in home deliveries[1].

HGVs and LCVs are essential not just for retail but to the operation of all sectors including construction, quarrying, refuse collection, emergency service response, and breakdown assistance. Indeed the list of essential services that rely on HGVs and LCVs is diverse and vast. Additionally, these vehicles will often have ancillary equipment used for lifting or refrigeration, for example, which requires power in addition to, and often taken from, the powertrain.

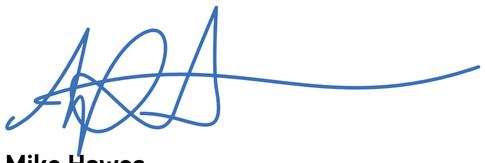
CVs are not purchased in the same way or for the same reasons as passenger cars. They are assets bought to provide particular functions and services.

LCVs and HGVs make up 13.1% of the vehicles in use in Britain and covered 24% of all road miles travelled in 2020, but given their significant power requirements they account for around 35% of CO_2 road transport emissions. Although today's new CVs emit the lowest levels of carbon, manufacturers are committed to going even further, introducing alternative fuels, as well as electric and fuel cell technologies that will over time reduce tailpipe emissions from the fleet to zero. Unlike the car sector, however, there is no 'silver bullet' technology that is appropriate for all use cases and given the wide variety of applications, there may never be.

Market penetration of alternatively fuelled powertrains - including gas, biofuels and hydrotreated vegetable oil (HVO), as well as zero-emission electric and fuel cell HGVs - is currently around 14 years behind that of cars. Government proposals are now on the table to end the sale of all new non-zero emission HGVs but propose only five years extra, 2040.

Meanwhile, around one in 12 new cars sold so far in 2021 is battery electric, while for LCVs – currently enjoying one of their best ever years for registrations – the figure is nearer one in 38.

Industry shares government's ambition to achieve net zero by 2050 and recognises the need for a zero-emission CV sector to achieve this goal. UK automotive is preparing for the end of sale of new petrol and diesel cars and LCVs from 2030 and continues to develop and invest in zero emission technology for all vehicle types as well as consistently improving existing technologies to reduce emissions in the interim and provide greater fuel efficiency. The nature of CV businesses and the resulting unique requirements of CV operators, however, must be fully understood to ensure that the right solutions are developed that deliver a successful transition to full decarbonisation.



Mike Hawes
Chief Executive
The Society of Motor Manufacturers and Traders (SMMT)

01

COMMERCIAL VEHICLE USAGE AND UPTAKE

Commercial vehicles carry the vast bulk of goods for the industrial, commercial and consumer sectors

CVs are at the heart of a thriving UK economy, supporting employment and growth in all UK regions and enabling global trade success. They carry 90% of the total weight of goods transported in the UK[2] for the industrial, commercial and consumer sectors, but also do so much more despite comprising just 13.1% of all vehicles on UK's roads[3].

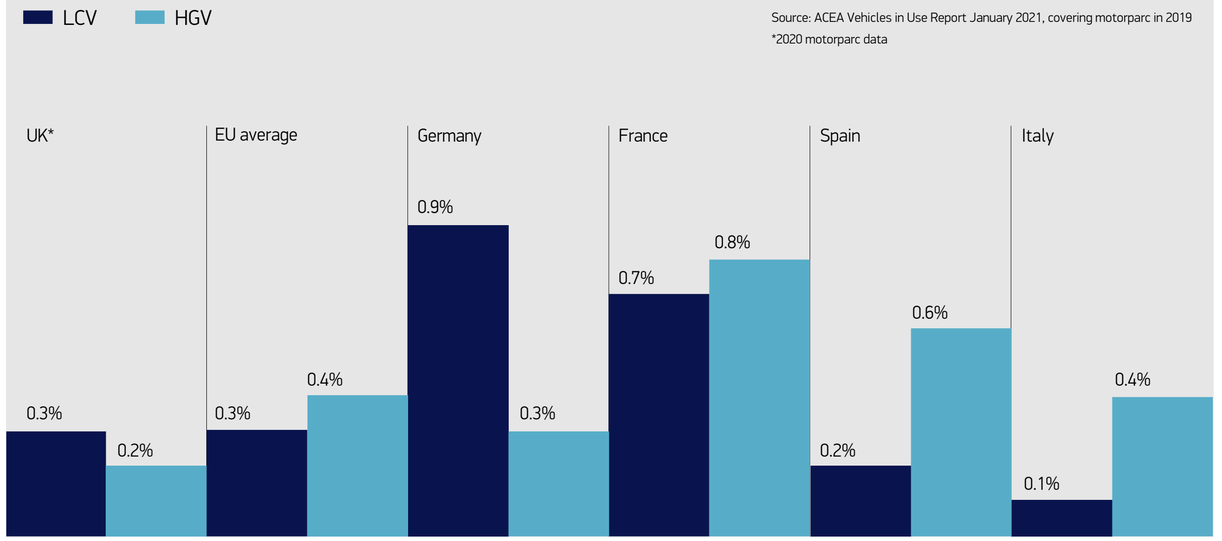
The LCV sector is incredibly diverse, everything from small car derived LCVs used by trades across the country, larger LCVs for construction, removals, to pick-ups and 4x4s.

In addition to carrying freight, HGVs are used to remove waste, sweep streets, clear sewers, mix feed for farm animals, pump concrete, and recover disabled vehicles. They operate as ambulances and fire engines, as well as supporting our armed forces.

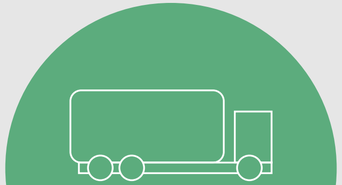
These everyday essential tasks often require bespoke bodywork and equipment, as does specialist freight transport. For instance, fresh and frozen foods, and some pharmaceutical products, are required to maintain set temperatures so must be carried in vehicles with temperature controlled bodies. Bulk liquids, powders, and gases are carried in tankers as well as concrete in mixers. HGVs used by builders' merchants have cranes, and many vehicles used to transport goods use tail-lifts. Indeed, the function-specific bodywork can often be more expensive than the vehicle to which it is fitted. Where the equipment requires power to pump or lift, this is usually provided by the HGV's powertrain.

The manufacture of HGVs is often completed in a multi-stage process and is reliant on SMEs in both the body builder market and the UK supply chain. On a tipper, for example, the chassis-cab (including the drivetrain) is made by one of seven major European manufacturers, the tipping body by an independent UK company, and the hydraulic gear to tip it by another UK or European company. 'Off the shelf' HGVs built in a single factory and used without further modification are a minority, and usually confined to articulated tractor units, but even these require minor modifications to suit individual customers. When an HGV manufacturer introduces a new design, body convertors must reconfigure their own products accordingly and ensuring the vehicle conforms to UK Type Approval Regulations.

How the UK's alternatively-fuelled commercial fleet compares with our neighbours



The Road to Zero



HGV alternative fuel use is 14 years behind that of cars

Battery electric LCV use is a year behind that of cars

2030
End of sale for new petrol and diesel cars

2040
Proposed end of sale for new fossil fuel HGVs

BUILT TO WORK

CVs are business tools. Operators specify vehicles for maximum efficiency, taking into account factors such as fuel consumption, payload, and durability. Operational efficiency is also a key factor. To ensure costs are kept to a minimum, operators will aim to keep vehicles in continuous operation outside of their required maintenance checks. Some vehicles, particularly in the long-haul freight sector, are multi-shifted, working day and night with different drivers. For both LCVs and HGVs, it is paramount to have access to refuelling or recharging technologies that enable the vehicle to get back on the road with minimal delays. Otherwise, operators face lost time and revenue, plus delivery delays and dissatisfied customers.

LONG-LASTING

The high cost and quality of CVs means operators retain them for as long as feasible: the average UK HGV having an operating life of 12 years. Some operators, those that must regularly access urban areas, have incurred considerable costs through the accelerated fleet renewal required to comply with city-based emissions regulations. They will need to run these vehicles for their full lives to repay the investment underscoring the importance of certainy in future local and national regulation.

The Covid crisis has hit the supply of new HGVs and LCVs, and the components needed to build them, although supply is starting to return to pre-pandemic levels. Meanwhile, uncertainty over cashflow has led to many operators deferring fleet renewal. As a result, the average LCV on the UK's roads is now eight years old – the highest on record, up from 7.8 in 2019 and up from seven in 2010.

WHY DIESEL DOMINATES

Diesel engines offer outstanding durability, reliability and efficiency, resulting in greater fuel economy, and the latest Euro VI incarnations have led to significant reductions in pollutants. Fuel consumption has also improved over the years, one of the most critical factors in logistic costs.

The current UK Car and Van CO_2 regulations require a further -31% reduction (compared to 2021 baseline) by 2030, although these regulations are currently under review as part of government's 10-point plan for a green industrial revolution.

The UK's Heavy Duty Vehicle CO_2 Regulations – based on the vehicle energy consumption calculation tool (VECTO) process – will require manufacturers to reduce their CO_2 fleet average emissions by -30% in 2030 compared to a 2019-2020 baseline. These targets cannot be achieved with improvements in current technology alone and will require investment in new powertrain technologies. Alternatives to the internal combustion engine are being developed by a variety of companies, but none is yet commercially viable on a large scale, making it challenging to determine the best investment plan for infrastructure.

CHALLENGES

Company car and other tax incentives have boosted the take-up of electric cars – with around 70% of all battery electric passenger vehicle (BEV) registrations in 2020 coming from business fleets. Today approximately 1.6% of cars on the UK's roads can be plugged in. Currently electric LCV uptake levels remain lower than those for cars, even though the phase out dates of new petrol and diesel vehicles of both categories are the same.

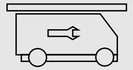
Manufacturers are investing heavily to bring more electric LCVs to market, with more than 20 models already available, but as for all the sectors, a variety of enablers are still required to accelerate uptake. LCV operators have to be reassured that the infrastructure exists to fully support their operational requirements and convinced that the purchase of such a vehicle is commercially sound. At the end of 2020, just 0.3% of LCVs in use in the UK were BEVs. Cars reached the same proportion in 2019, but uptake rates have increased dramatically compared to their commercial counterparts. Between January and July 2021, 8.2% of new cars registered were pure battery electric. By comparison, just 2.6% of LCVs registered in the same period relied purely on a battery for power. This is expected to change over time as demand and supply increase but assuming that appropriate incentives and infrastructure are provided for the wider EV ecosystem.

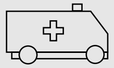
Likewise, "alternative fuels" in use in the HGV sector is at a lower level than that seen in cars with only 0.2% of the total number in use. This is the share that alternatively fuelled cars had in 2007: the HGV market is 14 years behind cars, in transitioning from pure petrol and diesel and therefore face a timescale to make the switch from diesel to alternative solutions that will be tougher in real terms.

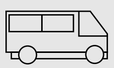
CVs uses include:

LCVs

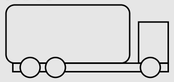

Last mile delivery

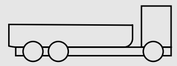

Construction

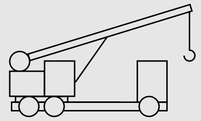

Emergency services

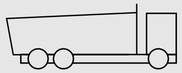

Passenger transport

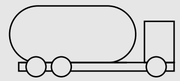
HGVs

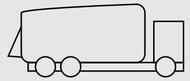

Distribution


Recycling and bulk solids


Construction

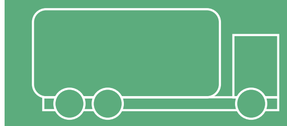

Quarrying

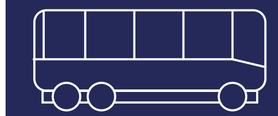

Liquid and gas transport


Refuse collection

Vehicles on the road 2020


LCVs
4,604,861


Trucks
589,445


Buses
73,608

THE OPERATOR VIEW

ROAD HAULAGE ASSOCIATION

The RHA supports the policy aim to decarbonise transport in the United Kingdom and welcomes the debate that has accompanied the publication of DfT's Transport Decarbonisation Plan and consultation on a phase-out date for new non-zero emission HGVs. We believe that market-driven solutions, guided by policies framed by economic, social and environmental needs, are best-placed to achieve commercial vehicle decarbonisation.

Our core message as we transition to Net Zero is that the **whole vehicle lifecycle must be central to decision making** so that all owners of that vehicle during its lifetime benefit from its utility. We look for coherent public governance that sustains investment in vehicle standards and permits businesses to replace vehicles in line with normal asset replacement cycles. We also ask for agile implementation that allows for the many unknowns that exist on the pathway to Net Zero.

With this framework in place, we believe businesses that include our vital SME sector can then do the "heavy lifting" required to deliver transport decarbonisation sustainably.

Chris Ashley
Head of Policy, Environment and Regulation
Road Haulage Association

02 FUELLING THE FLEET

One of the biggest challenges facing the UK in decarbonising road freight transport is the proposed creation, from scratch, of two new infrastructure networks: electrical charging and hydrogen refuelling.

HYDROGEN

Hydrogen is emerging as a potential zero-emission long-distance heavy transport fuel, with the possibility of using this gas through fuel cells that convert hydrogen to electricity or in certain cases to power internal combustion engines directly. In either case, true zero emissions will only be achievable if the hydrogen is produced in a green, and zero emission manner.

Hydrogen presents an opportunity to reduce carbon and other pollutants cost effectively, not just for the long-haul sector, but other use cases including construction equipment. To enable this to happen, a significant increase in the provision of hydrogen for refuelling is required. Currently, there are just 11 hydrogen fuelling points for vehicles of any size in the UK[4]. The hydrogen dispensed from them is made from fossil fuel or from electrolysis of water – so unless the electricity used is entirely from renewables, it will not be carbon-neutral.

ELECTRIC CHARGING POINTS FOR HGVS

Electric HGVs are available in the UK market now both as factory-built vehicles and conversions. However, there are currently no accessible roadside chargers for them. Operators will need to install their own depot chargers which often requires an upgrade to the local energy network to support these at great cost. This currently makes the operation of fully electric HGVs feasible only for use cases operating on a back to base model with low mileage on set routes. Successful use cases in the UK include refuse collection and last mile deliveries. However, for other operators a roadside charging network will be required.

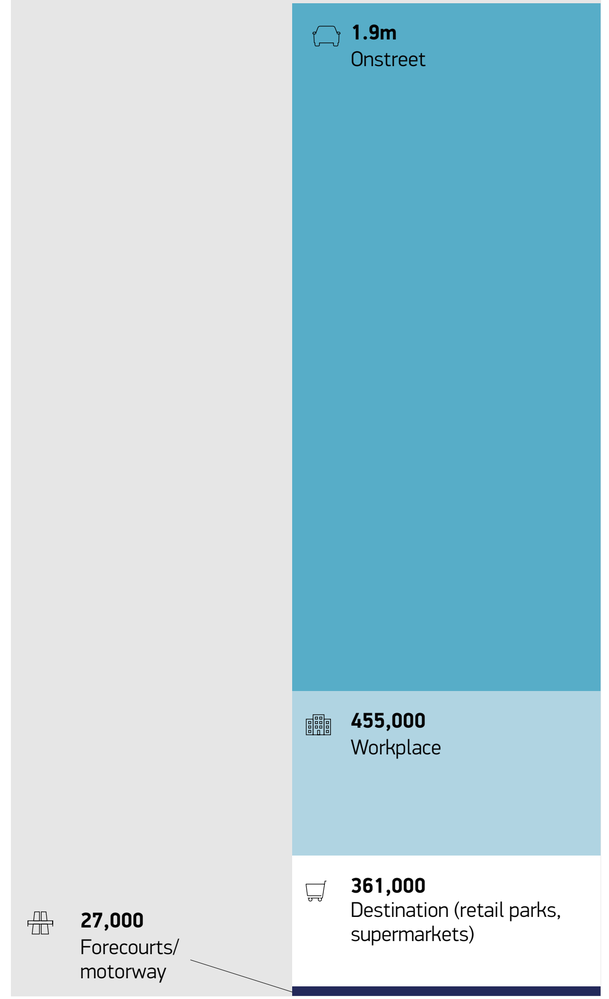
HGVs also face specific challenges when charging. As they are naturally longer and larger vehicles (especially with trailers), access and turning requirements necessitate larger sites for recharging. They do not necessarily visit motorway services, often using A road lay-bys or private land around business depots for rest stops. This naturally limits the scope for recharging an electric truck when on regional or long-haul deliveries. HGV charging will also place significant additional demands on the grid, often in remote areas.

From a commercial viewpoint, when a truck is recharging, its operational efficiency is reduced, increasing costs which will ultimately be passed on to the consumer. Indeed, if the delay is extensive, an operator may have to use additional vehicles and drivers to carry out the same business task to the same service requirements thereby potentially putting more vehicles on the road. ACEA, the European vehicle manufacturers' trade body, has calculated that the UK will need to have 2,450 roadside HGV charging points open by 2025, and 8,200 by 2030 to support the anticipated electric HGV fleet[5]. To meet this target, two new HGV charging points will have to be opened in the UK every day.

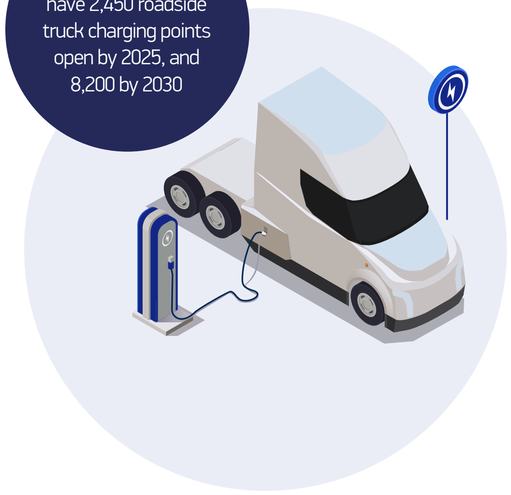
While the UK Government acknowledges the challenge of installing sufficient chargers to support the electric car fleet, with a £950 million investment pledged for Project Rapid car charging-points at motorway service areas, there has been no funding announced for the more powerful and expensive chargers required by long-haul electric HGVs.

There is a number of rest stops across the country where HGV operators have access to facilities and can rest during long haul journeys. However, the numbers are already insufficient for today's requirements and given the additional requirements that will arise as the result of charging stops, government should seek to develop

Estimated required charging points for cars by 2030



The UK will need to have 2,450 roadside truck charging points open by 2025, and 8,200 by 2030



a network of low carbon hubs to provide operators with charging and refuelling at convenient locations without disrupting their commercial operations.

ELECTRIC CHARGING POINTS FOR LCVS

The phasing-in of electrical power to replace diesel for LCVs is less problematic than it is for heavy HGVs but still faces its own unique set of challenges. LCVs often operate at much higher loads than cars so the increased weight will require larger batteries than their car equivalents, resulting in potentially longer charging times. While public car charge points can theoretically be accessed by many LCVs, there are some local regulations that may restrict commercial vehicles from charging in car parking bays and the required space for an LCV is often larger than that required for a car. LCV drivers will face the same challenges as electric car drivers related to availability, compatibility and ease of payment, which need to be addressed rapidly.

The current charging network will need to be increased to support the demand from the car segment as sales of new electrified cars increase. SMMT calculates that, to support a 100% new electric car market, by 2030 there will need to be a network of around 1.9 million public on-street chargers, 455,000 chargers for workplace parking, 361,000 chargers at destination points and 27,000 chargers at motorway services and filling stations. HGV and LCV charging requirements will be separate and additional to this task.

CURRENT ALTERNATIVES

While there is currently no clear ‘final’ universal technology for fossil fuel free HGV operation, there are a variety of transition technologies that could act as stepping stones to the longer-term goal of zero-emission transport. Some are already in use at low levels, others remain to be proven as having long-term viability.

For instance, some UK fleets are running heavy HGVs which burn methane gas instead of diesel and have comparable fuel range to diesel HGVs. Operators can install their own refuelling facility and access a growing number of HGV-specific gas filling stations.

Biowaste can also provide a fuel that can be used by most modern diesel HGVs. HVO (hydro-treated vegetable oil) is an extremely clean biofuel produced from waste. It is a “drop-in fuel” meaning that it can be used in existing vehicles and offers a 'well-to-wheel' reduction in CO_2 of up to -90%.

Other options include synthetic fuels, such as e-fuels, where green or blue hydrogen is combined with CO_2 to create fuels that can be used in conventional ICE engines, or by creating a network of power lines over the UK’s motorways (catenary), that could then be used to charge an electric truck’s battery while on the move. These options are being trialled[6] in certain markets in Europe and elsewhere and, in determining future technologies, decision makers should always be cognisant of the inter-operable nature of logistics. As a major trading nation, CVs have to travel into and out of the UK, so the fuels and technologies the UK adopts must be accessible in the markets to which we deliver UK goods by road.

To support a 100% new electric car market, by 2030 there will need to be a network of around 1.9 million public on-street chargers

03
MAINTAINING A FUTURE ZERO EMISSION COMMERCIAL VEHICLE FLEET

The average HGV technician is 50 years old

The HGV sector is highly regulated with enforcement of these regulations carried out by the Driver and Vehicle Standards Agency (DVSA) and the Traffic Commissioners (TCs). Operators have an important legal responsibility to maintain their vehicles in a roadworthy condition. In addition to this, with yearly vehicle mileages exceeding 100,000 being relatively normal within the industry, regular workshop visits for safety inspections and routine servicing are essential.

REPAIR AND MAINTENANCE

Companies running newer vehicles will normally get most maintenance done in the HGV manufacturer's workshop network. More often than not, the cost of this will be covered in a repair and maintenance (R&M) agreement usually charged on a monthly basis or included in the leasing cost of the vehicle. The R&M agreement often covers the first five years of the vehicle's life.

Some new vehicles, however, are leased from third-party financiers, and these organisations may run their own workshops, operating to manufacturers' agreed standards.

As vehicles age and are moved on to second and third owners, they are increasingly likely to be maintained outside the manufacturer-approved networks of workshops. Repairs may be carried out by an independent provider or by the vehicle's operator if suitable facilities are available.

PERIODIC INSPECTIONS

HGV operators are also legally obliged to have their vehicles formally inspected for roadworthiness at intervals that they must agree with the licensing authority. These are in addition to the HGV's annual test, which is carried out by the DVSA at an approved testing facility. The inspection interval can range from every 13 weeks for new vehicles on light work to every four weeks for older HGVs and those engaged on heavy work or venturing off-road. These inspections may be carried out either in-house if there is a suitable workshop, or by a nominated service provider. If a company fails to adhere to the schedule agreed and/or safety is compromised, then they can be reported to the Traffic Commissioner for possible suspension of their operating licence. The authorities can check vehicle inspection records to ensure the schedule has been adhered to and, if not, exact substantial penalties.

Working on electric trucks presents technicians with new challenges

WORKSHOP WORKFORCE

While the HGV driver shortage in the UK has been making headlines, a parallel shortage of HGV technicians has attracted less attention. Like the HGV driver shortage, there is an ageing demographic and seemingly little appetite for new recruits to enter the heavy vehicle maintenance industry who perceive other industries as being more attractive in which to work. Industry is working hard to address the perceptions that have led to this shortage and a range of high-quality apprenticeships and other training programmes are now widely available.

Working on electric HGVs presents technicians with new challenges. Current knowledge and skills relating to internal combustion

powertrains, will over a long period, become redundant. Instead, technicians will have to be trained in a wide range of new processes to deal safely with high-voltage electrical installations, and the workings of motors, inverters, control units and battery packs. However, some common ground regarding braking systems, suspension, steering, and low-voltage electricals, will be retained.

Ensuring there are sufficient technicians to maintain a future fleet will require recruiting new blood into the sector, as well as reflecting the diversity across society. There are currently around 12,000 technicians certified by the Institute of Road Transport Engineers (IRTEC) to work on HGVs. However, the average age of such a technician is now 50 and this is becoming an acute problem.

NEW ACCREDITATIONS

IRTEC launched an accreditation scheme for large electrical vehicle technicians in April 2021. So far, 50 technicians have qualified, while a recent survey of the Institute of Road Transport Engineers members indicated that only 19% of technicians had a qualification to work on alternatively fuelled vehicles (including HGVs powered by gas). Some 96% of members felt that there were not enough technicians trained to work on such vehicles[7].

Transitioning away from fossil fuel vehicles therefore presents workshops with several challenges. Workshops themselves will have to invest in new facilities to handle electric vehicles alongside diesels. Likewise, they will need to attract a new generation of technicians so that as the industry transitions away from fossil fuels, so there are sufficient numbers of qualified technicians to provide essential maintenance. This will be crucial to maximise uptime for new zero emission HGVs and LCVs – helping operators remain commercially successful and ensuring these vital vehicles can deliver on their full potential in driving Britain towards net zero.

Workshops will have to invest in new facilities to handle electric vehicles alongside diesels.

04 CONCLUSION

European HGV manufacturers have pledged to be fossil fuel free by 2040. However, this bold commitment cannot be delivered by the industry alone.

A supportive policy framework that includes incentives for vehicle purchase and operation, a ubiquitous charging and refuelling infrastructure network and a strategic effort to attract new technicians and upskill the existing workforce is required to enable decarbonisation of CVs. The total cost of ownership and versatility offered by the existing range of conventional vehicles within CV operations must be maintained for zero emission technologies if the same essential services are to be delivered at the price and convenience that consumers expect. A dearth of infrastructure suitable for zero-emission HGVs stands as the biggest hurdle to wider adoption. LCVs, assumed to be on the same trajectory as cars, require additional infrastructure in recognition of the larger size of these vehicles and their usage patterns – one size does not fit all in this context. Maintaining these vehicles in the best condition requires new skills which are only just beginning to trickle into the market.

A range of technological solutions are now available. Given the diversity of use cases for commercial vehicles, however, as the UK makes its transition towards net zero, **government should account for the range of vehicle weights and operational profiles when determining a timeline for phase-out.**

Transitioning the CV market requires confidence from users, including certainty over infrastructure, clarity over regulation, predictability over residual values for new technology and reassurances that payload will not be compromised. Given the road logistics sector works on low margins and makes purchasing decisions against a total cost of ownership model, government should provide **significant and long-standing financial incentives to give certainty to operators to make the switch to zero emission vehicles.**

Such a step will be important in ensuring that the UK becomes an attractive marketplace for fossil fuel free CVs. While usage of alternatively fuelled CVs is very low across Europe, the UK is slightly below the EU-wide average and significantly behind France and Germany. **Clear government strategy and a strong financial offering to the logistics sector will be vital to ensure low carbon and zero emissions vehicles are brought to the UK market as quickly as possible.**

As well as the market, there must be support for manufacturing. The UK has significant LCV manufacturing capability but the HGV sector also relies heavily on UK SMEs for both body building and the supply chain. With new technology comes new opportunities for the UK to develop and manufacture fossil fuel free CVs and their component parts. To ensure SMEs can benefit, **a clear roadmap on the development of fossil fuel free technologies should be agreed with industry and implemented to support UK manufacturing and the supply chain.**

> Successfully creating a clear framework for transition, that supports uptake and manufacturing, will deliver a thriving and diverse automotive sector.

Failure to encourage uptake and production of fossil fuel free CVs will lead to operators deferring their decarbonisation decision to the last minute, delaying emission reductions today and jeopardising our ability to meet the bold environmental commitments of the future. But successfully creating a clear framework for transition, that supports uptake and manufacturing, will deliver a thriving and diverse automotive sector. This will help propel the UK towards a successful post-Brexit future based on international trade, productivity, research, development, digital innovation, and a rebalanced economy across all regions of the country – as well as creating a greener transport system that can set the standard for the globe to emulate.

1 https://www.theguardian.com/business/2020/aug/20/pandemic-prompts-doubling-of-online-grocery-shoppers-in-uk

2 https://www.gov.uk/government/statistical-data-sets/tsgb04-freight

3 Source: SMMT Motorparc 2020

4 Zap Map, August 2021

5 ACEA Position Paper - Heavy duty vehicles: Charging and refuelling infrastructure requirements

6. https://www.mobility.siemens.com/global/en/portfolio/road/ehighway.html

7 Survey of 125 IRTE members, conducted July 2021

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