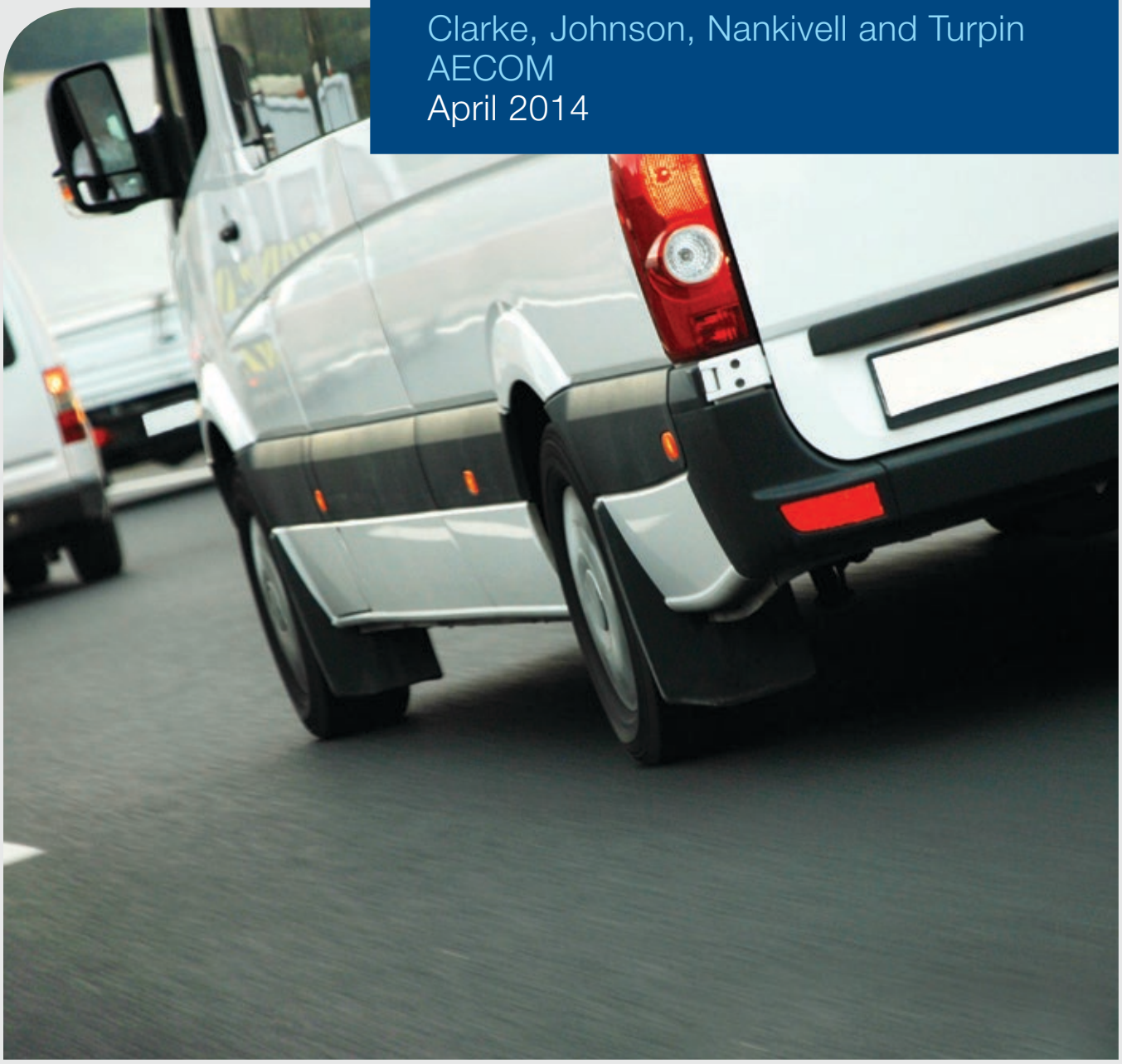
RAC Foundation

Van travel trends in Great Britain

Clarke, Johnson, Nankivell and Turpin
AECOM
April 2014



The Royal Automobile Club Foundation for Motoring Ltd is a transport policy and research organisation which explores the economic, mobility, safety and environmental issues relating to roads and their users. The Foundation publishes independent and authoritative research with which it promotes informed debate and advocates policy in the interest of the responsible motorist.

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About the Authors

Geoff Clarke is a Regional Director at AECOM and Chartered Fellow of the Chartered Institute of Logistics and transport, specialising in freight transport issues. He has extensive knowledge of the transport industry with over 20 years experience in front line transport and distribution management and 11 years in consultancy. After completing a Transport and Business Management degree, Geoff's industrial career included time as a vehicle scheduler, Transport Manager and Regional Distribution Manager. Geoff was responsible for running a large fleet of trucks on his Operator's licence and he also operated vans so had first-hand knowledge of the subject of this report.

Anne Johnson is an Associate Director, and Chartered Member of the of the Chartered Institute of Logistics and Transport. She has 20 years experience in freight and logistics, specialising in project management and business engagement. Since joining AECOM, Anne has worked closely with TfL and managed a variety of London based projects including TfL's Understanding Vans in London, Construction Logistics and Cyclist Safety (CLOCS), Fleet Operator Recognition Scheme (FORS), Olympics Freight Advice Programme, and the Heathrow Freight Movement Study. Anne has experience of different types of research including surveys, data analysis, stakeholder management and policy development.

James Nankivell is a consultant within the Sustainable Transport Group at AECOM and is responsible for delivering freight and logistics management studies, analysis and reports. He has over 13 years experience in the logistics & transport sectors and has a keen interest in transport operations and systems. He has gained firsthand experience of running fleets of vehicles including vans and managing teams of drivers. Some of James's recent clients have included the European Commission, Transport for London and the Hamad Medical Corporation based in Qatar.

Matthew Turpin is senior consultant at AECOM and specialises in research, data collection and analysis and reporting on a range of freight transport issues. He is a Mathematics graduate of Manchester University and is a member of the Chartered Institute of Logistics and Transport. Matthew has worked on projects for a number of clients such as Transport for London, the Department for Transport, and the European Commission.

About AECOM

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has an annual revenue in excess of $6 billion.

More information on AECOM and its services can be found at **www.aecom.com**. For more information about AECOM's transportation capabilities, visit **www.aecom.com/transportation**.

AECOM's freight and logistics team sits within the Sustainable Transport Group which works with clients to manage, plan and deliver travel and transport in ways that optimise environmental outcomes without compromising economic and social objectives. More specifically, it focuses AECOM's expertise in all aspects of sustainable transport including influencing travel behaviour for goods and people movement, the use of intelligent transport systems (ITS) to improve transport efficiency and safety, carbon management and strategic policy development. It has particular expertise in sustainable freight operations, reducing emissions and improving road safety as a result of improved operational management and influencing driver behaviour.

About this report

This report has been commissioned to follow on from the RAC Foundation's 2012 'On the Move: Making sense of car and train travel trends in Britain' report authored by Professor Peter Jones (UCL) and Dr Scott Le Vine (Imperial College London) on behalf of the ORR, Independent Transport Commission and Transport Scotland.

'On the Move' focused specifically on car and rail travel. Other aspects of road travel such as vans, HGVs and buses and taxis were left aside for the original study. Given van traffics significant growth within overall road traffic over the past 15 years this report has been commissioned to provide a review of literature and data describing Light Commercial Vehicle (LCV) use in Great Britain and how this has changed over time.

Contents

Foreword

White van man has reason to smile. He is in a rapidly growing section of the driving community. While over the last decade the number of heavy lorries on British roads has actually fallen, the number of light commercial vehicles – LCVs or vans – has risen dramatically: up from 2.5 million in 2002 to 3.3 million in 2012, a period during which we saw a severe recession.

Around one in ten of all vehicles is now a van. And the numbers look set to keep in increasing with van traffic predicted to rise at twice the rate of cars over the next couple of decades or so. Indeed, if you believe the forecasts van traffic will almost double by 2040.

This report accurately and thoroughly presents the past and present of van travel in this country. But what it does not do, what was not in its scope, is fully address the question why van numbers and usage has surged ahead. We can of course surmise.

In 2013, 72% of British adults shopped online, up from 53% in 2008. It might come as no surprise to learn that Britain has the highest rate of online shopping in Europe. Intuitively you would think this has lead to a big rise in home deliveries and hence van use. But so far we have scant research to demonstrate this is the case.

Others suggest the time and cost associated with training HGV drivers, and rising environmental standards for lorries mean that the less regulated van market is increasingly attractive to individuals and firms under severe pressure to make their businesses pay. Again we do not have all the evidence to prove this.

The subject of future traffic growth and demand for scarce road space is a contentious one. To know what provisions we will have to make in the future we need be able to disaggregate total vehicle movement and identify the components that make it up. As this report explains LCVs are one of these key components. Never before has the behaviour of white van man been so important.

Professor Stephen Glaister

S. Glaister.

Director of the RAC Foundation

Executive Summary

Introduction

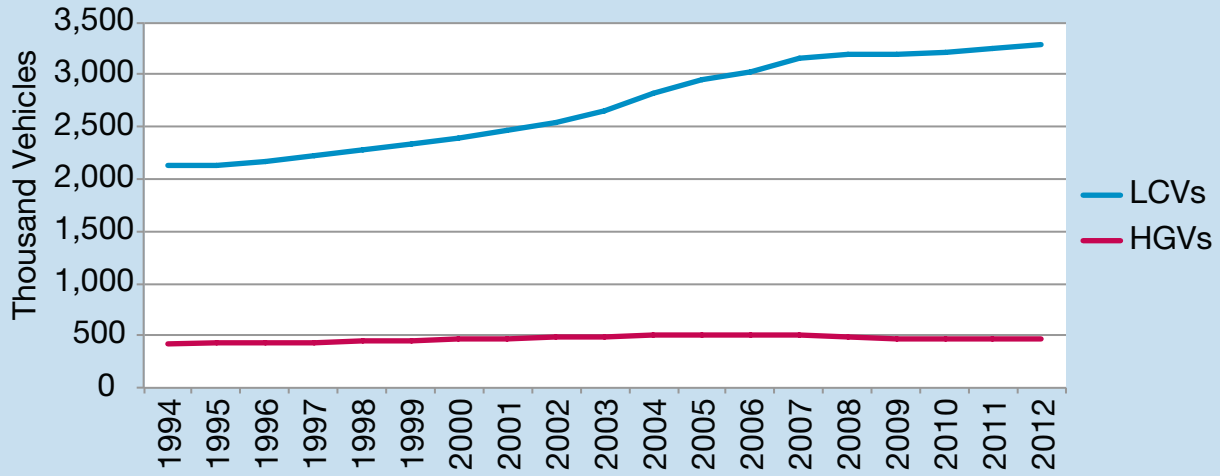
The Light Commercial Vehicle (LCV) market and its behaviours are poorly understood when compared with Heavy Goods Vehicles (HGVs). Quite often authorities treat LCVs the same as HGVs or cars, when they are in fact their own distinct group. This summary details what is known about the LCV market.

For the purposes of this report, an LCV is defined as a vehicle dedicated to moving freight or providing a non-passenger service that weighs no more than 3.5 tonnes (gross vehicle weight).

LCV ownership

- The number of LCVs registered in the UK has increased by 29% over the past 10 years to 3.28 million
- Every tenth vehicle on the road is an LCV
- Over the same 10-year period, the number of HGVs has decreased by 5% to 460,600

Number of LCVs and HGVs Registered in the United Kingdom



Source: DfT (2013), AECOM analysis

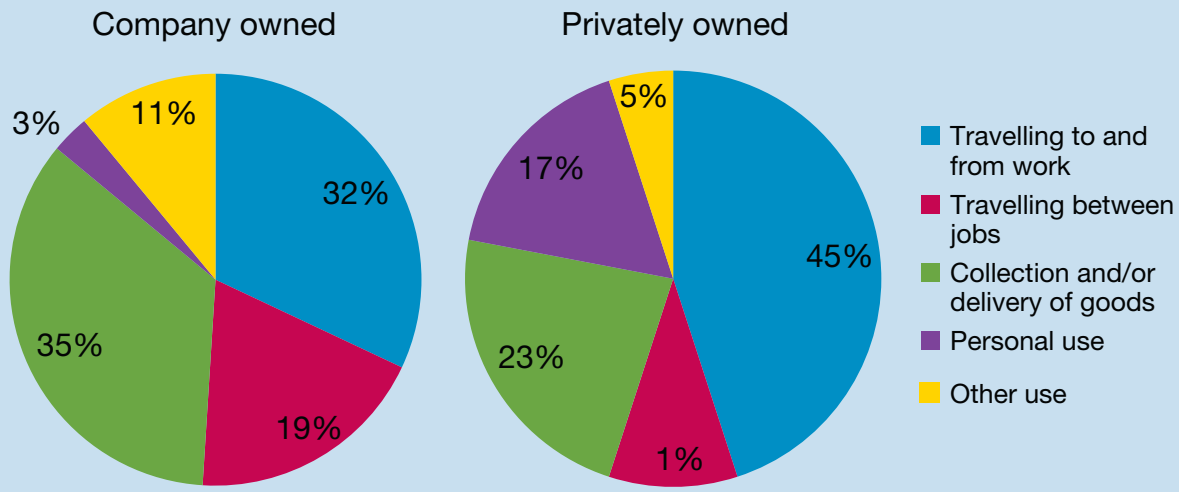
- 53% of LCVs are privately owned but it is likely that many of these are used for business purposes
- 47% of LCVs are commercially owned; that is, registered in the name of a business
- 99% of privately owned LCVs are owned by men

Ownership	Number	Percentage
Commercial	1,509,742	47%
Private	1,700,891	53%
Grand Total	3,210,633	

Source: DfT (2013), AECOM analysis

- For company-owned LCVs, most travelling is spent collecting or delivering goods (35%). For privately owned LCVs, this is only 23%
- Travelling to work is particularly significant for privately owned LCVs. This would include tradesmen

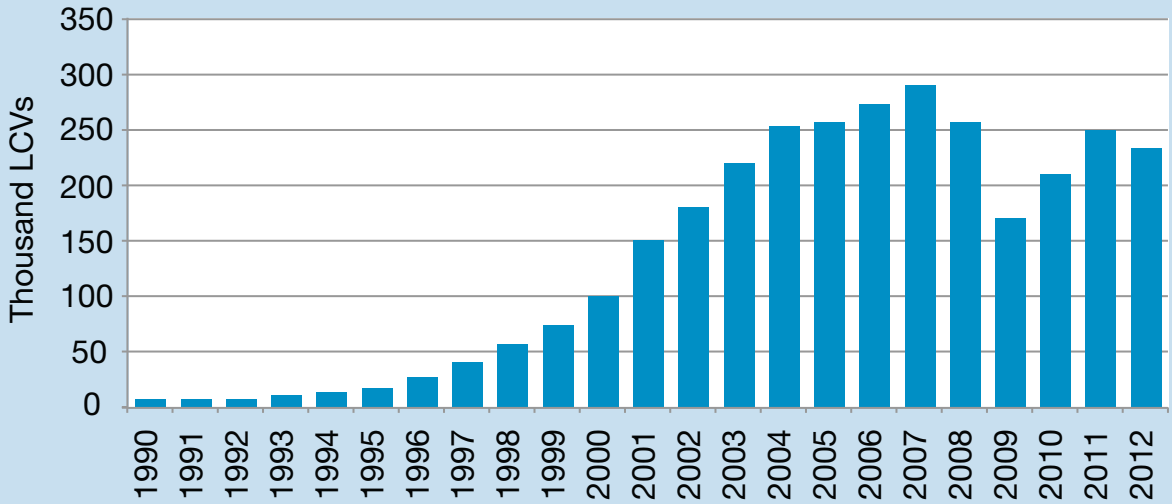
Breakdown of LCV Vehicle-km by Purpose of Travel



Source: DfT 2003/4

- LCVs are being kept for around 10 years before being replaced
- 112,000 LCVs are 20 years or older with 26,800 being registered before 1970
- The effect of the economic crisis can be seen with a dip in 2009 registrations

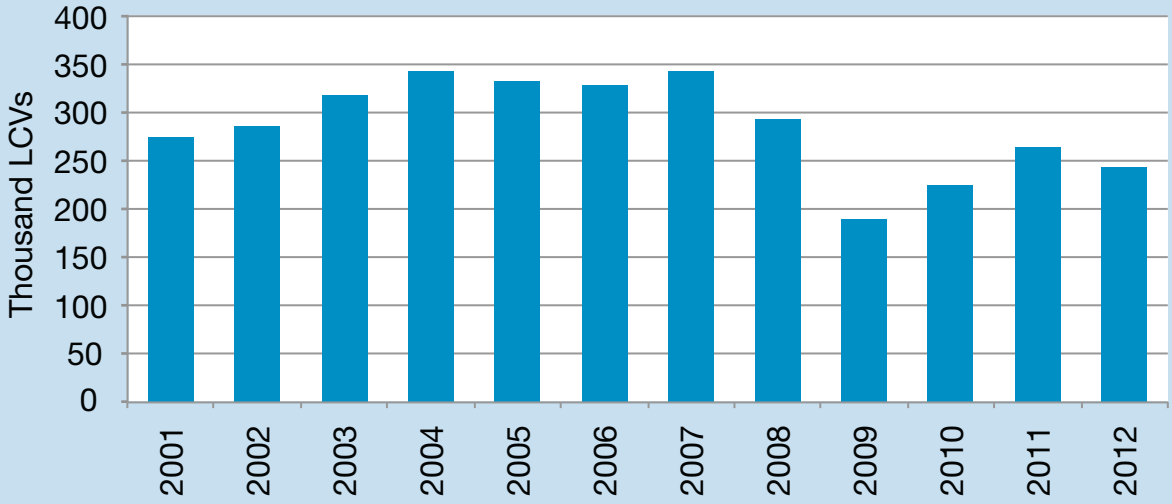
Registration Year of LCVs



Source: DfT (2012), AECOM analysis

- On average, 320,000 new vans were registered every year between 2002 and 2008
- 2009 saw a 35% reduction in new LCV registrations compared with 2008
- The number of new LCV registrations has increased since 2009 but registrations are at 83% of 2008 levels

New LCV Registrations

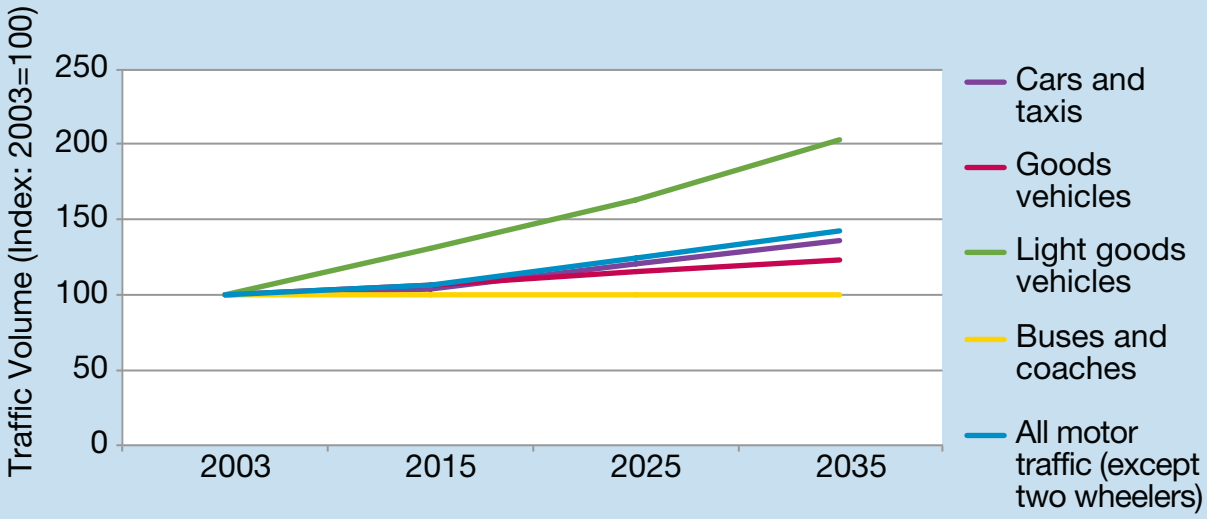


Source: DfT (2012), AECOM analysis

Forecast growth in LCV activity

- LCV activity is predicted to almost double between 2010 and 2040
- LCV activity is the fastest growing of all the vehicle groups
- There is evidence that LCVs have been used to substitute for HGVs
- A key factor is pay – an LCV driver might earn £15k, an HGV driver £25k
- There has been a rise in home deliveries, to which LCVs are better suited. Online non-food sales grew 17.8% in December 2012 compared with December 2011
- Regulation will have an influence; vans, their operation and their drivers are less heavily regulated than HGVs

Road Traffic Forecasts

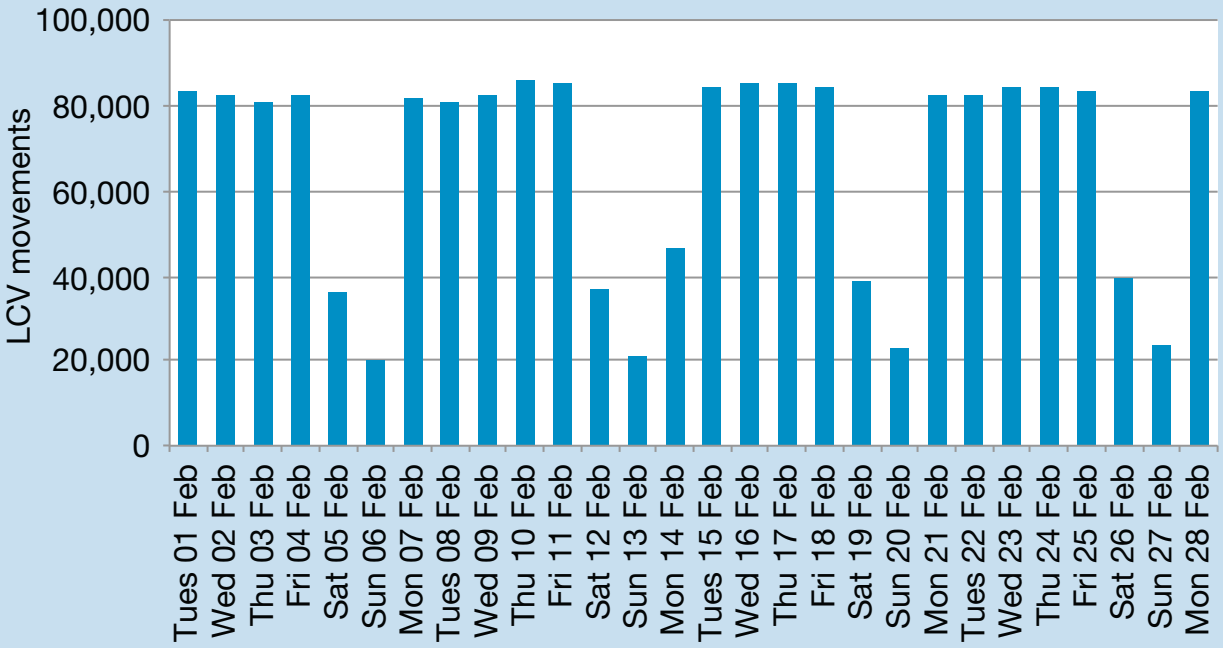


Source: DfT (2013)

LCV movements

- LCV weekday movements are fairly constant
- The number of LCV movements on a Saturday is about half that on a weekday
- The number of LCV movements on a Sunday is about half as much again

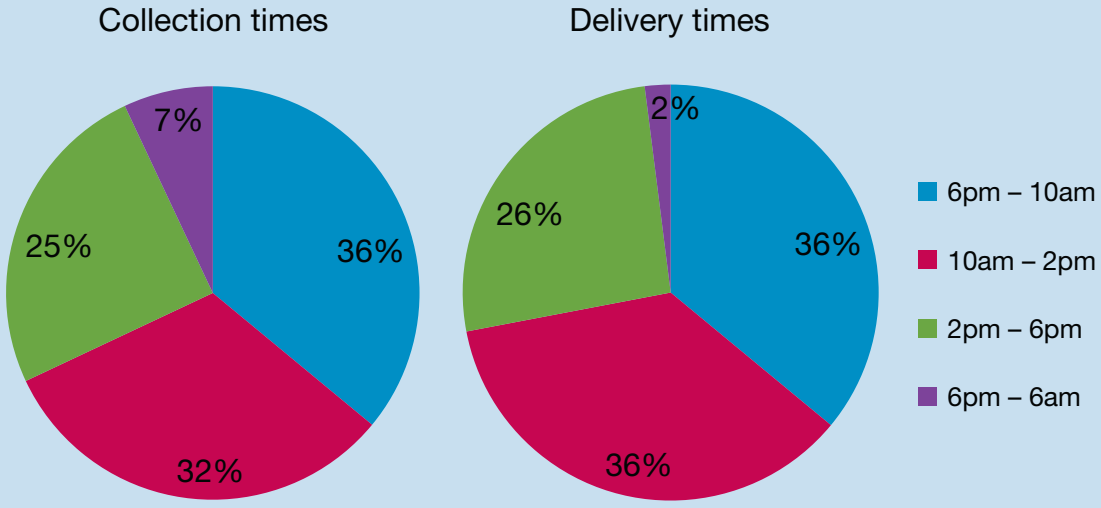
Daily Total LCV Movements in and out of the Congestion Charge Zone



Source: TfL (2012), AECOM analysis

Collection/delivery times

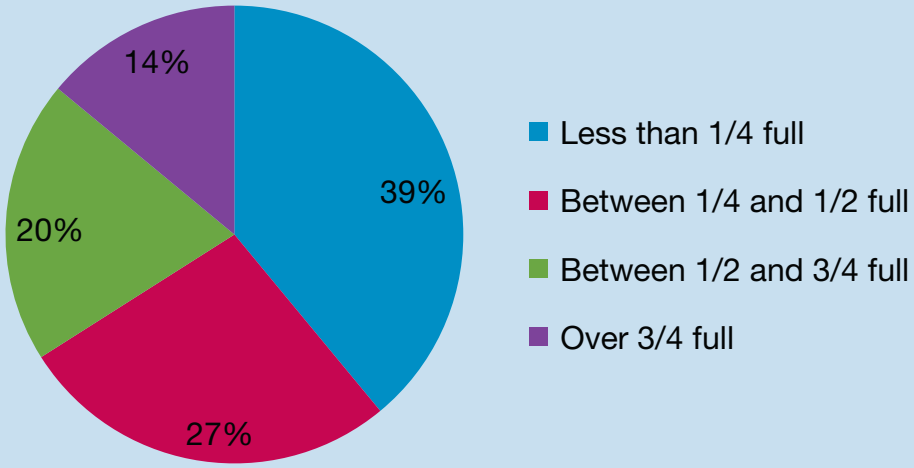
- A high proportion of collections/deliveries (70%) occur before 2 p.m.
- A limited number of collections and deliveries (5%) occur at night



Source: AECOM analysis (2012)

LCV use

- 39% of LCVs are poorly used as they are < quarter full
- The average laden factor of an LCV is 38%, which is about 300kg (DfT, 2010)

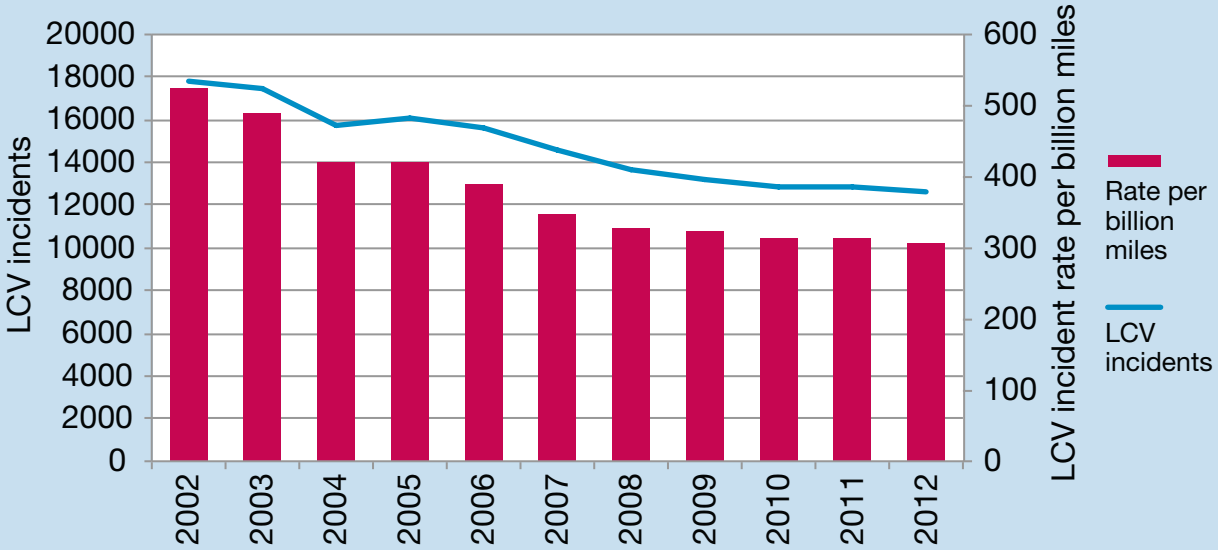


Source: AECOM

Safety

- There were 12,575 reported incidents involving LCVs in 2012. This is 5% of all reported road traffic incidents in Great Britain
- Many of these incidents occur in major urban areas of Great Britain
- Incidents involving LCVs have reduced both in number (down 29%) and the rate per billion miles driven (down 42%), despite the number of LCVs registered increasing over the same period (up 29%)

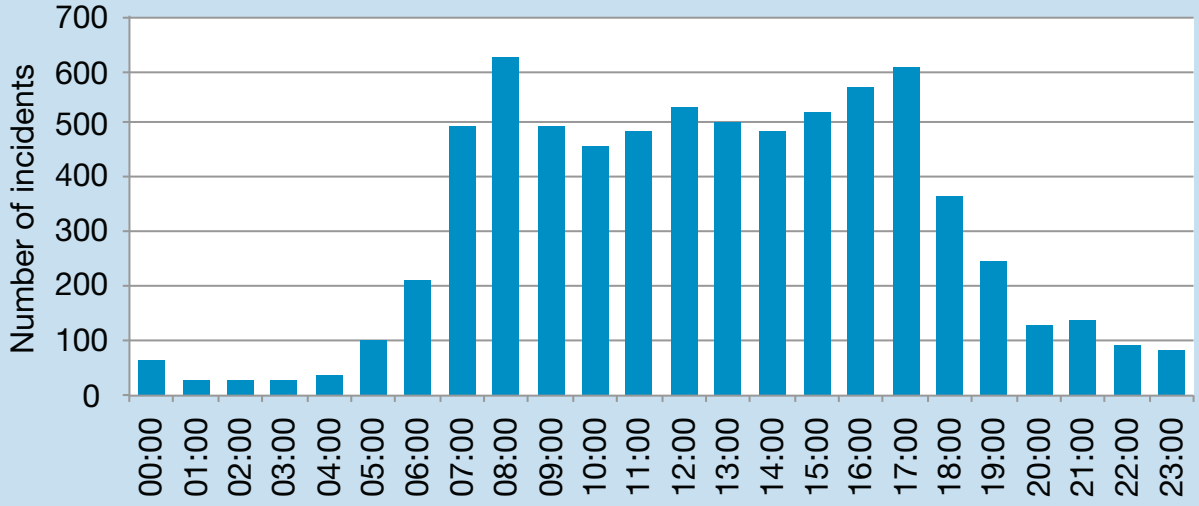
LCV Incidents 2002–2012



Source: AECOM analysis of STATS19

- The majority of incidents (77%) occur between 8 a.m. and 6 p.m., during the working day.
- Morning and afternoon peaks in collisions occur at 8 a.m. and 5 p.m. respectively.

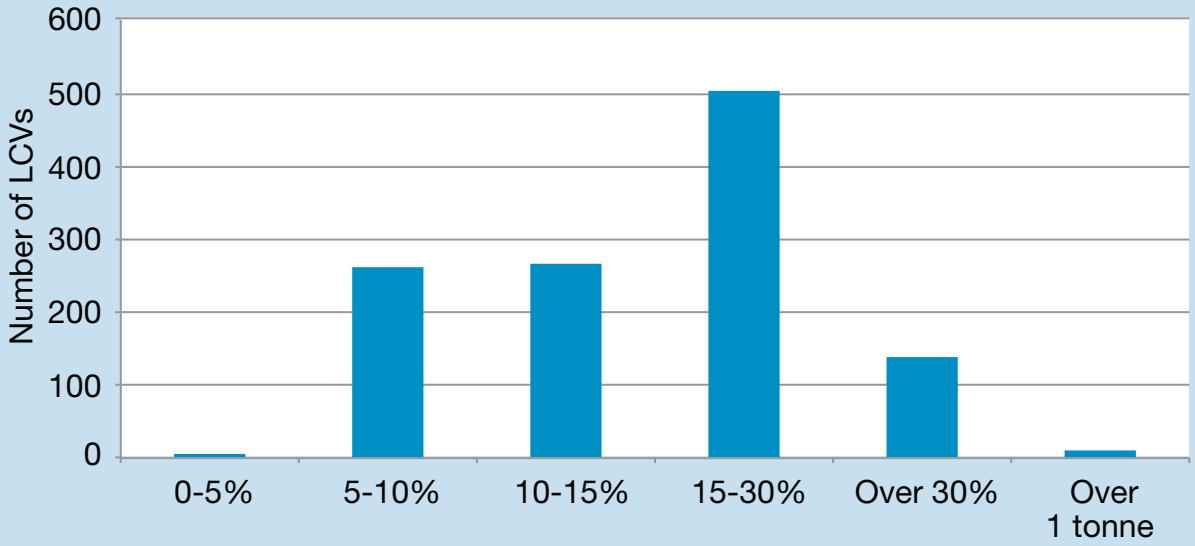
LCV Incidents by Time of Day



Source: STATS19 (2013), AECOM analysis

- 89% of LCVs pulled over by the Vehicle and Operator Services Agency (VOSA) were overweight. No regional data is available
- 50% of LCVs fail their MOT first time

Overweight LCVs – Degree Overweight

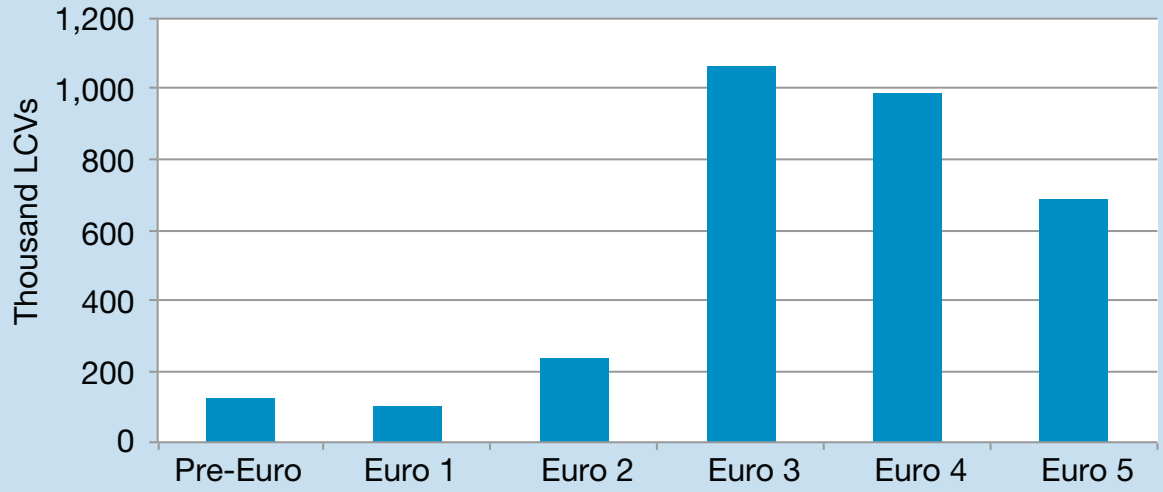


Source: VOSA (2011), AECOM analysis

LCV Euro standards

- Euro engine standards stipulate the maximum emissions an engine can emit
- Current regulations mean that new LCVs must be manufactured to Euro 5 standard
- 86% of LCVs have a Euro 3-rated engine or better
- 4% of LCVs have engines that predate the Euro Engine Standard regulations; these are the most polluting engines

Euro Engine Standards of Registered LCVs

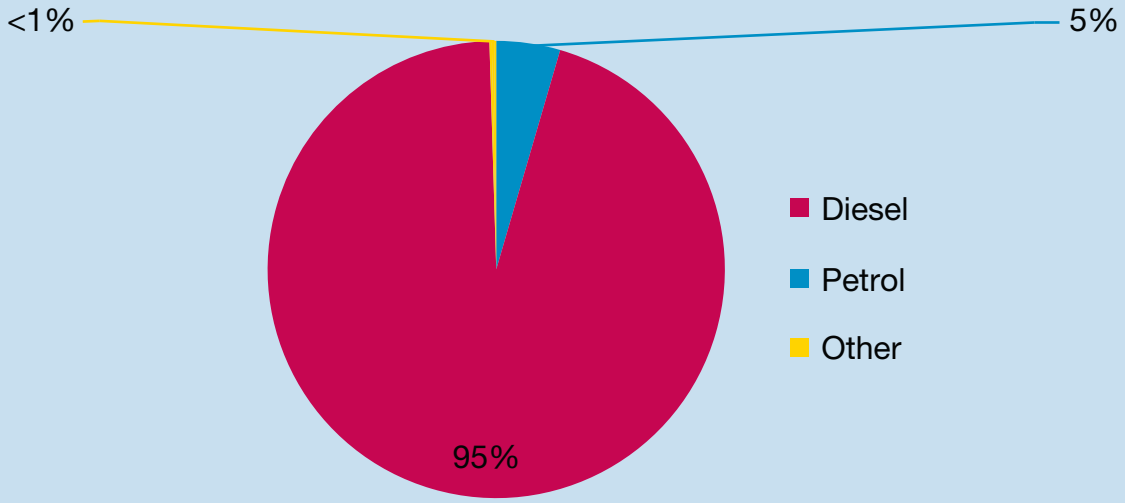


Source: DfT (2013), AECOM analysis

Propulsion type

- The overwhelming majority of LCVs (95%) are diesel-powered

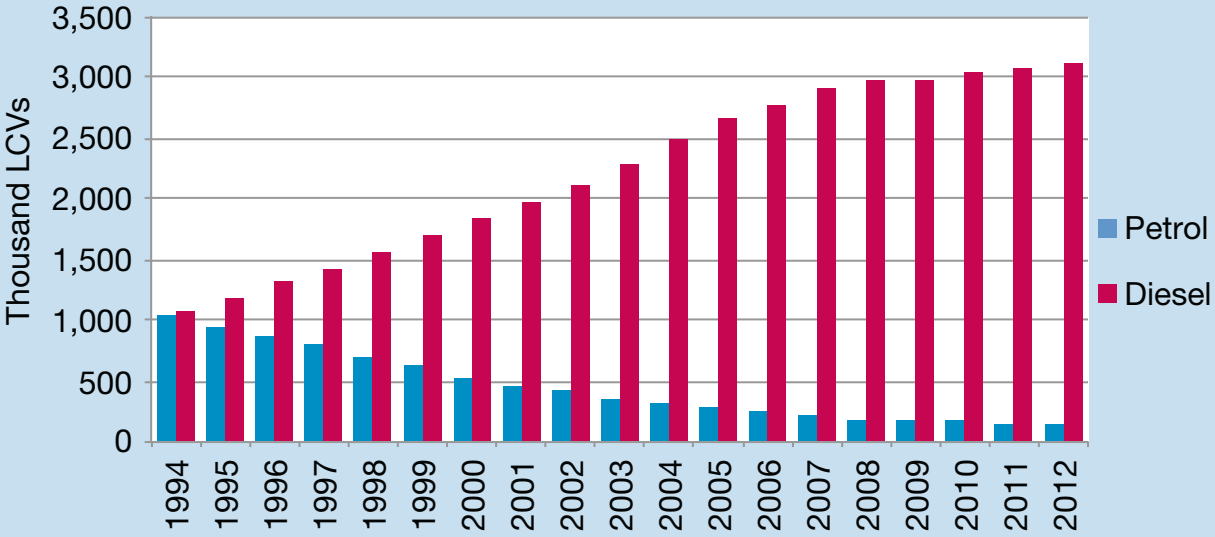
LCV Propulsion Types



Source: DfT (2013), AECOM analysis

- In 1994 there was almost parity between diesel and petrol-fuelled LCVs
- The number of diesel-fuelled LCVs has increased at the expense of petrol. This differs to cars as although the number of diesel-fuelled cars has increased, this increase has not come at the expense of petrol-powered cars

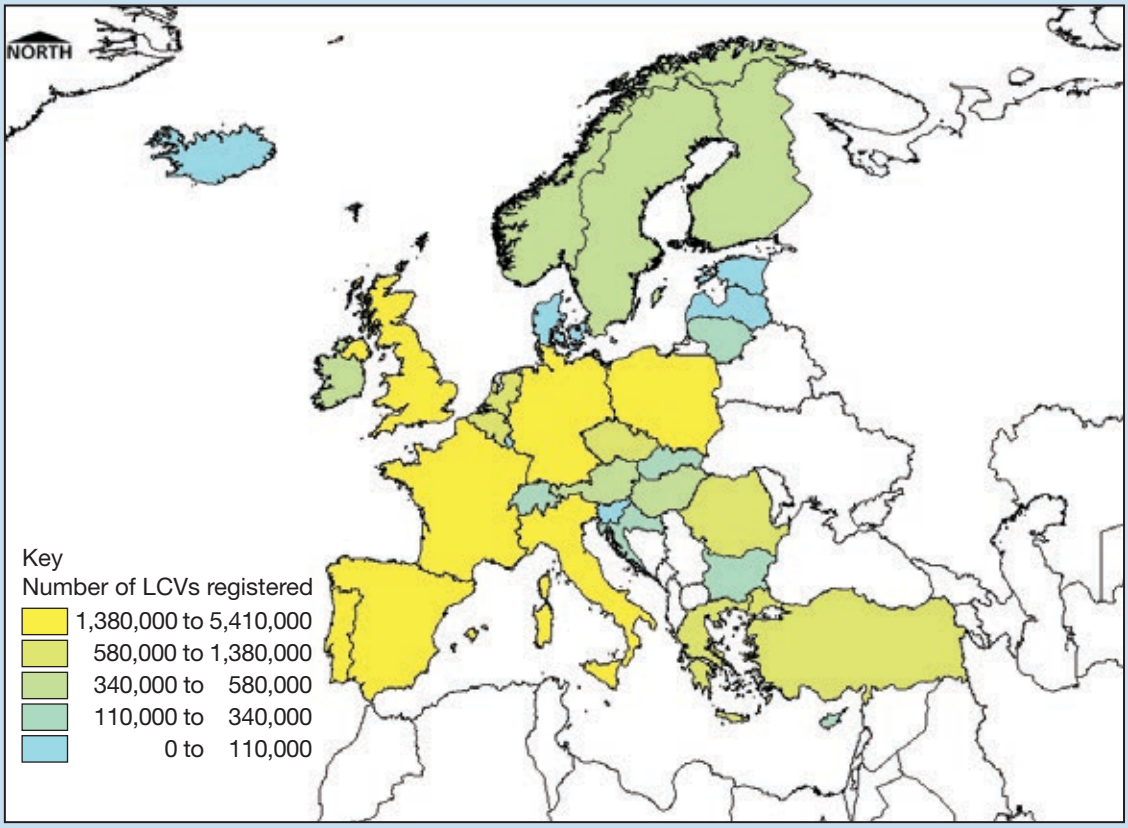
Diesel and Petrol-Fulled LCVs 1994-2012



Source: DfT (2013), AECOM analysis

LCVs in Europe

- Over 32.2 million LCVs are registered in the EU, representing 12% of the total vehicle stock
- France, Spain and Italy have more registered LCVs than the UK
- Note that Europe considers LCVs up to 5 tonnes Gross Vehicle Weight



Regulation

- The regulation for running an LCV differs to an HGV; LCV regulation is less rigorous compared with HGV regulation

	Required for HGV	Required for LCV
Specialist driving licence	✓	×
Driver CPC	✓	×
Operator's licence	✓	×

1. Introduction

The reason for the large growth of Light Commercial Vehicle (LCV) traffic as part of the overall traffic in the UK is largely unknown. Various hypotheses have attributed this increase to the explosion of online shopping, the shift from private cars to vans for employment or personal reasons or to the shift from HGVs to LCVs to support a changing demand for deliveries.

AECOM was commissioned by the RAC Foundation to conduct a scoping study on LCV travel trends with the purpose of understanding how LCV activity is changing, what is driving LCV purchase/use, the reasons behind recent traffic growth in this sector and how this might change in the future. This report presents the findings.

2. LCV travel trends

2.1 LCV traffic within Great Britain

LCVs make up 14% of all traffic on Great Britain's roads (DfT 2013i). However, the market and its behaviours are poorly understood when compared with Heavy Goods Vehicles (HGVs), which comprise just 5% of all traffic, a much lower overall percentage of total traffic flow. Authorities sometimes group LCVs with HGVs or cars when they are in fact their own distinct group with their own distinct behaviours and requirements. For example, several data sources and applications use the Continuous Survey of Road Goods Transport (CSRGT), which is sent by the Department for Transport (DfT) to HGV operators. No such survey is sent to LCV operators.

Table 2.1 shows that the definitions and terminology used relating to LCVs vary for different organisations and stakeholders.

Table 2.1: Differing definitions and terminology used relating to LCVs

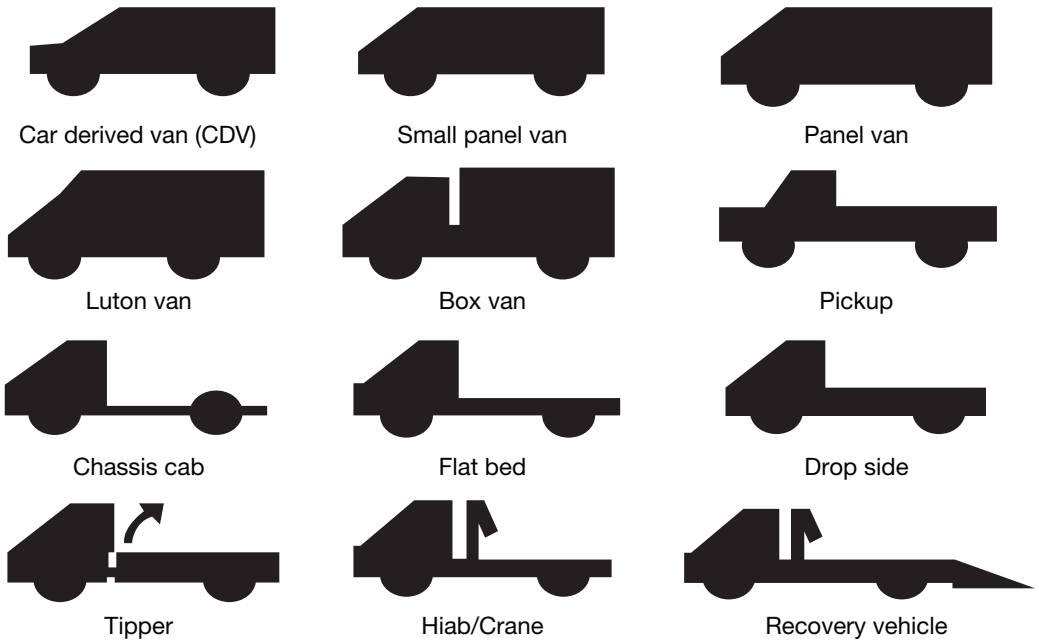
Source	Definition and terminology
Department for Transport	Sometimes referred to as vans; otherwise they are light goods vehicles that weigh up to 3.5t GVW
Driver and Vehicle Licensing Authority	Light goods vehicles up to 3.5t GVW
Society of Motor Manufacturers and Traders	Light van under 1.8t GVW Medium vans (1.8-2.6t and 2.6-3.5t) Heavy vans and light trucks, 3.5-7.4t
Fleet managers	Often referred to as light commercial vehicles that can weigh up to 7.5t GVW

Source: University of Westminster (2003a)

For the purpose of this study, a vehicle is defined as an LCV if it falls within the N1 category, as defined under EU Directive (EC) 2007/46/EC, with a gross weight of 3.5 tonnes or less. For completeness, N2 category vehicles are vehicles weighing between 3.5 tonnes and 12 tonnes and N3 category vehicles are vehicles weighing over 12 tonnes.

Figure 2.1 shows a number of variants under the N1 vehicle class (FTA, 2008).

Figure 2.1: Variants covered under the N1 vehicle class



Note: other variants include double-cab derivatives of those in Table 3.1, short/medium/long wheelbase derivatives, front or rear-wheel drive derivatives and specialised vehicles such as ambulances, hearses, armoured vehicles and horse boxes.

Source: Freight Transport Association (2008)

Within the N1 class there are three further sub-classes. These are:

- N1-I: LCVs that have a maximum permissible weight less than 1,305kg.
- N1-II: LCVs that have a maximum permissible weight between 1,305kg and 1,760kg.
- N1-III: LCVs that have a maximum permissible weight of greater than 1,760kg (but not more than 3,500kg).

Though there is some standardisation of defining and categorising LCVs, there is no universal and complete categorisation. This occurs across and within organisations. The LCV market is sufficiently large and diverse that complete categorisation is extremely difficult.

Within academic study, there is also no one standard definition of an LCV. LCVs can be described as vans, light commercial vehicles or light goods vehicles (LGVs). In the context of this study, all are considered to be an LCV.

Table 2.2: Possible categorisation of LCVs

Name	Reference mass	Class as defined for EU emissions standards	Payload mass
Car-derived LCVs	≤ 1,305kg	Class I	600kg
Class II LCVs	1,305	Class II	≤ 1,000kg
Large LCVs	> 1,740	Class III	Up to 1,800kg

Source: DfT (2010a)

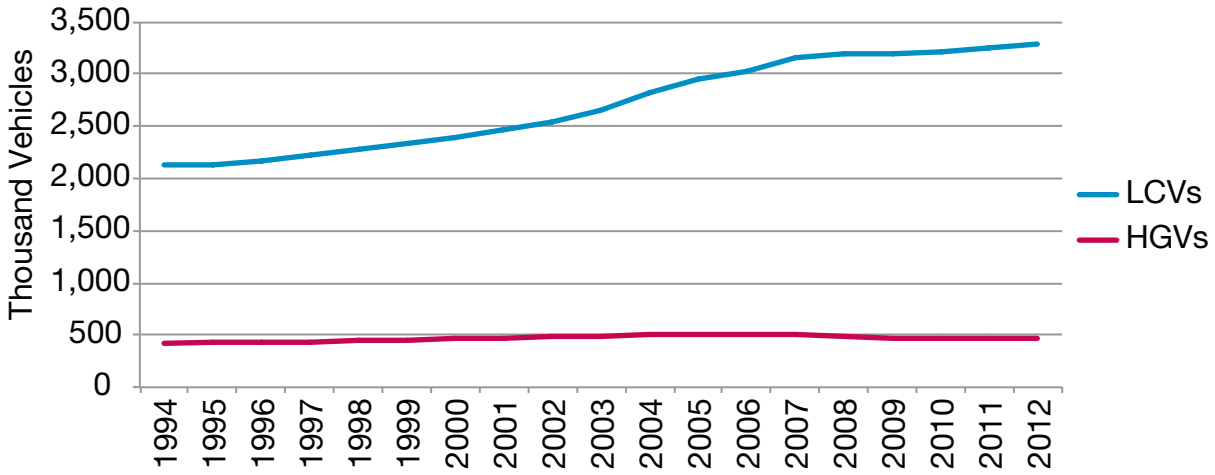
Table 2.2 shows a categorisation system for LCVs along with their indicative maximum payload mass.

LCVs are manufactured with several different body types. The two most common body types for LCVs are: (i) panel LCVs (which are usually between 1.8 and 3.5t GVW) and (ii) car-derived LCVs (which from the outside are visually very similar to the cars on which they are based but have no rear seats). Other LCV body types include pickups, Luton LCVs and box LCVs (University of Westminster, 2007a).

2.1.1 Trends in LCV numbers

Since 1950 (when the number of LCVs and HGVs were at similar numbers within the vehicle parc), the LCV fleet has become much larger than the HGV fleet. This growth in the LCV fleet has continued unabated in recent years, increasing by 32% over the last 10 years. This is shown in Figure 2.2. LCV growth has far outstripped the growth in the HGV fleet during the last decade, and the HGV fleet has actually decreased by 3% (University of Westminster, 2007b). The number of LCVs in the UK stands at 3.28 million compared with 460,600 HGVs (DfT, 2013), with LCVs currently outnumbering HGVs by 7:1.

Figure 2.2: Number of LCVs and HGVs registered in the UK



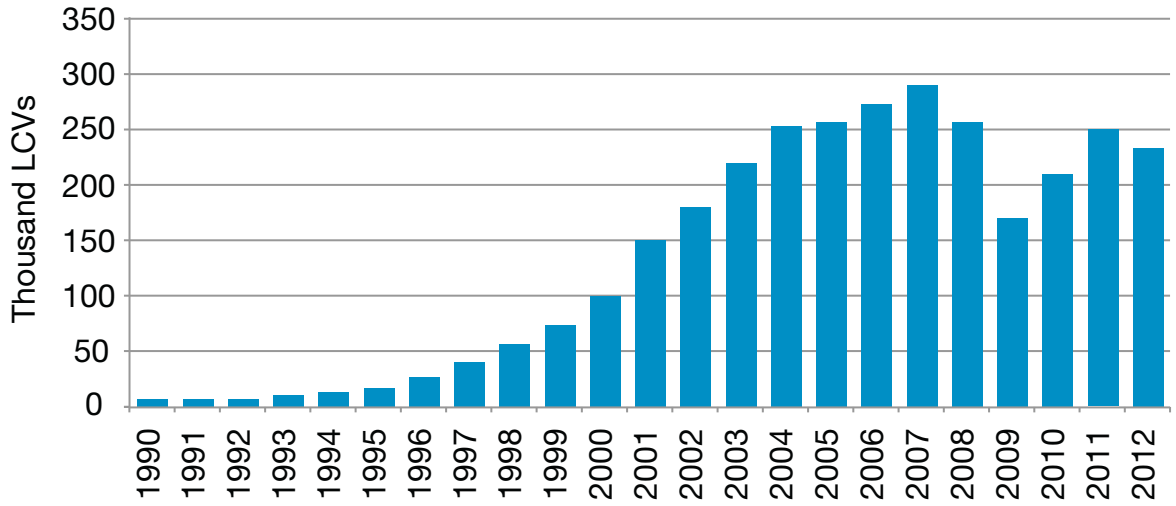
Source: DfT (2013b)

Figure 2.2 shows that the number of LCVs has increased sharply. There has been significant growth in the number of LCVs registered each year (European Parliament, 2009).

The increase in LCV activity can be attributed to:
Increased popularity of just-in-time deliveries
More deliveries of critical importance that cannot be stored
Greater difficulty of hiring HGV drivers and operating HGVs
Various restrictions on HGVs in urban areas (such as weight, emissions, height, width)
More home deliveries resulting from increased popularity of internet shopping
Increased number of households requiring more home wares and shopping deliveries (Poznan School of Logistics, 2010).

2.1.2 Registration year of LCVs

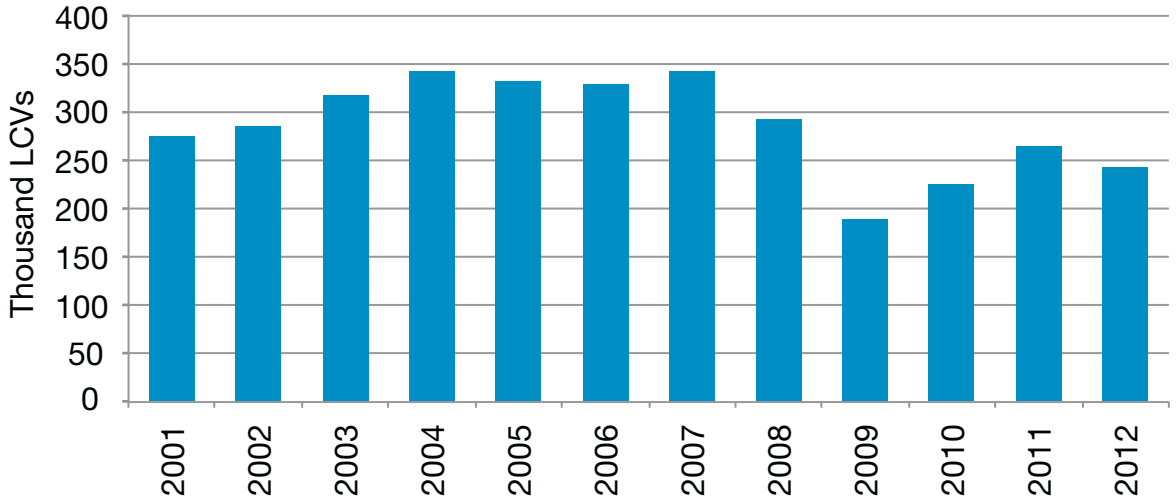
Figure 2.3: Registration year of LCVs



Source: DfT (2013c)

Figure 2.3 shows the distribution of the year of registration for LCVs within Great Britain. It would appear that LCVs are being kept for around 10 years before being replaced, and that 112,000 LCVs are 20 years old or older, with 26,800 being registered before 1970.

Figure 2.4: New LCV registrations



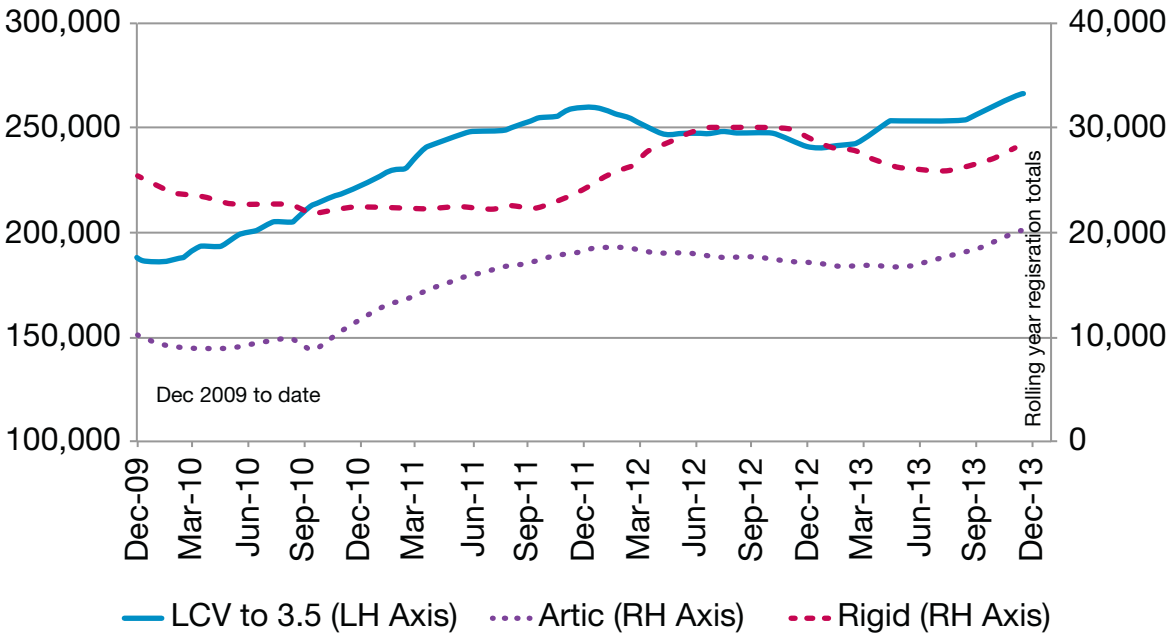
Source: DfT (2013d)

The data illustrated in Figure 2.4 shows a similar trend to Figure 2.3 in the registration year for new LCV registrations. On average, 320,000 new LCVs were registered every year between 2002 and 2008, but in 2009 there was a marked reduction (35%) in the number of new registrations from the 2008 figure. This was due to the economic climate and general uncertainty that was prevalent at the time, as well as the lack of access to funding for new LCV purchases. There is an increase after 2009, but this is only 83% of the 2008 levels with a slight dip in 2012.

However, data released by the Society of Motor Manufacturers and Traders (SMMT) in 2013 (Figure 2.5) shows that the number of new LCV registrations rose 19.4% in November 2013 to the highest levels since 2008, with 22,647 registrations. Growth for the year hit 13.1% with 271,073 units boosted by a 32.5% growth rate in December. In comparison, the number of new car registrations rose 7% in November to 159,581 units, which was the month's best performance since 2004. Overall, new registrations increased by 10.8% in 2012 to 2,264,737 units, the highest total since 2007.

For 2013 it can be seen that the number of new LCV registrations represented less than 11% of the total number of new registrations compared with cars.

Figure 2.5: LCV and truck registrations – rolling year trends from December 2009 to date



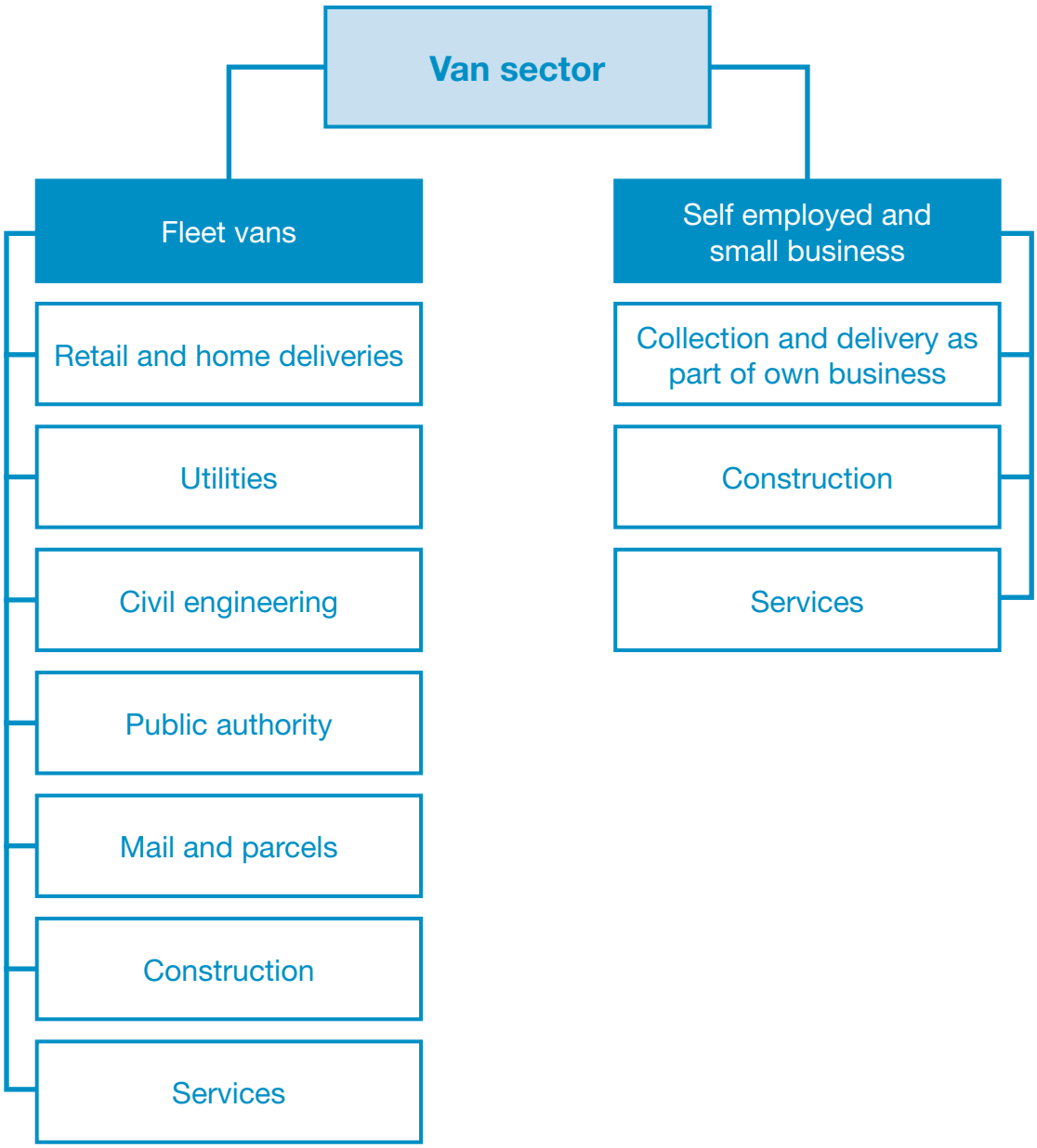
Source: SMMT (2013)

2.2 How are LCVs used?

LCVs vary significantly in size, type and degree of specialist use. This reflects the complexity of requirements and the many roles played by the

vehicle in economic activity (Figure 2.6). LCVs are used to carry goods (e.g. parcel movements) and to provide services (e.g. repair and maintenance of telecommunications equipment).

Figure 2.6: UK LCV sector key activity



Source: Commission for Integrated Transport (CfIT), 2011

In addition, LCVs are used for:

- Non-business purposes (e.g. personal journeys) as a substitute for a private car
- Commuting either to a fixed place of work or to a place of work that may have varying locations (e.g. in the case of someone using an LCV to carry out repairs in homes and offices).

LCVs play a critical role in the final delivery of many time-critical, high-value goods and are also widely used in industries that provide critical support services. The greatest proportion of the total distance travelled by LCVs is within urban areas. The LCV fleet is responsible for 25% of the total diesel and 3% of the total petrol used by all motorised road transport vehicles in Britain (DfT, 2008a).

The LCV sector is extremely diverse and a growing range of industry sectors use LCVs for a wide variety of purposes. Research undertaken for the DfT's Van Activity Baseline Survey categorised the primary uses of LCVs within all sectors into the activities shown in Table 2.3.

Table 2.3: Primary uses of LCVs

Use	Share of mileage	Share of LCV numbers
Delivery/collection of goods	28%	21%
Carriage of equipment	51%	50%
Providing transport	3%	3%
Private and domestic	9%	18%
Not specified	8%	9%

Source: DfT (2008a)

This study found that the two primary uses for LCVs were 'the carriage of equipment, tools and/or materials to provide a service', accounting for 51% of the average weekly mileage and 50% of the vehicles, and 'the delivery/ collection of goods', accounting for a further 28% of the mileage but only 21% of stock.

2.2.1 LCV ownership

Approximately 3.2 million LCVs were licensed throughout Great Britain in 2011 (DfT, 2011a). This was split between 1.7 million owned privately and 1.5 million owned by companies.

Table 2.4: Ownership of LCVs in Great Britain

Ownership	Number	Percentage
Commercial	1,509,742	47
Private	1	53
Grand Total	**3,210,633**	

Source: DfT (2013a)

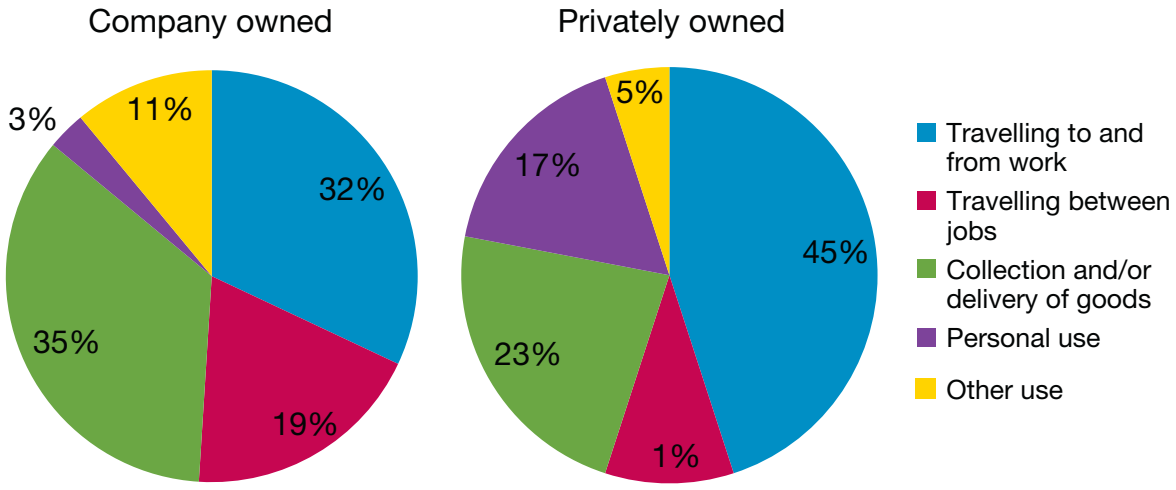
Table 2.4 contains DfT data which shows that LCV ownership in Great Britain is split between 53% owned privately and 47% owned by companies.

During 2011, 21% of LCVs changed ownership at least once (DfT, 2011b). This was much higher than the 13% experienced by the HGV sector, and suggests that LCVs change ownership quite frequently over their lifetime. The total number of LCV transfers was down on 2010 from 856,800 to 839,200, a -2% drop.

Data for privately registered LCVs is broken down by gender and shows that where known, 99% of LCVs are owned by men, suggesting that the sector is heavily male dominated.

Much of the population that uses commercial vehicles are from a lower socioeconomic background (Key Note 2011).

Figure 2.7: Breakdown of LCV vehicle-km by purpose of travel



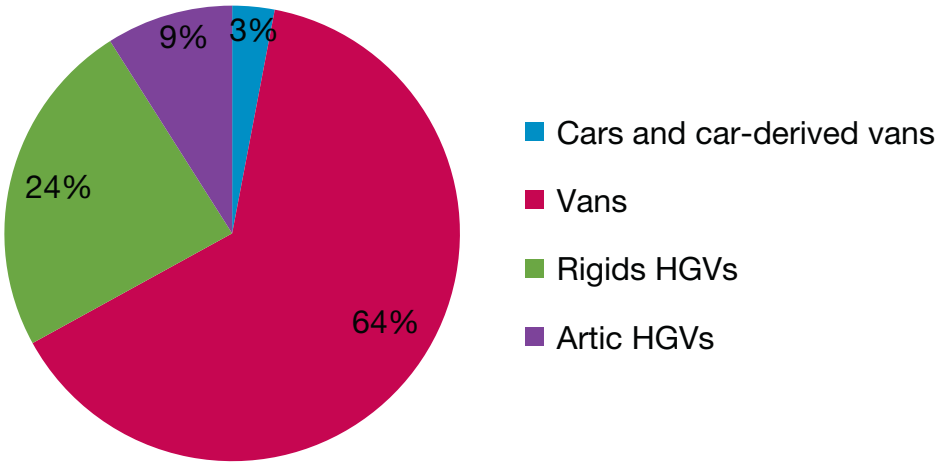
Source: DfT (2003/4)

Figure 2.7 shows the breakdown of LCV vehicle-km by purpose of travel (Committee on Climate Change, 2008). For company-owned LCVs, most travelling is to collect or deliver goods (35%), whereas for privately owned LCVs this is only 23%. There is quite a contrast in operations between company and privately owned LCVs, with privately owned LCVs having a higher proportion of time spent on personal use. This is likely because the LCV may be the private owner's primary mode of transport.

Information on how LCV drivers use their vehicles outside of working hours is very limited, so it is not possible to fully address this issue. Although Her Majesty's Revenue and Customs record personal LCV usage for tax purposes, this is somewhat unreliable and not a true representation. It would seem the only way of obtaining this data would be to conduct face-to-face interviews with people.

The DfT 2007 Freight Best Practice initiative benchmarked LCVs operated by parcel couriers to understand their operation practices. Figure 2.8 and Table 2.5 show the findings from this survey.

Figure 2.8: Participating vehicles



Source: Freight Best Practice (2007)

Figure 2.8 shows that LCVs make up nearly two thirds (64%) of the total number of vehicles operated by parcel couriers. This suggests a sector that is heavily reliant on LCV drivers to conduct its business.

Table 2.5: Consignments and kilometres per trip

Vehicle type	Consignments per trip	Kilometres per trip
Car	158	155
Car-derived LCV	8	116
LCV less than 3.5t GVW, short/medium wheelbase	59	108
LCV less than 3.5t GVW, long wheelbase	57	119
Rigid goods vehicle 7.5t GVW	36	101
Rigid goods vehicle 18t GVW	16	79

Source: Freight Best Practice (2007)

Table 2.5 shows that LCVs were found to serve, on average, over 50% more consignments per run than 7.5t rigid HGVs and over treble the number of 18t rigid HGVs. Cars were found to serve the most consignments per trip of all vehicle types, essentially delivering large quantities of very small consignments.

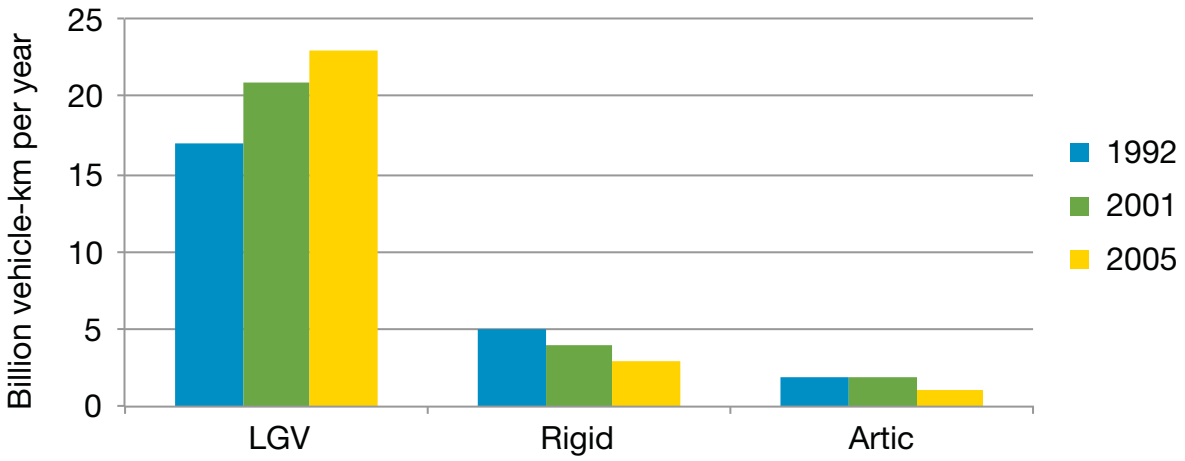
A consequence of LCVs delivering the highest number of parcels is that the distance they travel per trip is higher than HGVs, which indicates that LCVs make many drops over long journeys for parcel companies.

The Freight Best Practice benchmarking guide also mentions that the time-critical nature of parcel-delivery operations can be a constraint for efficiency in vehicle use. That means customer demands may restrict how well an LCV can be used. Normally, vehicles deliver consignments in the morning and undertake collections in the afternoon, which means the LCV will nearly always be underused. Ultimately, this service-driven sector may find it difficult to become more efficient while ensuring compliance with agreed time windows.

The Department for Transport Company and Privately Owned LCV Survey results show that the peak periods for LCV travel during the week were 7 a.m. to 9 a.m. and 4 p.m. to 6 p.m., when approximately 30% of company-owned LCVs and 20–25% of privately owned LCVs were in use. At weekends, no more than 4% of company-owned LCVs were in use during any one-hour period. However, the situation is different for privately owned LCVs, with almost 15% of them in use at weekends during the middle of the day (University of Westminster 2007a).

Figure 2.9 (University of Westminster, 2007c) shows that the number of vehicle-km in urban areas has increased for LCVs. This goes hand in hand with the increase in the number of LCVs registered. While the number of vehicle-km for LCVs has increased in urban areas, the number of vehicle-km for rigid and articulated HGVs has actually dropped. Indeed, LCVs have increased their market share at the expense of other, larger freight vehicles.

Figure 2.9: Road freight traffic in urban areas by vehicle type

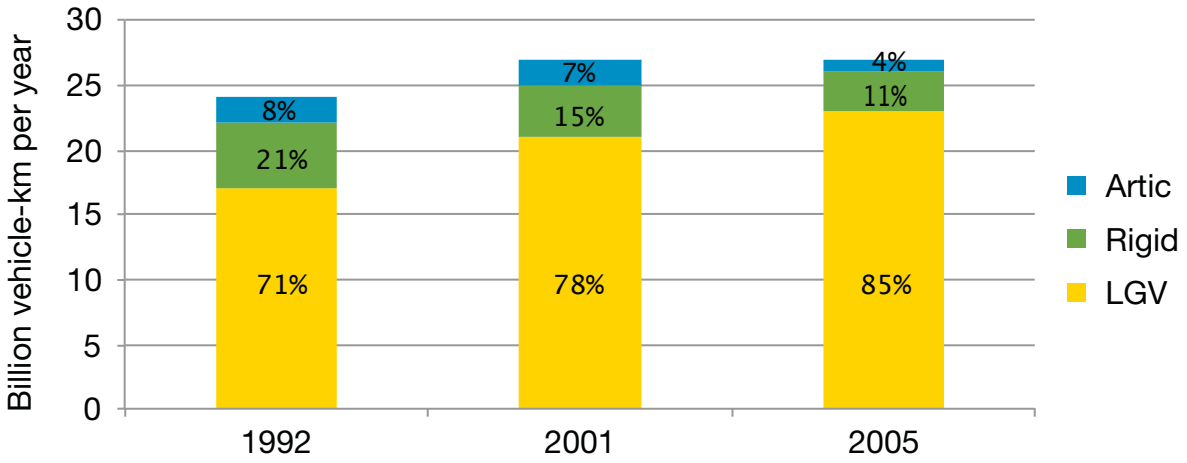


Source: DfT (2006a)

Figure 2.10 confirms this shift in market share. While the number of vehicle-km has not changed much over the period 1992–2005, the number of vehicle-km travelled by LCVs has increased in relative and real terms.

The number of vehicle-km travelled by LCVs has grown very rapidly over the last 15 years, and projections suggest this will continue to grow at 2% per annum (Committee on Climate Change, 2008). Indeed, DfT forecasts show that LCV activity is predicted to almost double between 2010 and 2040 and that LCV activity is the fastest growing of all vehicle groups (DfT, 2013a).

Figure 2.10: Road freight traffic in urban areas market share



Source: DfT (2006a)

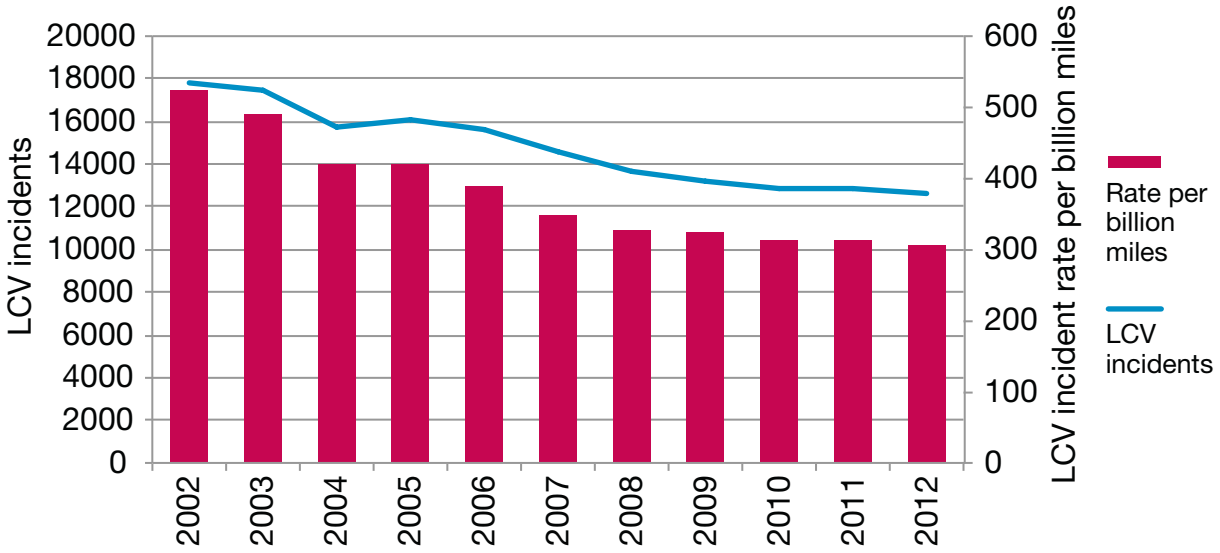
2.2.2 LCVs and incidents

Incident data in relation to LCVs is limited (European Parliament, 2009). Available data is held in STATS19, the UK's database of reported incidents. A limitation of STATS19 is that it only holds details on incidents that were reported to the police.

In Great Britain there were 12,575 reported incidents involving LCVs in 2012. This figure represents 5% of all reported road traffic incidents in Great Britain (while making up 14% of traffic). Many of these incidents occur in major urban areas of Great Britain.

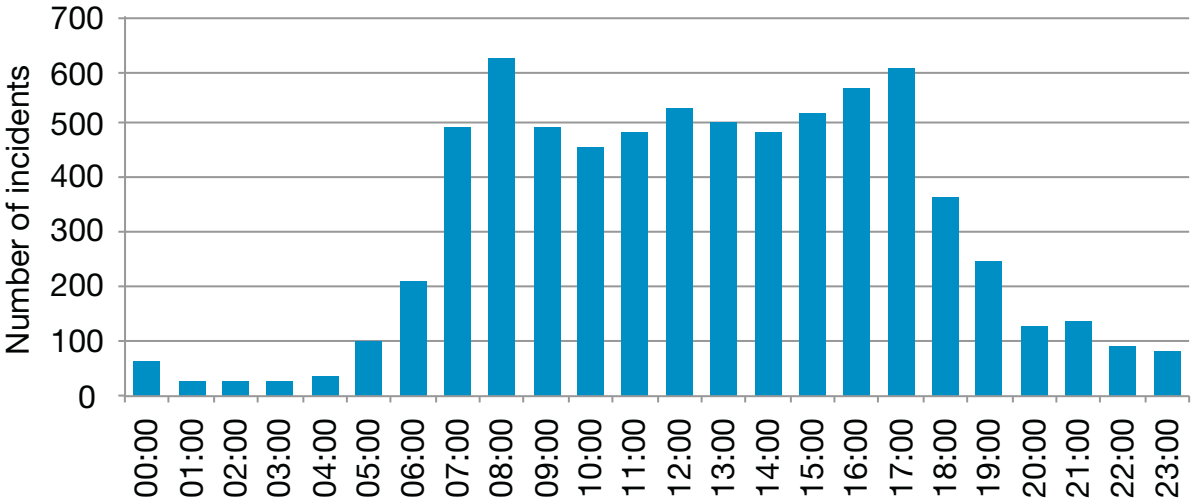
Figure 2.11 shows that the number of incidents involving LCVs has reduced both in number (down 29%) and the rate per billion miles driven (down 42%), despite the number of LCVs registered increasing over the same period (up 29%).

Figure 2.11: LCV incidents 2002–12



Source: DfT (2013e)

Figure 2.12: LCV incidents by time of day



Source: STATS19 (2013)

Figure 2.12 shows that the majority of incidents (77%) occur between 8 a.m. and 6 p.m. This would be expected as LCVs are most active during the morning and afternoon peaks, which coincide with peak traffic movements. A logical conclusion of this is that as traffic on the roads increases, so does the number of incidents involving LCVs. It would be interesting to undertake further research to see whether LCV incident rates differ from those for cars and HGVs.

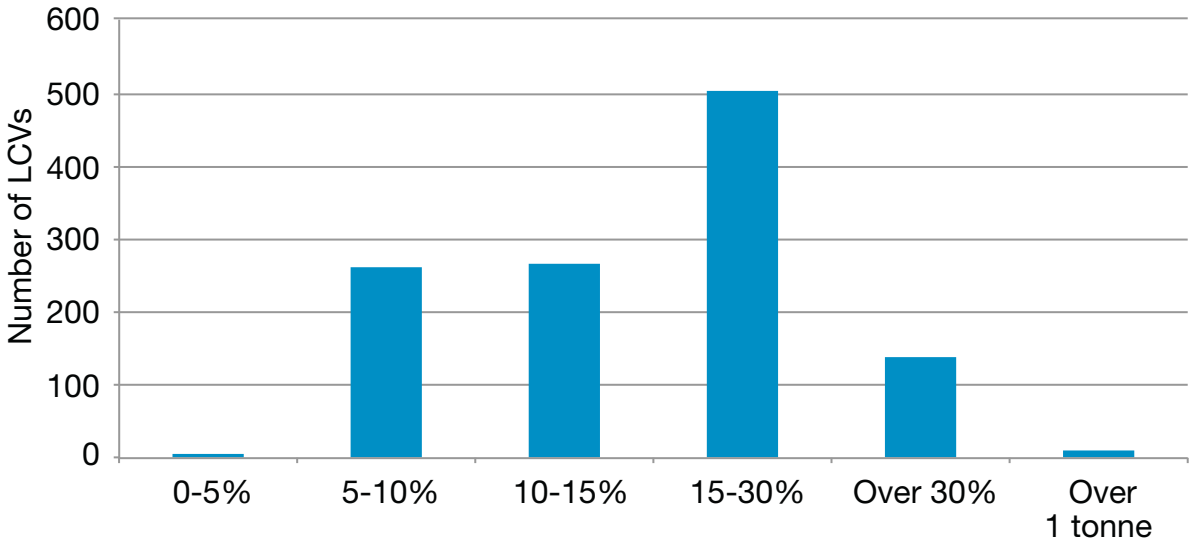
2.2.3 Weight limits

LCV overloading is a particular concern, possibly caused by the lack of regulatory controls and low cost of entry to LCV operations (TfL, 2007). Roadside checks show that LCVs are regularly overloaded (CfIT, 2010). Official data suggests that a concerning proportion of LCVs are not well maintained and are operated when overloaded. These can be important factors in accident involvement (Poznan School of Logistics, 2010).

The Vehicle and Operator Services Agency (VOSA) operates a targeted approach to vehicle enforcement including checking vehicle weights. Compared with the number of LCVs operating in Great Britain, less than one in 1,000 were pulled over for checking in 2011–12. Significantly, of the 2,177 LCVs VOSA pulled over for weighing, 89% were overweight. It should be noted, however, that these figures are skewed because VOSA targeted overweight vehicles through observation, and these vehicles are not particularly hard to spot. The same could be true of other enforcement statistics of this type as vehicles in good condition are stopped less frequently than those in poor condition.

Section 2.5.6 later on in this report discusses LCV use in greater detail. As the sample size is less than 0.1% of the UK LCV population, reliable statistics on the full extent of the use of overweight LCVs are limited.

Figure 2.13: Degree of overweight LCVs



Source: VOSA (2011)

Figure 2.13 shows the degree of overweight LCVs; that is, how overweight the LCVs were compared with the VOSA sample discussed above. It can be seen that 42% of LCVs are in the 15–30% overweight category. Few LCVs are more than 1 tonne overweight, which for an LCV is extremely overweight, given that 1 tonne is 29% of the heaviest LCVs' weight at 3.5t.

Overweight vehicles are a hazard as vehicle manufacturers design the vehicle to respond within set parameters; for example, braking performance. Overweight vehicles are less responsive, and basic physics means they will have a much longer stopping distance. Additionally, overweight vehicles will cause more than normal wear and tear on mechanical parts within the vehicle as well as the road surface. Statistics produced by VOSA confirm this; the first-time MOT failure rate for LCVs has been around 50% for the past three years. By comparison, the initial fail rate for cars is 40%. The most common defects that resulted in LCV MOT failures were faulty lights, steering, brakes and suspension (VOSA, 2011).

2.2.4 Drivers' hours

Only 44% of LCV owners have some or extensive knowledge of the GB domestic rules on drivers' hours relating to LCVs 3.5t or below, and 24% have no knowledge (DfT, 2008a). The domestic rules apply to drivers on journeys within the UK who are exempt or excluded from the EU rules, which is all LCV drivers, as their vehicles weigh under the 3.5t maximum gross vehicle weight.

The domestic driver's hours are as follows:

- In any working day (24 hours from the start of duty) the maximum amount of driving is 10 hours.
- In any working day (24 hours from the start of duty) the maximum amount of duty is 11 hours. For employee drivers, duty means being on duty (whether driving or otherwise) for anyone who employs him/her as a driver, including all periods of work and driving including rest and breaks. For self-employed drivers, duty means driving a vehicle connected to their business, or doing any other work connected with the vehicle and its load.
- A tachograph measures the amount of driving that has been conducted, but as LCVs weigh less than the 3.5t maximum gross vehicle weight, they are not required to be fitted with an EU-type approved tachograph. As such, proving that an LCV driver has exceeded domestic rules on drivers' hours is difficult.

2.2.5 Enforcement

The negative effects of non-compliance with the various procedures and regulations mentioned above are being increasingly felt by operators. VOSA is concentrating its efforts on dealing with this problem and encouraging all LCV drivers to take a 30-minute rest for every 4.5 hours of driving, which is in line with the Great Britain domestic drivers' hours rules. VOSA has reported

that half the 10,000 LCVs it stops each year are found to have serious roadworthiness defects – and many of those are overloaded (VOSA, 2013).

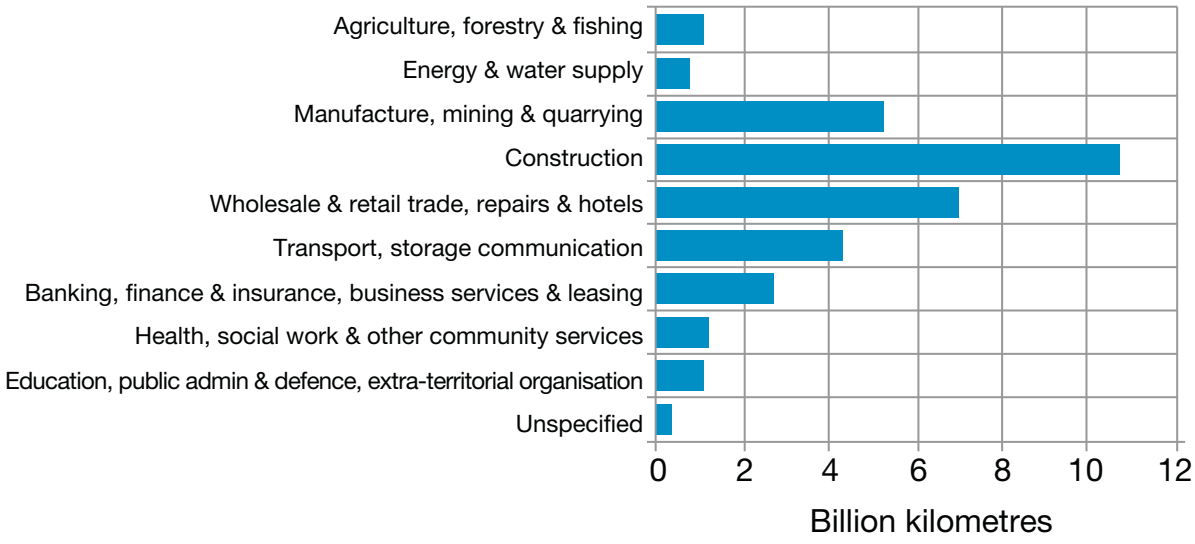
LCV drivers found to be in breach of the regulations can be faced with a vehicle use ban (where serious mechanical defects, overloading and drivers' hours offences are detected), fixed penalties and on-the-spot fines (for non-UK resident offenders). VOSA has produced a best practice guide which provides advice for drivers and operators on how to keep their vehicles roadworthy and abide by the law.

2.3 Who uses LCVs?

2.3.1 LCV owners and users

Research undertaken for the Survey of Company-Owned LCVs for the period from 2003 to 2005 explored the estimated vehicle kilometres by type of business undertaken. It was found that one third of all LCVs were used in the construction sector. In comparison, one fifth of LCV use is within the retail and wholesale sectors. The results of this study are shown in Figure 2.14.

Figure 2.14: Estimated vehicle kilometres by type of business LCVs undertake: Annual average 2003–5

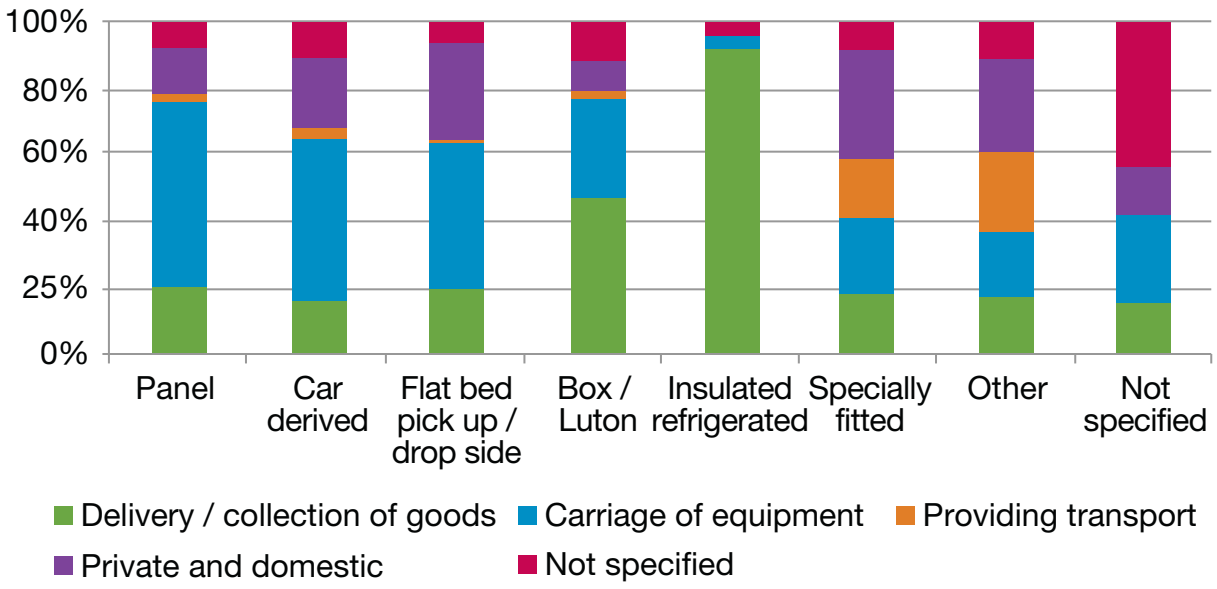


Source: DfT (2008b)

The results concur with the findings of the LCV Activity Baseline Survey (DfT, 2008a). The graph shows that the construction sector used the greatest proportion of LCVs and accounted for 31% of vehicle kilometres, while the wholesale and retail sector were the next greatest user with 20%. Within the LCV Activity Baseline Survey, construction would have been classified as the carriage of equipment, tools and/or materials to provide a service, and the wholesale and retail trade would have been classified as the 'delivery/collection of goods'.

Figure 2.15 gives a strong indication of the primary use of LCVs on Britain's roads. Carriage of equipment, which ranges from equipment used within the utility and construction sectors to sole traders such as plumbers and electricians operating within the building sector, is the most common use of LCVs. Delivering goods, home deliveries, mail and courier services is the second most common usage for LCVs, and this usage is predominantly undertaken by larger box/Luton-style LCVs.

Figure 2.15: Percentage of light goods vehicles by body type and primary use



Source: DfT (2008a)

2.3.2 LCV activity by ownership

There are a number of factors likely to be partly responsible for the growth in size of the LCV fleet and the total vehicle kilometres it travels in Britain in recent years (University of Westminster, 2007a).

In terms of transporting goods, the following reasons are likely to have encouraged the use of LCVs:

- A reduction in stockholding levels and movement toward a just-in-time distribution system has led to a reduction in delivery quantity and therefore encourages the use of LCVs.
- An increase in time-critical deliveries; in the parcel sector, the demand for faster services has resulted in greater use of LCVs.
- A shortage of HGV drivers and changes in driving licence legislation requiring HGV drivers to pass additional tests means companies are finding it increasingly difficult to recruit HGV drivers, so some are opting to use LCVs instead, which can be driven on standard car driving licences.

- Additional licensing restrictions placed upon drivers since January 1997 when category C1 entitlement was no longer automatic when passing a B category test, thus allowing vehicles up to 7500kg to be driven.
- An increase in operating restrictions on HGVs in urban areas may have an effect on companies' vehicle selection policies. LCVs would therefore be selected as a means of circumventing HGV restrictions to continue business.
- The growth of home delivery through an increase in the popularity of home shopping. The majority of these deliveries are made by LCVs which are ideally suited to the products bought and the residential driving conditions.
- A growth in the number of households. Causes for this include a reduction in the average household size, people living longer, changes in family composition, net immigration and more people choosing to live alone. All these factors result in more households being required and hence more delivery addresses for home deliveries, which are typically made by LCVs.
- An increase in value density, especially of consumer goods, emphasises the use of LCVs at the end of the supply chain.
- Operating vehicles in the 3501–7500kg weight bracket under the constraints and requirements of the current operator licensing system has resulted in increased costs and forced operators to use smaller vehicles.

In terms of service operations, the following factors are likely to result in an increase in LCV use:

- Outsourcing service functions to specialist companies has increased and this has tended to result in a range of services provided to buildings and homes that require vehicle trips.
- An increase in rapid response servicing such as boiler or computer repairs has resulted in increases in LCV trips made to rectify such problems.
- The development and use of more technological and communications equipment requires installation, servicing and repairs. These sectors primarily use LCVs for their engineers and servicing staff.
- A growth in the number of households has led to more trips to meet servicing needs, many of which will take place in LCVs.

Table 2.6: Use by mileage for LCV by ownership type

Ownership	Share of mileage
Private	16%
Business	66%
Hire/Lease	18%

Source: DfT (2008a)

Use by mileage is shown in Table 2.6. Sixty-six per cent of total LCV mileage is undertaken by LCVs owned by businesses, with privately owned LCVs only doing 16% of the mileage. 'Private' means that the LCV is owned by a private individual.

2.3.3 LCVs and employment

Office of National Statistics data showed that an estimated 187,000 people (ONS, 2004) in the UK would describe themselves as dedicated LCV drivers (Lang and Rehm, 2006), despite over 2.8 million LCVs being registered in the UK at that time. This is less than 7% of all possible LCV drivers (assuming one LCV driver per LCV). This suggests that many LCV drivers consider the actual driving of the LCV a secondary consideration. In the same survey, 314,000 people in the UK described themselves as truck drivers, with 506,000 HGVs registered in the UK. This is 62% of all possible HGV drivers (assuming one HGV driver per HGV). Approximately 90% of these LCV drivers are employees, and 10% are self-employed (University of Westminster, 2007).

2.3.4 LCV fleet size

LCV owners can range from one-man bands operating small fleets (i.e. one to three LCVs) to hire companies operating fleets of 65,000 LCVs. Although the number of LCVs in the UK is known, how these LCVs are organised into fleets

is not so well known. Unlike HGVs, LCVs do not have to be organised into fleets, and as such VOSA does not know the number and sizes of LCV fleets. Furthermore, the segmentation of the LCV sector means that there are likely to be a high number of LCVs in single ownership, particularly in the service sector, such as those used by plumbers and electricians. Transport for London's Fleet Operator Recognition Scheme (FORS) programme holds information on the fleet sizes of its participants.

Table 2.7: Fleet sizes of FORS operators that operate LCVs

LCV fleet size	FORS operators	Number of LCVs in this fleet category
1	458	458
2 to 5	823	2,601
6 to 10	263	2,007
11 to 20	214	3,213
21 to 50	151	4,777
51 to 100	58	4,064
101+	76	60,472
Total	**2**	**77,592**

Source: Fleet Operator Recognition Scheme (2013)

Table 2.7 shows that 22% of FORS operators only operate one LCV, and 63% operate five or less. However, this only represents 4% of the total number of LCVs registered.

2.3.5 LCV purchasing decisions

The cost of purchasing an LCV varies depending on its capability and business purpose. An indicative cost of a new 3.5t panel LCV is £25,000 (Commercial Motor Magazine, 2012). The cost of a second-hand LCV will vary significantly more because of factors such as miles driven, age and the general status of the vehicle. Thus the price of second-hand 3.5t panel LCVs can range from £1,000 to £21,500 (plus VAT if applicable) (Auto Trader, 2012).

LCVs are driving growth in new registrations of commercial vehicles. The number of newly registered LCVs is predicted to increase year on year to 8% by 2015 (Key Note, 2011). Growth in the commercial vehicle market is significantly dependent on economic conditions. In the short term, economic uncertainty may continue to be a problem; however, forecasts in the medium to long term suggest the commercial vehicle market in the UK should grow modestly, with LCV growth higher than HGV growth.

LCVs are the dominant commercial market sector, accounting for 82% of new registrations in 2010. The number of LCVs on Britain's roads has continuously increased (except during 2009).

Smaller businesses are likely to make individual purchases of LCVs, while larger businesses will take larger orders to update a fleet.

Fifty-three per cent of LCVs were purchased second-hand with 46% purchased new (DfT, 2008a). Eighty-six per cent of privately purchased LCVs were purchased second-hand. The majority of new sales of LCVs are to fleet buyers (CfIT, 2010), with 94% of hire/lease LCVs purchased new (DfT, 2008a). Business-owned LCVs were split 50/50 between first and second-hand. This could be because businesses can raise finance to buy new LCVs. Second-hand LCVs are cheaper than brand-new equivalent LCVs and so might be more affordable for private individuals.

2.3.6 LCV operating costs

Fuel bills for LCVs are around a third of all annualised operating costs. Annual fuel costs for a typical delivery LCV range from £1,800 to £3,600 depending on size, use and type of LCV (Transport and Environment, 2012).

According to an online salary checker, an LCV driver earns on average £16,662 per year (Total Jobs, 2013). Vehicle Excise Duty for LCVs depends on the age of the LCV and its engine type or CO2 emissions because of EU legislation. However, before 2001, tax bands were based on engine size, which is the same for cars. Typically, van tax can range from £135 to £1,030 per year (DVLA, 2012). Other costs that an LCV operator can expect to incur are MOT testing, maintenance and potential back-office costs. Not all LCVs incur back-office costs because they generally do not need the support of active transport management such as dedicated route planning.

2.4 The composition of the LCV market

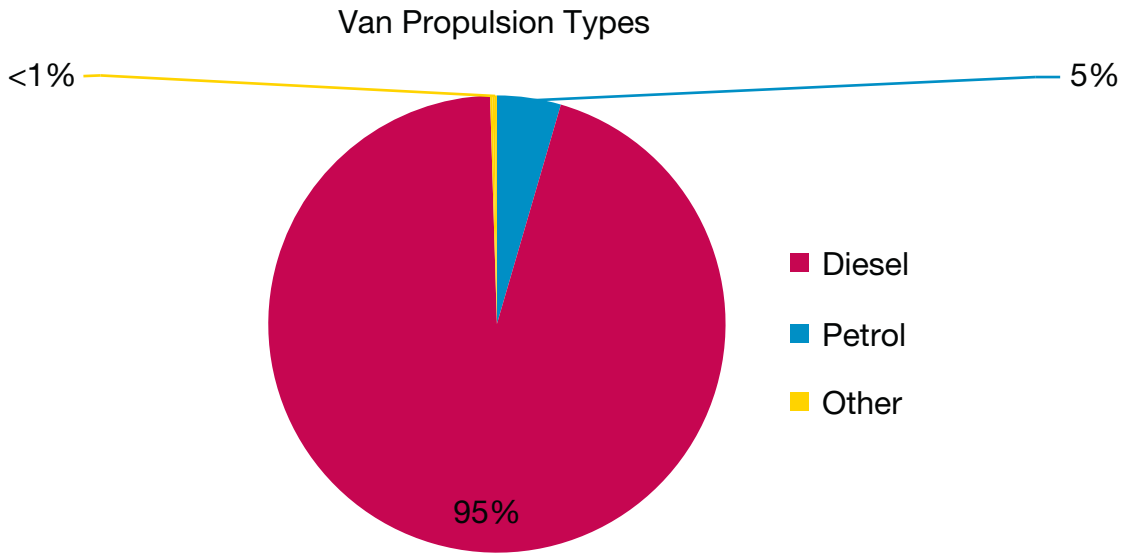
2.4.1 LCV age

The average age of an LCV in Great Britain was 7.6 years in 2011 (DfT, 2011c). This steadily declined between 2000 and 2007, but has risen in recent years, possibly because of the economic climate. Forty-one per cent of LCVs are between 6 and 13 years old. The fact that some LCV users have long LCV replacement cycles and LCVs are kept much longer than other commercial vehicles means that it will be a long time before new technology becomes established within the market. A buyer of a new LCV typically keeps the vehicle for about 5 years (Transport and Environment, 2012).

The renewal of the urban freight fleet is generally slower than the non-urban freight fleet (World Bank, 2009). Some users have long LCV replacement cycles, and those LCVs that are kept the longest are likely to be those registered to private individuals (CfIT, 2010).

2.4.2 Propulsion types of LCVs registered

Figure 2.16: LCV propulsion types, DfT (2013), AECOM analysis



Source: DfT (2013f)

Figure 2.16 shows the propulsion type of LCVs registered in Great Britain. It shows that the overwhelming majority of LCVs (95%) are diesel-powered and there is little alternative. Much of the remainder are petrol LCVs (5%). Very few LCVs are powered by alternative fuels or are hybrids. However, there have been tentative steps toward the introduction of electric-powered vehicle fleets.

The dominance of diesel-powered LCVs has been driven by the fact that diesel engines have historically been more reliable, have lasted longer and are more economical to run.

Another example of this progress is provided in the case study below, which is related to the fact that British Gas is a leader in installing electric charging points across the UK. They have installed more than 1,000 of the 7,000 already in place in the UK, 80% of which are at commercial or public premises.

Ashwoods develops hybrid technology for LCVs

Ashwoods Automotive have developed a hybrid drivetrain which is fitted into Ford Transits, and now they have developed an in-cab training device called 'Lightfoot'. Islington Council runs a fleet of 37 Ashwood hybrid Transits and it is claimed these vehicles will save 33 tonnes of CO_2 and £48,000 over 3 years.

What Van, 2014

British Gas trials UK's largest electric CV fleet

News from Nissan: British Gas is piloting 28 Nissan e-NV200 LCVs throughout winter to determine the future viability of 100% electric vehicle technology as part of its 13,000 home service LCV fleet. A collaboration with Hitachi Capital Commercial Vehicle Solutions and Gateshead College, the pilot will see the four strategic partners working together during this testing period.

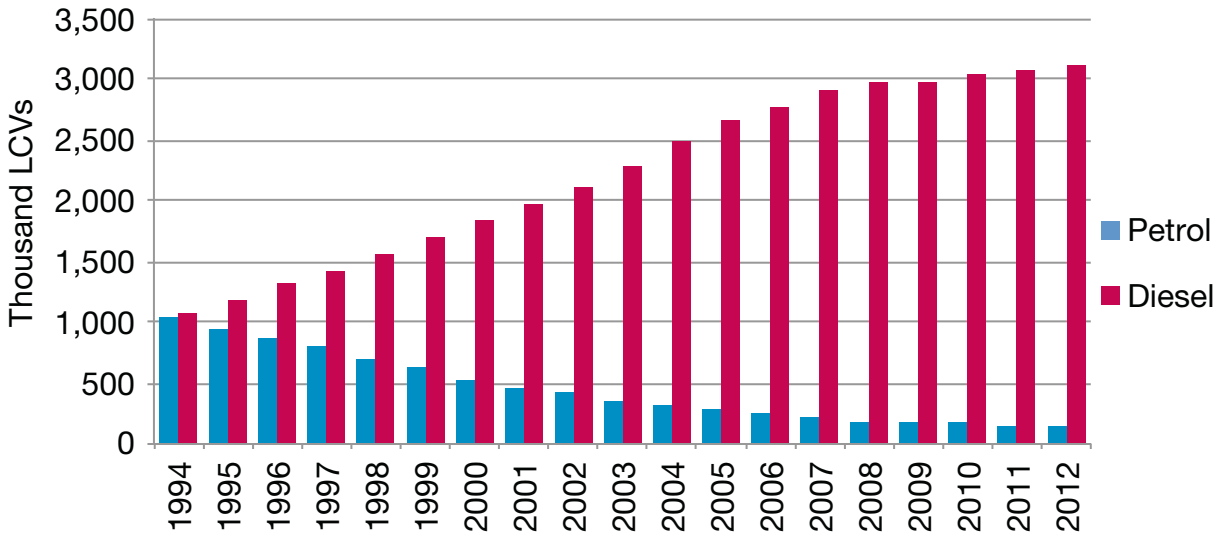
The pilot of the Nissan e-NV200s is being conducted nationwide to assess how the LCVs perform in winter conditions during the company's typical daily usage pattern.

Available on forecourts next year, the Nissan e-NV200 is a breakthrough zero-emission compact LCV that promises a dramatic reduction in running costs while also helping the environment by bringing CO2 emissions down to zero at the point of use. As British Gas home services engineers operate within a defined zone, the Nissan e-NV200 can easily operate within a British Gas engineer's daily usage pattern.

28 November 2013, source, edie newsroom

In addition, Transport for London announced in December 2013 (Transport News Brief, 2013) that they have selected the company IER to drive forward its recharging infrastructure with the aim of more than tripling the number of charge points by 2018. The number will rise from 1,400 to 6,000, but early reports suggest that the registrations of electric LCVs have been slow off the mark as fleet managers take time to assess the long-term cost benefits of operating electric vehicles.

Figure 2.17: Diesel and petrol-fuelled LCVs 1994–2012



Source: DfT (2013f)

Figure 2.17 shows how the number of diesel-fuelled LCVs has increased at the expense of petrol since 1994 when there was almost parity between the two propulsion types. This increase may have been driven by the fact that diesel-powered engines have been historically more reliable, have lasted longer and have cost less to run.

2.4.3 Air quality issues

LCVs account for 8% of all road transport emissions (Transport and Environment, 2012). Despite being smaller and lighter compared with HGVs, LCVs are far less efficient in terms of fuel consumption and emissions per unit of freight transported (Poznan School of Logistics, 2010). Diesel is significantly more polluting and damaging to health than petrol according to research by the Department for Environment, Food and Rural Affairs (Defra) (2011), which shows that related air pollution contributes to lung disease, heart attacks, asthma and other respiratory problems. Given that 95% of LCVs registered in Great Britain are diesel-fuelled, it is not surprising that LCVs' contribution toward pollution is so high. This is particularly a problem in towns and cities where air pollution is concentrated. Petrol cars with catalysts still produce more carbon monoxide (CO) and hydrocarbons (HC) than diesel cars, but exhaust emissions of nitrogen oxide (NOx), sulphur oxide (SOx) and particulates are much lower than diesel cars. It is well documented that both NOx and SOx are causes of acid rain when combined with water vapour in the atmosphere, which damages crops and forests when it falls back to earth.

By way of example, a Euro 4 diesel car emits around 22 times as much particulate matter as the equivalent petrol car (Edie, 2013).

Table 2.8: Average emissions per kilometre of diesel and petrol LCVs

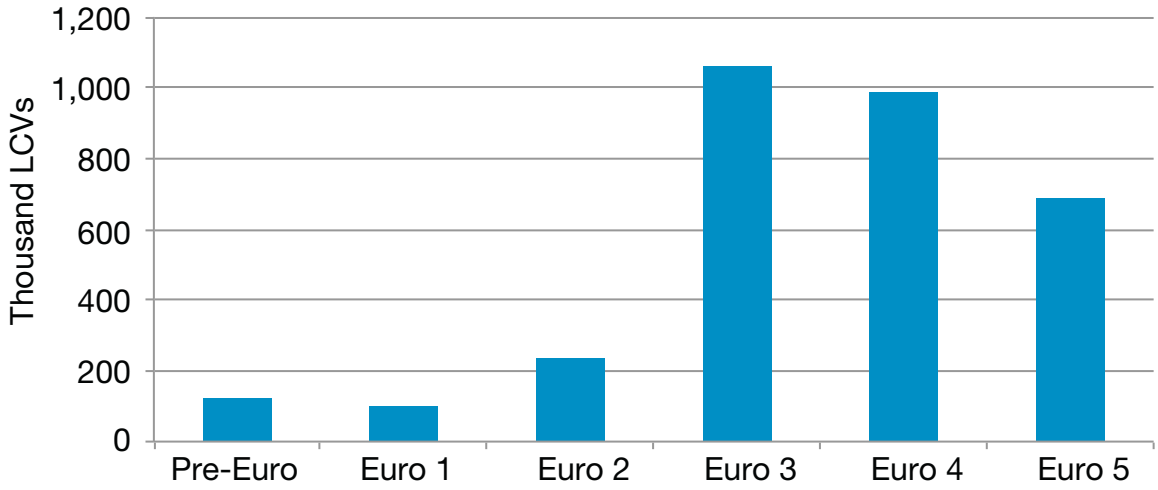
	Carbon Monoxide	Hydrocarbons	Oxides of Nitrogen	Particulates	Carbon Dioxide
Euro 3 Diesel LCV	2	6	42	25	95
Euro 3 Petrol LCV	4	2	4	1	86

Source: DfT (2013g)

Table 2.8 shows the average emissions per kilometre of diesel and petrol LCVs. It illustrates that a diesel LCV emits much more NOx and particulates per kilometre than an equivalent petrol LCV. Note that the values displayed in Table 2.8 are not the actual amount of emissions, but rather an indexed value against a baseline value.

LCVs are one of the fastest-growing sources of transport GHG emissions, increasing by 26% between 1995 and 2010 (Transport & Environment, 2012).

Figure 2.18: Euro engine standards of registered vans



Source: DfT (2013c)

Figure 2.18 shows that the majority (86%) of LCVs registered are of Euro 3 standard or better. The graph also outlines that 4% of LCVs have engines that predate the Euro Engine Standard regulations, and it is these engines that are the most polluting.

2.5 Differences in LCV use (region, person type, business type, trip type)

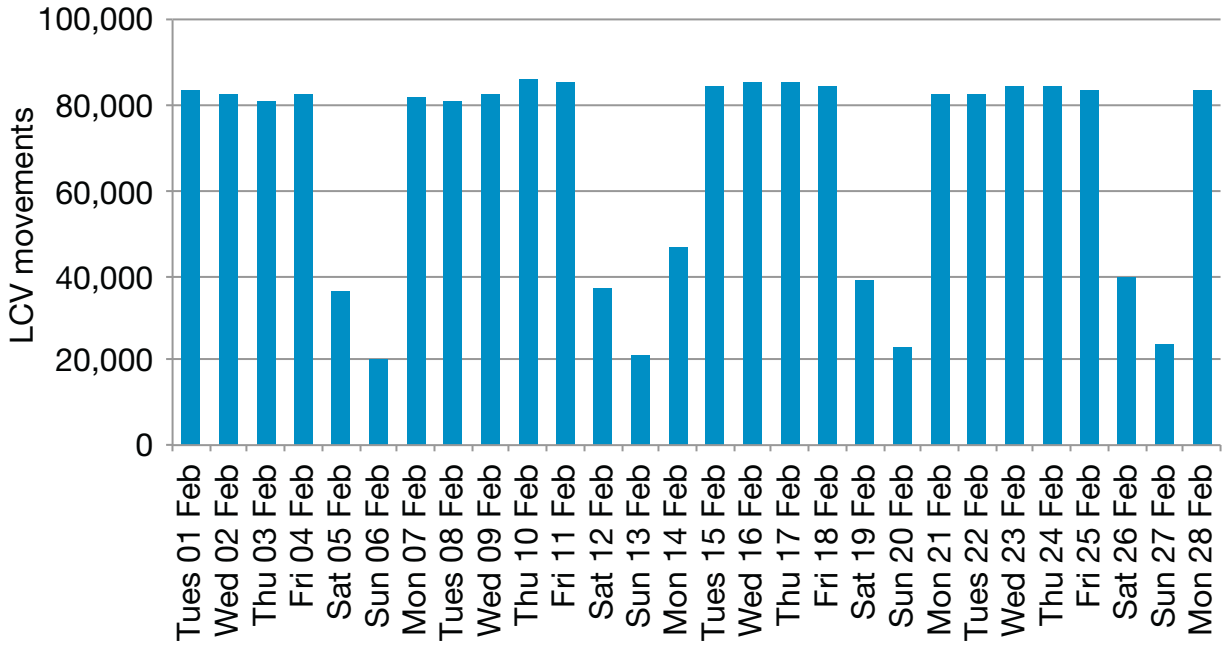
2.5.1 Origins and destinations of LCVs

Knowing the origins and destinations of LCVs in Great Britain helps build a picture of what LCVs are doing. In the case of privately registered LCVs, the majority of these LCVs will start their day at the registered address, which is likely to be a place of residence. In the case of business-registered LCVs, a proportion of these will start their day at the registered address such as a transport yard whereas others will start at the residence of the LCV driver.

Some LCVs, particularly in the collection and delivery sector, will make multiple visits to multiple destinations whereas other LCVs, such as those in the service sector, will make one trip per day and sometimes several trips to the same destination over a period of days.

AECOM received data from Transport for London's Congestion Charge team. This data was captured from cameras within London's Congestion Charge Zone which is located in Central London. The whole month of February (2011) was analysed. The data provided information on vehicle types, and whether the vehicle entered or exited the Congestion Charge Zone. The data included multiple movements of the same vehicle.

Figure 2.19: Daily total LCV movements in and out of the Congestion Charge Zone, February 2011



Source: Transport for London (2012)

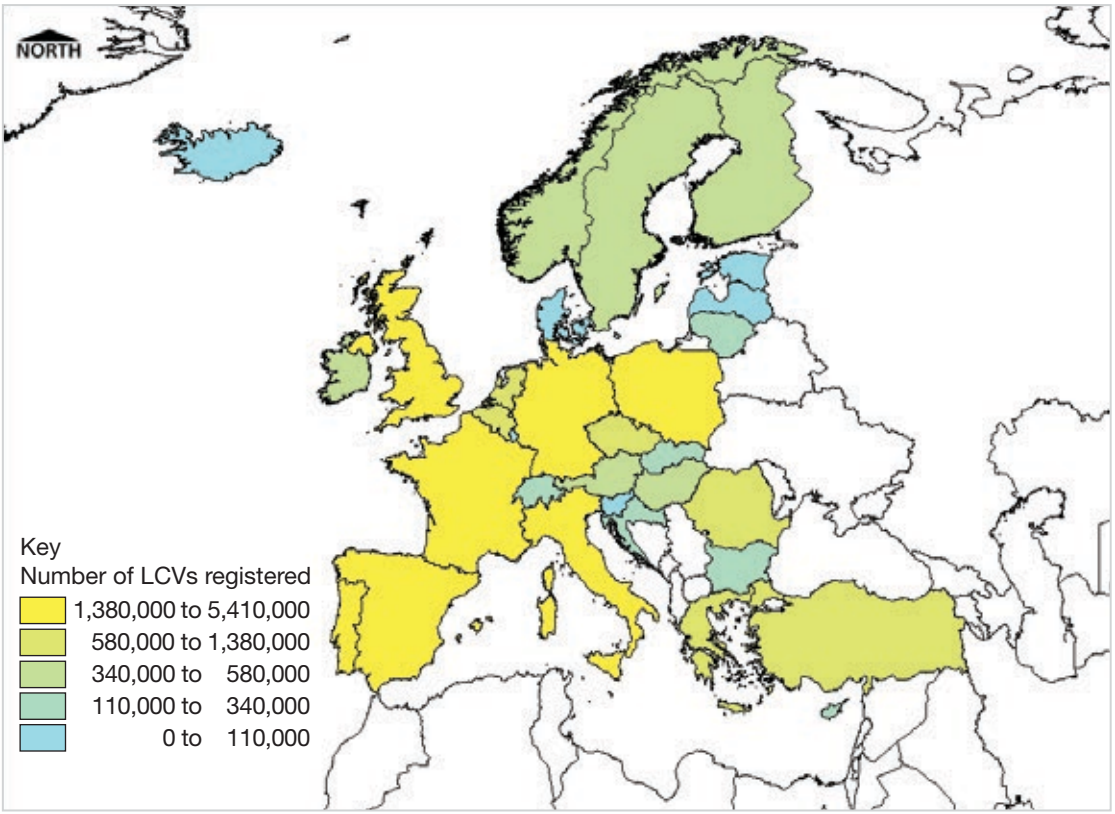
Figure 2.19 shows that weekday LCV traffic coming in and out of the congestion charge zone is fairly constant from one day to the next, and indeed across the month. The number of LCV movements on a Saturday is about half that of a weekday, and the number of movements on a Sunday is about half as much again.

Although this data has been taken from the London congestion zone, it is likely that other cities would show similar data, i.e. there will still be shops that need supplying and construction sites that need building etc.

2.5.2 LCVs in and around Europe

There are over 32.2 million LCVs registered in the EU, representing 12% of the total vehicle stock. France, Spain and Italy have more registered LCVs than the UK.

Figure 2.20: LCV ownership throughout Europe



Source: Eurostat (2013)

Figure 2.20 shows the distribution of LCVs throughout Europe. The majority of LCVs are registered in the richer and more populous countries in Europe.

Selecting a few countries and comparing LCV ownership with population produces the following table:

Table 2.9: LCVs per capita

Country	LCVs[1]	Population	LCVs per capita
UK	3,576,452	63,495,351	0.06
France	5,405,456	65,327,724	0.08
Germany	2,528,656	81,843,743	0.03
Spain	5,060,791	46,818,219	0.11
Italy	4,022,129	60,820,696	0.07

Source: Eurostat (2013)

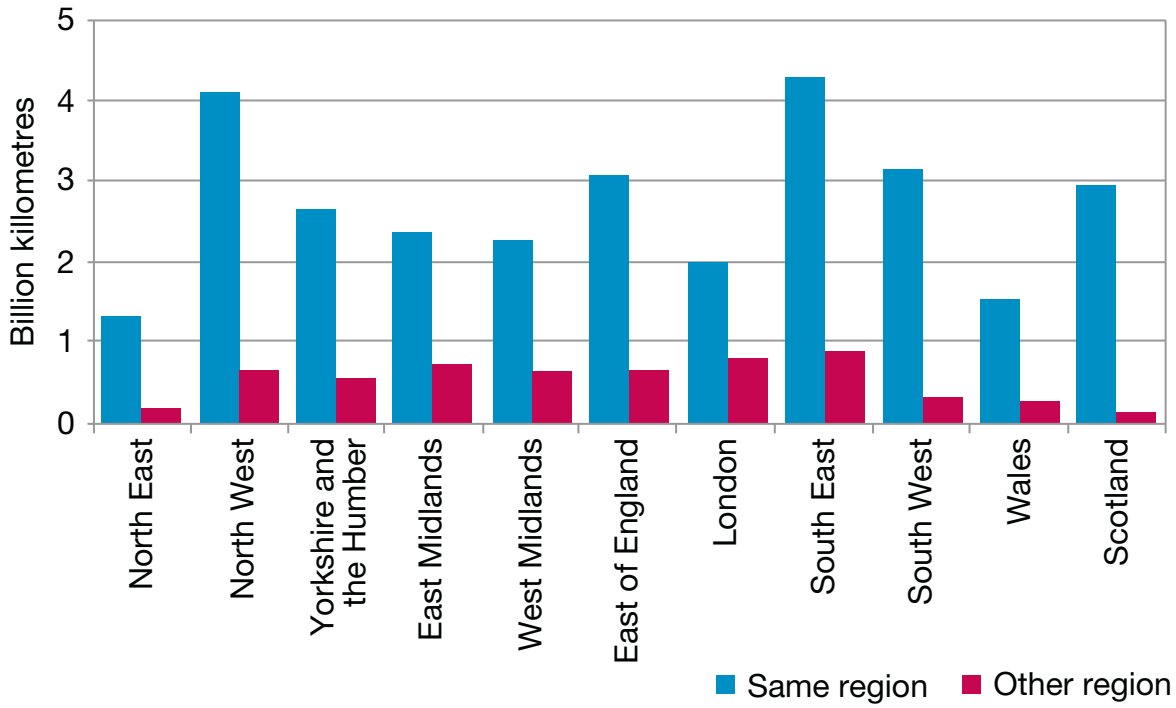
Table 2.9 details LCVs per capita. Germany has the lowest ratio due in part to its large population, as well as having a low number of LCVs in comparison to the other nations. Conversely, Spain has a smaller population than the UK yet more LCVs, hence its LCVs per capita ratio is much higher. The link between LCVs and population is not clear. It is likely that there are other factors influencing the number of LCVs registered in a country, such as economic, cultural or regulatory factors.

2.5.3 LCV journeys – purpose and average length

The Department for Transport Company Van Survey results show that more than 80% of distance travelled by company-owned LCVs was for trips that started and ended in the same government office region. Company-owned LCV trips starting and ending in the South East, for example, accounted for over 75% of distance travelled on all trips that start in the South East (Figure 2.21) (University of Westminster, 2007a). Also, Low Emission Zone data (TfL 2012) reveals that 44% of all vans registered in the UK visit London at least once a year.

1 Note that Eurostat considers LCVs up to 5 tonnes gross vehicle weight.

Figure 2.21: Company-owned LCVs – estimated vehicle kilometres by origin and destination 2003–5



Source: DfT (2006a)

2.5.4 LCV use by business sector

LCV drivers come from a diverse range of industries so it is helpful to compartmentalise activity into different areas. These have been derived by AECOM's expert project team. Typical LCV activity can be described as follows:

- **Employed dedicated LCV drivers** (e.g. courier drivers). In most cases, the LCV is assigned to a dedicated driver who is financially responsible for its condition. These drivers are likely to have a heavy workload and unrealistic schedules with limited breaks for rest. This can lead to safety issues and increased chances of speeding. These drivers are most likely to identify themselves as 'LCV drivers' and to have received additional driver training.
- **Employed tradesmen** (e.g. electrical engineers). For this group, driving is secondary to their actual job. The LCV is seen as a mobile work shed, used for transporting equipment to and from jobs.
- **Self-employed tradesmen** (e.g. self-employed builder). This group's working day is built around their clients' needs which could, if advanced planning is feasible, benefit from certain fuel-saving interventions.
- **Self-employed dedicated drivers** (e.g. self-employed furniture removal). The working day for this group is built around their clients' needs which could, if advanced planning is feasible, benefit from certain fuel-saving interventions.

- **People-carrying LCV drivers** (e.g. airport taxi drivers/local authorities). Typically, the people-carrying LCV is assigned to a dedicated user. The working day for this group is built around their clients' needs.

These categories of drivers represent a diverse range of activities covering freight deliveries servicing, trade and passenger-carrying activities. In addition there are recreational LCV users who have purchased LCVs for towing racing cars and carrying bikes, boats etc.

Each of these distinct groups has differing motivational stimulants and needs. A summary LCV driver profile is shown in Table 2.10.

Table 2.10: LCV driver profile

Description	Statistics		
Average age [2]	37 years	Range 18–73	Majority 30s-40s
Gender	>96% male	<4% female	
Marital status [3]	66% married	24% single	10% divorcees
Origin and destination [4]	84% of distance for journeys starting and ending in same Government Office Region	Most driving is local and urban	
Reading habits [5]	Mostly tabloid newspapers	Around 50% regularly read one or more magazines related to work, but more often linked to hobbies	
Listening habits [6]	Majority listen to independent local radio stations		
Training	Proud of certificates – testaments to abilities they have always claimed to have		

Source: AECOM (derived)

The LCV driver profile breakdown shown in Table 2.10, and also the Renault White Van Man Report, are useful means of categorising the sector. The White Van Man Report was undertaken by researchers taking to the road and interviewing the drivers themselves in their natural habitats such as filling stations, industrial estates, lay-bys, cafés and motorway service areas that lend definition to Britain's social geography.

The survey on vans in London identified LCVs being used in a number of business sectors (University of Westminster, 2007c). These businesses are involved in the following as shown in Table 2.11.

2 Renault (2005), White Van Man Report.
3 Renault (2005), White Van Man Report.
4 DfT, Survey of Company Owned LCVs for the period of 2003 to 2005.
5 Renault (2005), White Van Man Report.
6 Renault (2005), White Van Man Report.

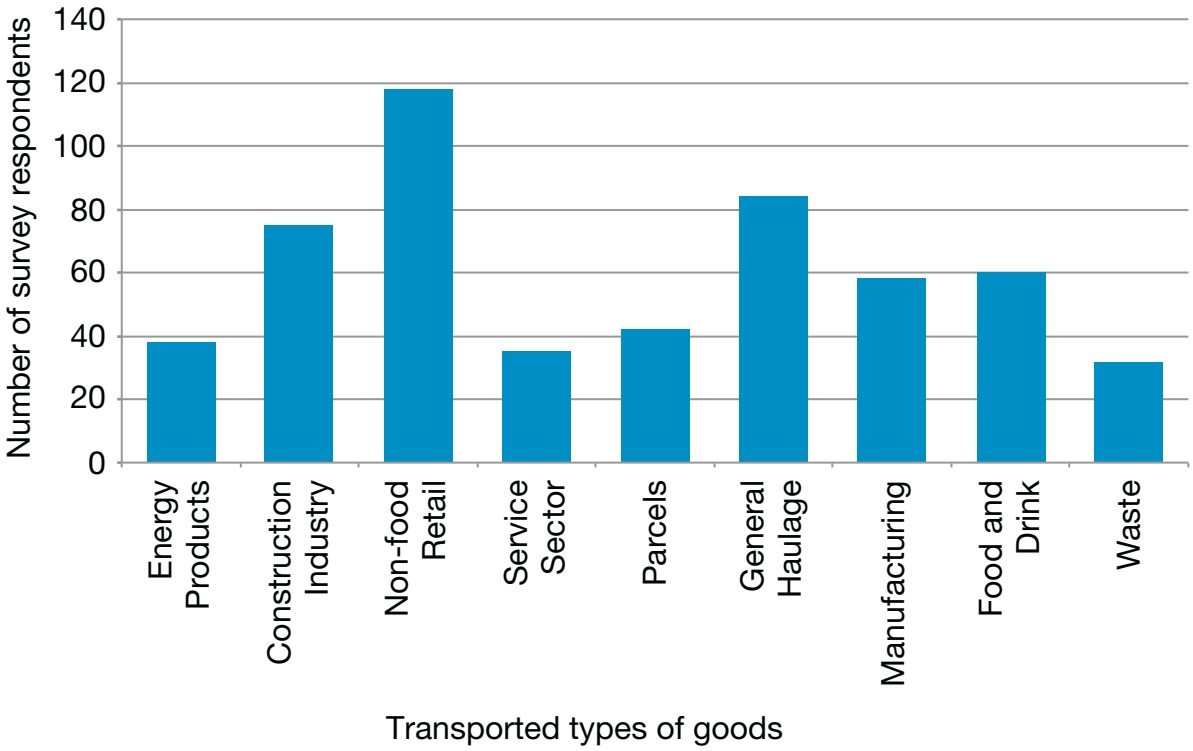
Table 2.11: Businesses using LCVs identified in surveys

Manufacturing Sector	Building Sector	Distribution Sector	Retail Sector	Service Sector
Textiles	Joinery	Parcel carriers	Paint suppliers	Drain cleaning
Metal fabrication	Plumbing and piping	News and print distributors	Carpet/flooring	Windscreen suppliers/ repairers
Paper merchants	Drain cleaning		Office furnishing	Shipping companies
	Woodworking		Floristry	Cleaning
	Welding		Bottled water supplying	Medical services
	Tiles and ceramics		Bike shop owner	Roadside assistance
	Glazing		Market trader	Vehicle/LCV hire
	Lift and escalator maintenance		Printing and graphics	Utilities
	Building contractor		Lighting and design	Catering
			Food supplying	Laundry
			Supermarkets	Charities and aid
				Storage
				Vehicle repair centres

Source: University of Westminster (2007c)

It should be noted that Table 2.11 is not exhaustive but gives an idea of the range of businesses and industries that use LCVs.

Figure 2.22: Types of goods transported by LCVs



Source: AECOM (2012)

Figure 2.22 shows that the survey respondents use their LCVs in a range of industry sectors. Non-food retail is the most populous industry sector.

2.5.5 Other industries

Construction generates the most trips and the greatest distance in Great Britain, while retail is the second-largest traffic generator for this mode (University of Westminster, 2004).

The construction industry accounts for the greatest proportion of vehicle kilometres travelled in the case of both privately owned and company-owned LCVs (accounting for approximately 50% and 30% of total vehicle kilometres travelled for business purposes, respectively). The wholesale and retail trade accounts for approximately one fifth of vehicle kilometres travelled by company LCVs (DfT, 2004a; 2006a) (University of Westminster, 2007a). While the construction industry is involved in large projects, it is also involved in many smaller jobs.

A self-employed joiner operates a panel LCV which would be used as a marketing tool to carry tools and materials to and from local jobs. As a result, the LCV would likely be clean and have aesthetic livery on the bodywork helping to promote the company and the services they provide. There may be

some short trips to the builders' merchants or hardware store for materials and parts during the day. The joiner's main concerns would be the cost of running the vehicle, the cost of repairs (especially for older vehicles) and the vehicle size with respect to access to sites and parking. Other concerns include the possibility of theft from the LCV.

The Department for Transport Company and Privately Owned Van Survey results show that the transport of tools, machinery and equipment accounted for almost 50% of all travel by company-owned LCVs and approximately 40% of all travel by privately owned LCVs (University of Westminster, 2007a).

Home shopping is growing at twice the rate of retailing as a whole, and figures released in December 2013 (ONS, 2013a) showed that this accounted for more than 11.8% of all retail sales.

Table 2.12: Summary of internet statistics for July 2013

Category	Year-on-year growth % (Value NSA)	Proportion of total sales made online
All retailing	10.7	9.5
All food	10.3	3.2
All non-food	7.0	7.8
Department stores	25.9	8.8
Textile, clothing and footwear stores	8.0	9.5
Household goods stores	-5.6	5.3
Other stores	1.2	7.3
Non-store retailing	13.9	63.7

Source: Office of National Statistics (2013b)

Table 2.12 shows that although food retailing is not the fastest-growing home-delivery channel, it is showing year-on-year growth of 10.3%. This represents an increase of 10.7% for all retailing.

Many major retailers are not fully equipped to deal with e-commerce businesses and often outsource most of their administrative and logistic activities to fully integrated express carriers. Although the figures above do not specifically state that internet sales of food are delivered to consumers' homes, it would not be unreasonable to assume that a large percentage of these would be delivered by LCVs through the supermarket's home-delivery network. Non-food retailers are also undertaking e-commerce. Thus, a greater number of LCVs are required to cope with the increased demand.

Further evidence to support this has been provided by Morrison's Supermarket, who announced that by the end of 2014 they will be capable of delivering to

more than half of all UK homes (Morrison's, 2013). Other new home-shopping methods include 'click and collect' whereby the customer picks up their internet purchases in-store, which does not necessitate an LCV journey to the home. For this reason, the precise relationship between internet sales and LCV use is interesting but currently unclear. It is likely to require further research.

It would be reasonable to assume that a company operating grocery home delivery is likely to deploy a large number of 3.5-tonne temperature-controlled box LCVs to serve an area. Delivery hours run from approximately 9 a.m. to 10 p.m., Monday to Friday, with delivery hours on a weekend slightly reduced. On an individual trip an LCV can deliver approximately 15 orders and can make up to five or six trips in a day (Michigan State University, 2004). Such LCVs would be expected to travel in the region of 20,000 miles every year.

Delivering the load on time is of upmost importance to this sector, therefore avoiding confusion between multiple drops and finding a suitable parking space are issues that must be overcome. The security of the loads is of high priority and a key concern. The LCVs' appearance and the drivers' uniform are important in this industry as the company will seek to promote their brand.

Table 2.13: The difference between traditional and e-commerce deliveries

Traditional		E-commerce
Delivery to retail stores	Consumer shopping trips	Home delivery
Large quantities	Small quantities	One-piece delivery
Boxes, crates, roll cages, etc	Plastic bags	Parcels
Homogenous loads	Heterogeneous loads	Heterogeneous loads
Large trucks (LCVs)	Passenger cars	Small trucks (LCVs)
Box van	Car-derived van	Panel van
One stop	One stop	Many stops
Transport companies and own transport	Own transport	Mostly use couriers and parcel services
Vehicle movements to and within shopping areas	Vehicle movements between shopping and residential areas	Vehicle movements to and within residential areas
No delivery failures	No delivery failures	Possibility of many delivery failures

Source: Organisation for Economic Cooperation and Development (OECD) (2003)

Trends indicate that e-commerce will lead to an increase in freight transport in terms of tonne-kilometre volume, and to greater fragmentation of consignments, particularly at the level of urban distribution (OECD, 2003). On the other hand, e-commerce can contribute to advanced distribution systems by, for example, facilitating consolidation through online bidding of transportation.

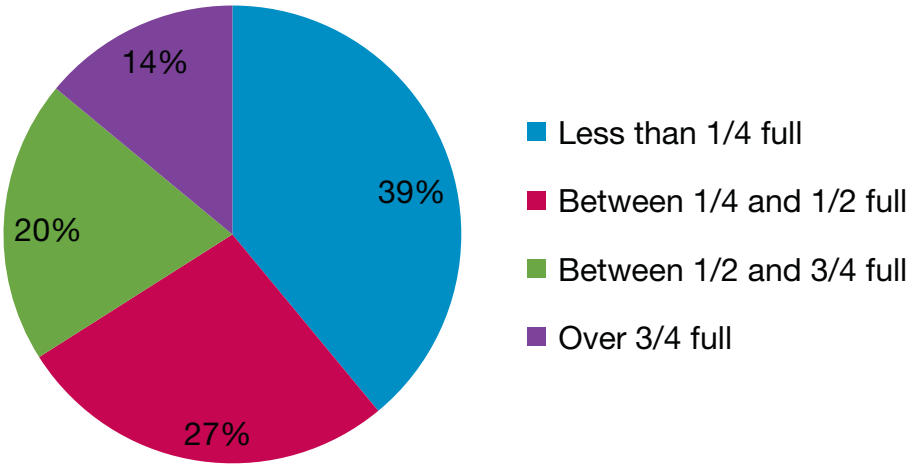
Advances in innovative logistic schemes (e-logistics and e-fleet management) can be used to consolidate transport flows both to and within urban areas. For this reason, e-commerce provides both challenges and opportunities for achieving efficient and sustainable urban goods transport systems. E-commerce-related transport services have been one of the most visible sources of innovations, with e-commerce now accounting for about 5% of retail turnover in Europe (French Institute of Science and Technology for Transport, Development and Networks, 2011).

The telecoms industry operates a large fleet of LCVs, and these are typically 3.5-tonne panel LCVs that carry equipment for multiple maintenance and connection calls. Because of multiple daily calls, their annual mileage is likely

to be around 35,000. Because of the equipment stored within the LCV, security is of primary importance and for some businesses easy access to residences is a key concern.

2.5.6 LCV use

Figure 2.23: LCV use



Source: AECOM (2007)

Figure 2.23 shows that LCV use is not uniform. Thirty-nine per cent of LCVs are poorly used, being less than a quarter full. This gives plenty of scope to improve use; however, consideration must be given to why these vehicles

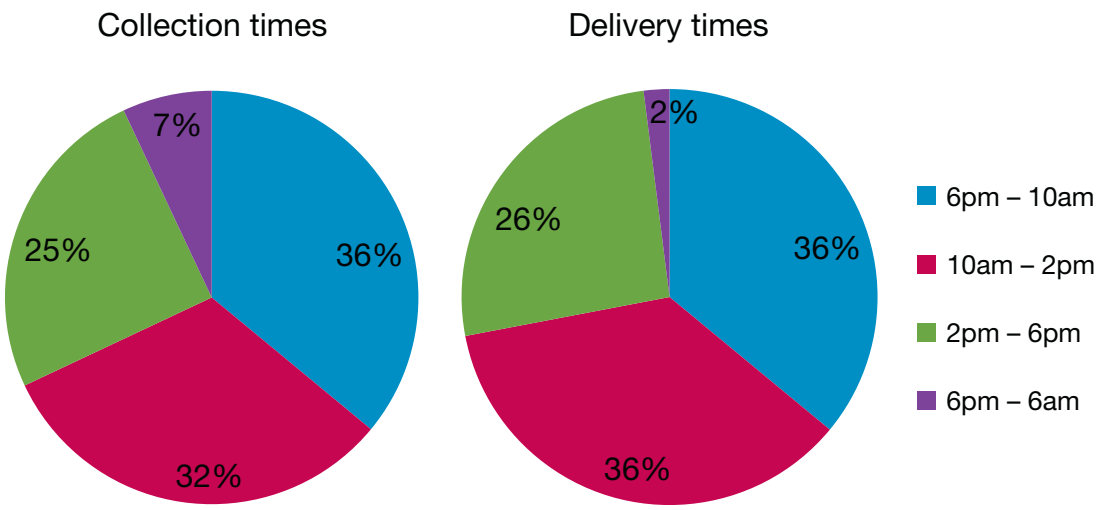
are not better used. The type of load being carried will have a significant influence on the LCV's use, and as such it may not be possible for an LCV to be 100% used.

The average loading factor for all LCVs is 38%, which equates to carrying around a 300-kg load (DfT, 2010a). It is, however, worth noting that the evidence base for this assertion could be stronger. Research has shown that carrying 300kg leads to around a 5g/km increase in CO2 emissions, relative to the emissions measured at an LCV's reference mass.

2.5.7 Collection and delivery times

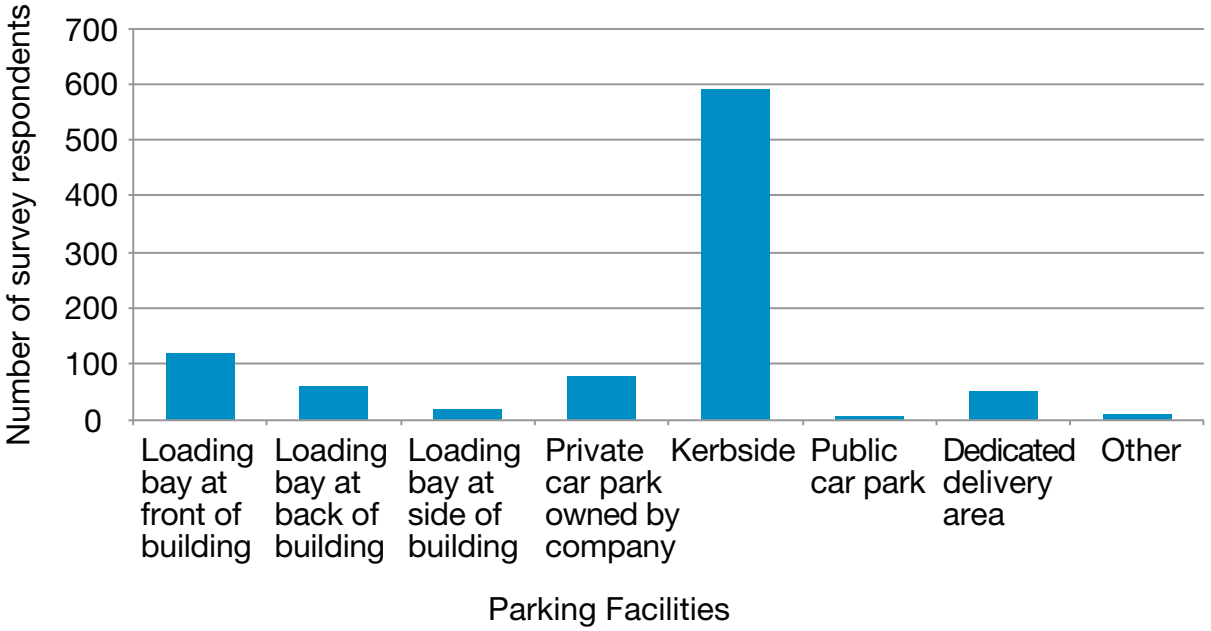
Figure 2.24 shows that a majority of deliveries and collections (70%) occur before 2 p.m. Other research has established that many collections and deliveries occur at the beginning or end of a working day, with only a limited number (5%) occurring at night. It might be asked why much of the freight activity takes place during working hours when many of the major cities in Great Britain operate on a 24-hour basis (BESTUFS (2008)). The likelihood is that collection and delivery times are stipulated by the customer. However, consideration could be given to attempting to spread LCV movements to other times in the day. Intelligent transport systems, such as the use of smart lockers, clever security systems and delivering to 'open all hours' stores, are facilitating the widening of delivery windows.

Figure 2.24: Collection and delivery times of LCVs in London



Source: AECOM (2012)

Figure 2.25: Location of collections and deliveries made by LCVs



Source: AECOM (2012)

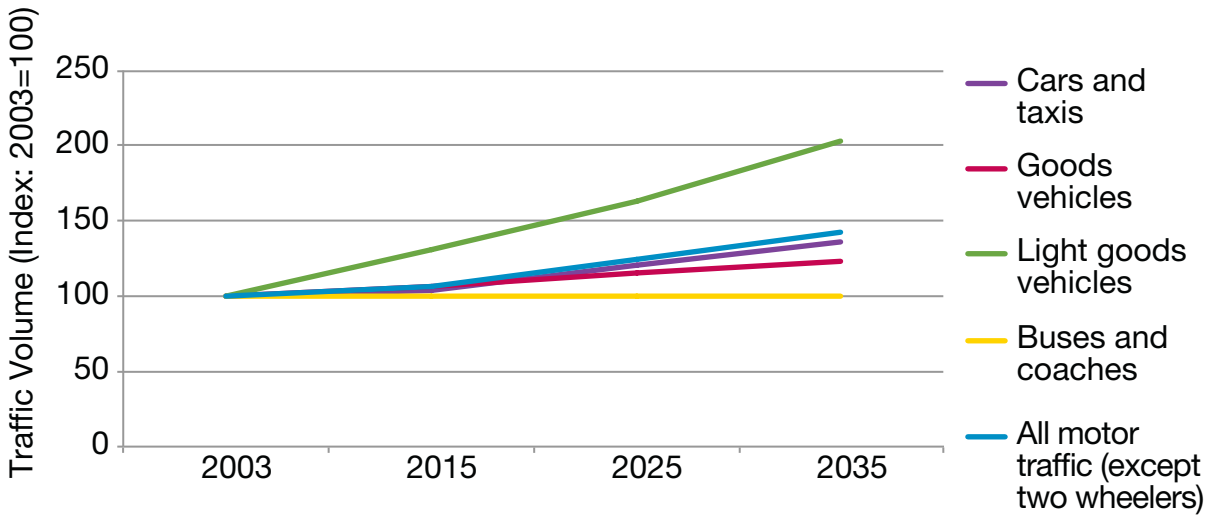
Figure 2.25 shows that when the location of these collections and deliveries is reviewed, the vast majority are made by LCVs occur at the kerbside. Drivers will use loading bays when they are provided, but on the evidence reviewed in this report, few delivery locations have any parking provision such as service areas or loading bays that are suitable for their requirements. In this instance, loading/unloading of the vehicle will take place at the kerbside, and although this may be legal, it is likely to cause either inconvenience to pedestrians by straddling the pavement or congestion by partially blocking the road. A way in which local councils tackle this issue where parking at the kerbside is not legal is by issuing a Parking Charge Notice (PCN), which is a penalty for contravening regulations. These PCNs can be administered either in person, through the post or by attachment to the windscreen, and do not result in a criminal record or points on the licence.

2.6 LCV use changes over time

2.6.1 LCV growth

The growth of freight transport is directly proportional to economic growth (Erasmus Research Institute of Management, 2008).

Figure 2.26: Forecast of Road Traffic in England



Source: DfT (2013h)

Figure 2.26 shows that LCV activity is predicted to almost double between 2010 and 2040 and that LCV activity is the fastest growing of the vehicle groups.

Reasons for growth in LCV numbers include:

- LCVs prove more useful and profitable in densely built-up areas with multiple delivery points and heterogeneous loads (Poznan School of Logistics, 2010).
- Freight demand is not very price-sensitive.
- Rapid expansion of internet shopping and home delivery (European Parliament, 2009).
- The service engineering sector has increasingly more sophisticated equipment requiring on-site service and outsourced maintenance contracts.

In addition, regulation will have an influence as with LCVs; their operation and their drivers are less heavily regulated than HGVs. For instance, a specialist driving licence and driver training is required to operate an HGV but these are not required for LCVs.

Probably the greatest driver of LCV growth, however, is the rise in home deliveries to which LCVs are better suited. Data from the British Retail Consortium (BRC) survey carried out by KPMG showed that online non-food

sales accelerated to 19.2% in December 2013, which was the fastest rate for more than 3 years. Online trade represented 18.6% of total non-food sales in December, up from 16.5% the previous year.

2.6.2 Growth in LCVs and the effect on traffic congestion

LCVs tend to carry heterogeneous loads. Individual consignments can range in size and weight from a small package to whole pallets. Studies analysed as part of the literature review have suggested that there has been a trend of LCVs replacing small HGVs. A consequence of this trend is that there is an increased demand for road space, which in turn can increase congestion.

Table 2.14: Road space required for replacing a 12t rigid HGV and a 44t articulated HGV with equivalent payload of LCVs

Vehicle class	Vehicle type	Passenger car equivalent unit (PCU value)	Maximum payload (tonnes)	Number of LCVs required	Total LCV equivalent PCU
LC	Large 3.5t	1	1.8	1	1
MGV	Rigid 12t HGV	1.5	7	4	4
HGV	Artic 44t	2.3	29.0	17	17

Source: Transport Research Laboratory (TRL) (RR67)

As can be seen in Table 2.14, replacing a rigid 12-tonne HGV with LCVs would require an additional 167% road space. Doing the same for an articulated 44-tonne HGV would require an additional 639% road space.

2.6.3 Growth in LCVs and the effect on road degradation

The NVF committee (NVF committee, 2008) details that there are a number of factors that affect road wear from heavy vehicles. The report suggests that a lower number of heavier axles will have a greater effect on road degradation than a larger number of lighter axles. This suggests that a shift from HGVs to LCVs could result in a decrease in road degradation. Other factors affecting road degradation include raised dynamic axle load loading, type of axle used, type of tyre used and type of vehicle suspension used.

2.6.4 Growth in LCVs and the effect on road safety

If the volume of traffic on the roads increases, the evidence is that the number of incidents will increase. As it would take more LCVs than HGVs to deliver the same volume of goods, and they would be operated by less qualified/skilled drivers, there could be a rise in the number of road traffic incidents. Other factors are involved in road traffic incidents, however, and while the number of incidents might be presumed to increase, the severity of these incidents could also change.

3 Conclusions

This report presents how van activity is changing and what is driving van purchase/use in Great Britain. The reasons behind recent van traffic growth and how van traffic might change in the future is also addressed.

The Light Commercial Vehicle (LCV) market and its behaviours are poorly understood when compared with Heavy Goods Vehicles (HGVs). Quite often authorities treat LCVs as the same as HGVs or cars, when they are in fact their own distinct group.

Since 1950 the LCV fleet has become much larger than the HGV fleet, and LCVs are driving growth in new registrations of commercial vehicles. This growth in the LCV fleet has continued unabated in recent years, increasing by 32% over the last 10 years. The number of LCVs in the UK now stands at 3.28 million compared with 460,600 HGVs, with LCVs currently outnumbering HGVs by 7:1.

The increase in LCV activity can be attributed to many things including, but not limited to, the increased popularity of just-in-time deliveries, the various restrictions on HGVs in urban areas (such as weight, emissions, height, width), more home deliveries resulting from the increased popularity of internet shopping and a greater difficulty of hiring HGV drivers and operating HGVs.

On average, 320,000 new vans were registered every year from 2002 to 2008. The number of new LCV registrations was found to be at the highest levels since 2008, with 22,647 registrations and 11.7% growth over the year so far accounting for 82% of all new registrations in 2010.

The link between LCVs and population is not clear and it is likely that there are other factors influencing the number of LCVs registered in a country, such as economic, cultural or regulatory factors. Over 32.2 million LCVs are registered in the EU, representing 12% of the total vehicle stock. France, Spain and Italy have more LCVs than the UK, and Germany has the lowest ratio of LCVs per capita.

The cost of purchasing an LCV varies depending on its capability and business purpose. Generally, the price of a new 3.5t panel LCV was found to be £25,000. Findings suggested that on average LCVs are being kept for around 10 years before being taken off the road, and a buyer of a new LCV typically keeps the vehicle for about 5 years. Fifty-three per cent of LCVs were found to be privately owned but more than likely used for business purposes, and 47% were commercially owned and registered in the name of a business.

The study established that fuel bills for LCVs are around a third of all annualised operating costs, and that the annual fuel costs for a typical delivery LCV ranged from £1,800 to £3,600 depending on the size and use of the LCV. Since 1994 there has been a switch to diesel propulsion and an overwhelming majority of LCVs (95%) were found to be diesel-powered, with very few being powered by alternative fuels. However, there have been tentative steps toward the introduction of electric-powered vehicle fleets and the means to charge them, with organisations such as British Gas and TfL driving this forward. Another scheme here is the Plug-in Van Grant, which has so far had little success partly because there is a lack of choice, but mainly because the vehicles are very expensive to buy.

LCVs account for 8% of all road transport emissions. This is due in part to them being far less efficient in terms of fuel consumption and emissions per unit of freight transported. Current regulations mean that new LCVs must be manufactured to Euro 5 standard. Eighty-six per cent of LCVs have a Euro 3-rated engine or better and 4% have engines that predate the Euro Engine Standard regulations, making them the most polluting.

The increasing use of LCVs as opposed to larger vehicles has had a negative impact on traffic congestion. Replacing rigid 12t HGVs with LCVs would require an additional 167% road space, and doing the same for articulated 44t HGVs would require an additional 639% road space.

The study shows that for company-owned LCVs, most travelling was spent collecting and delivering goods (35%), and for privately owned LCVs this figure was only 23%. Travelling to work is particularly significant for privately owned LCVs. This would include tradesmen. Over 1 month, LCV weekday movements were fairly constant, with the number of movements on a Saturday roughly half as much as a weekday and the number on a Sunday about half as much again.

A high proportion of collections and deliveries (70%) occurred before 2 p.m., and a limited number (5%) of these were at night. The LCVs were found to be poorly used and 39% were less than a quarter full, meaning that the average laden factor was just 38% or 300kg.

In Great Britain there were 12,575 reported incidents involving LCVs in 2012. This figure represented 5% of all reported road traffic incidents in Great Britain. Many of these incidents occurred in major urban areas between 8 a.m. and 6 p.m. However, the number of incidents involving LCVs was found to have reduced both in number (down 29%) and the rate per billion miles driven (down 42%), despite the number of LCVs registered increasing over the same period (up 29%).

In terms of safety, alarmingly only 44% of LCV owners were found to have some or extensive knowledge of the GB domestic rules on drivers' hours relating to LCVs 3.5t or less, and 24% had no knowledge. However, VOSA is concentrating its efforts on dealing with this problem and encouraging all LCV drivers to take a 30-minute rest for every 4.5 hours of driving, which is in line with the Great Britain domestic drivers' hours rules. They also reported that half the 10,000 LCVs stopped each year were found to have serious roadworthiness defects. It was highlighted that 89% of the vehicles stopped were overweight and that 50% fail their MOT first time as opposed to one in five cars.

The forecast growth in LCV activity is predicted to more than double between 2003 and 2035, and early reports suggest that this figure is on track. The rise in home deliveries to which LCVs are better suited is the main driver of this, and online non-food sales were found to have grown 17.8% between 2012 and 2013. The level of regulation surrounding the van sector is another factor to be taken into consideration as vans, their operation and their drivers are less heavily regulated than HGVs.

This report presents the most recent and readily available data on van activity. The use of vans continues to change dramatically, and is clearly an area of transport activity that warrants further research. This compendium of data provides a summary upon which further work can build.

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