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***Using official data sources to
analyse the light goods vehicle
fleet and operations in Britain***

Allen, J. and Browne, M.

***Transport Studies Group
University of Westminster
London***

***allenj@westminster.ac.uk
M.Browne@westminster.ac.uk***

www.westminster.ac.uk/transport

The logo for Green Logistics, featuring the words "GREEN" and "LOGISTICS" in a bold, green, serif font. The text is set against a background of several overlapping green squares of different sizes and shades.

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November 2008

Using official data sources to analyse the light goods vehicle fleet and operations in Britain

Report produced as part of the Green Logistics Project:
Work Module 9 (Urban Freight Transport)

Allen, J. and Browne, M.

University of Westminster

Final version

November 2008

Acknowledgement:

The research reported in this document was funded by the Engineering and Physical Science Research Council as part of the University of Westminster's contribution to the Green Logistics project. Further details of this project can be found at:

<http://www.greenlogistics.org>

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List of abbreviations

DfT	Department for Transport
EC	European Commission
gvw	gross vehicle weight
HGV	Heavy Goods Vehicle
km	Kilometres
LGV	Light Goods Vehicle
SMMT	The Society of Motor Manufacturers and Traders Ltd
VED	Vehicle Excise Duty

1. Introduction

The importance of light goods vehicles (LGVs – goods vehicles up to 3.5 tonnes gross weight) in terms of the total weight of goods that they move in Britain is relatively small compared with large rigid and articulated heavy goods vehicles (HGVs – goods vehicles over 3.5 tonnes gross vehicle weight). However, LGVs are very important for a number of reasons:

- LGVs are of ever-greater importance in terms of the final delivery of many time-critical, high value goods;
- They are also widely used in industries that provide a wide range of support services that companies, other organisations and individuals are dependant on;
- The LGV fleet is very large and growing (there are more than seven times as many LGVs, as there are HGVs licensed in Britain by taxation class – DfT, 2008a);
- In addition, the LGV fleet in Britain is growing at a faster rate than the fleet of goods vehicles over 3.5 tonnes (DfT, 2008a);
- The LGV fleet travels more than twice as many vehicle kilometres each year than the total goods vehicle fleet over 3.5 tonnes in Britain (64 billion vehicle km by LGVs in 2006 compared with 29 billion vehicle km for HGVs – DfT, 2007a);
- LGVs perform a far greater proportion of their distance travelled in urban areas than HGVs (37% of vehicle kilometres performed by LGVs were on urban roads in 2006 compared with 17% of HGV vehicle kilometres – DfT, 2007a);
- The LGV fleet consumed equivalent to 25% of the total diesel and 3% of the total petrol consumed by all motorised road transport vehicles in Britain in 2006 (DfT, 2007a).

LGVs used for delivering and/or collecting goods are often involved in the last leg of the product supply chain (i.e. to the final customer). LGVs are increasingly used to move high value, time-critical products and are commonly used in the parcels, cash-in-transit, and home delivery sectors. LGVs are also attractive to some operators due to the fact that they are subject to less regulation than vehicles over 3.5 tonnes (for example, in terms of driver legislation and the lack of need an operator licence).

LGVs used for providing services are used to transport personnel (such as engineers, maintenance staff, and a wide range of other service providers) to customers' establishments to carry out their servicing tasks as well as to carry the equipment,

tools and parts that they need in the course of their work. The use of LGVs for service tasks has increased as a result of the rise in the outsourcing of servicing by many organisations as well as increased use of equipment on many premises that requires servicing (such as computers, photocopiers, cash tills, security systems, and many other forms of sophisticated computer-controlled equipment).

LGVs have tended to receive relatively little attention in terms of either official data collection or detailed research into their activities. However, this situation has begun to change a little in the last few of years, with research carried out as part of the Review of Freight Modelling project for the Department for Transport (Allen, Browne and Wigan, 2002), the Department for Transport's Privately-owned and Company Van surveys (DfT, 2004a; DfT 2004b), survey work at Nottingham Trent University (Cooke, 2003 and 2004), work for the AA Motoring Trust as part of the Living with the Van project (AA Motoring Trust, 2006, Lang and Rehm, 2006; Land 2006), and work by Momenta for the DfT (Momenta, 2006). Browne et al. (2007) provides further discussion of the current knowledge about LGVs.

A report produced as part of this project in 2007 reviewed existing literature on the British LGV fleet, the activities of these vehicles and LGV policy-making (Browne et al., 2007). The aim of this report is to build on the earlier report by analysing in greater depth official government data on LGVs in Britain in order to provide further insight into the LGV fleet, LGV operating patterns, and taxes paid by LGV operators. Key sources of data used in producing this report include vehicle licensing data provided by the Department for Transport (DfT, 2008b), and data collected in the Department for Transport's Survey of Privately Owned Vans in 2002-3 (DfT, 2004b), and Company Van Survey from 2003-5 (DfT, 2007b).

Data analysed and presented in this report has been used in the Green Logistics project to calculate the external costs of LGV operations in Britain (Allen, Pieyck and McKinnon, 2008a) and the external costs of LGV and HGV operations in London (Allen, Pieyck and McKinnon, 2008b).

Section 2 considers the size of the LGV fleet and changes in the fleet size over time.

Section 3 provides data about the age of the LGV fleet, comparing vehicles by ownership.

Section 4 introduces an approach developed in order to segment LGVs by ownership (company- or privately-owned), gross vehicle weight, and propulsion system/vehicle fuel efficiency so that more detailed analysis of LGV fleet structure and activity patterns were possible.

Section 5 provides information about the LGV fleet by ownership (i.e. company- and privately-owned LGVs).

Section 6 presents details of LGV propulsion systems used in the British fleet.

Section 7 provides analysis of the euro engine standards of the LGV fleet by vehicle ownership, gross weight and propulsion system.

Section 8 discusses the fuel efficiency of LGVs.

Section 9 discusses the composition of the fleet by gross weight, and presents analysis of the fleet by ownership, gross vehicle weight, and propulsion system.

Section 10 considers vehicle kilometres performed by LGVs, analyses how this is distributed by LGV ownership and gross weight, and compares annual LGV vehicle kilometres with HGV vehicle kilometres.

Section 11 provides an estimation of the vehicle kilometres performed by LGVs according to ownership, gross weight and propulsion system on different road types. It explains how annual vehicle kilometres performed by LGVs can be derived from two different sources: the DfT Van Surveys (lower estimate) and DfT road traffic counts (higher estimate), and provides a breakdown of LGV distance travelled using both of these estimates.

Section 12 presents a classification system to distinguish between various “trip types” and “trip purposes” of LGVs. This helps to identify and isolate different reasons for LGV trips including goods, service and commuting trips, as well as commercial and private trips. An explanation is given as to how this classification system can be applied to DfT Van Survey data, and results of analysis are provided for vehicle kilometres, vehicle trips, and average trip lengths.

Section 13 considers LGV trip types and purposes by land use, and presents results of analysis of the DfT Company Van Survey by WSP.

Section 14 provides data about the sectors in which LGVs are used, analysing results from the Department for Transport's surveys of both privately- and company-owned LGVs.

Section 15 presents analysis of results from the Department for Transport's surveys of both privately- and company-owned LGVs concerning the types of goods and equipment transported by LGVs.

Section 16 discusses the utilisation of vehicle capacity on LGV trips, presenting analysis of the Department for Transport's survey of company-owned LGVs.

Section 17 provides a comparison of results of the Department for Transport's surveys of both privately- and company-owned LGVs with results of their HGV survey work, thereby indicating similarities and differences in the total fleet and activity of these categories of commercial vehicles.

Section 18 discusses Vehicle Excise Duty paid by LGV operators and presents an estimation of the VED paid per annum by ownership, gross weight and propulsion system.

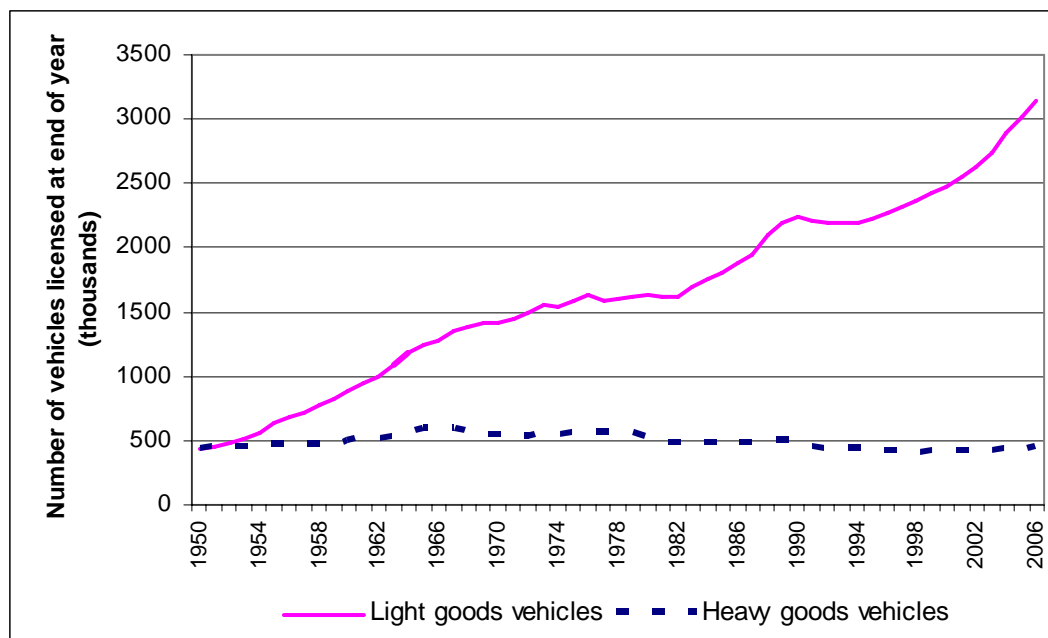
Section 19 provides an analysis of the total taxes paid by LGV operators per annum also taking into account LGV ownership, gross weight and propulsion system. The fuel taxes paid are affected by total distance travelled so results are provided for both the higher and lower estimates of LGV vehicle kilometres.

2. LGV fleet in Britain

At the end of 2006, there were 3,059,700 LGVs licensed in Britain. Included in the "light goods vehicle" category are powered motor homes and caravans. If these vehicles (which are not used for providing goods and services) are excluded, there were 2,926,891 LGVs licensed in Britain in 2006 (DfT, 2008b).

Figure 1 shows the growth in the LGV and HGV fleet in Britain since 1950. This shows that since 1950 (when the number of LGVs and HGVs were the same) the LGV fleet has become ever larger than the HGV fleet.

Figure 1: LGVs and HGVs licensed in Britain, 1950-2006



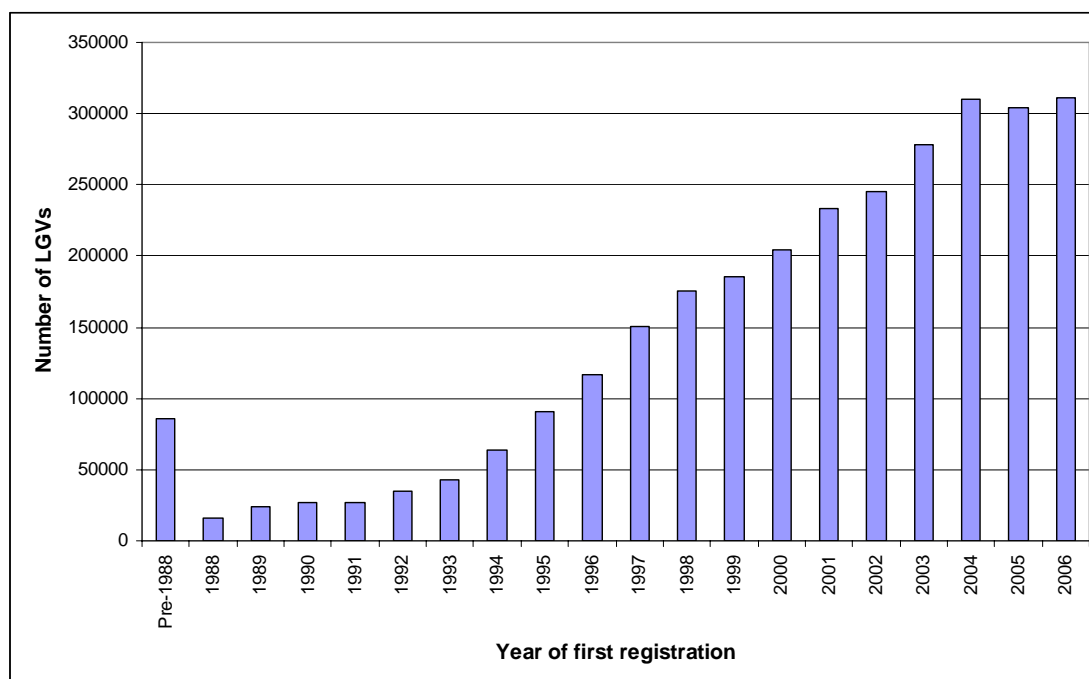
Source: DfT, 2007a.

This growth in the LGV fleet has continued unabated in recent years, increasing by approximately 38% over the ten years from 1996-2006. This has far outstripped the growth in the HGV fleet during the last decade (the HGV fleet has only increased by 8%). In fact, the growth in the LGV fleet was greater than the growth in cars over this period (the number of cars increased by approximately 25% between 1996 and 2006) (DfT, 2007a).

3. Age of the LGV fleet

Figure 2 shows the LGV stock in Britain at the end of 2006 by first year of registration. This shows that although almost 32% of LGVs were registered in the previous 3 years, and approximately 50% of LGVs were registered in the previous 5 years, there are a significant number of LGVs that are older than 5 years (50%) and even 10 years (18%) (DfT, 2008b).

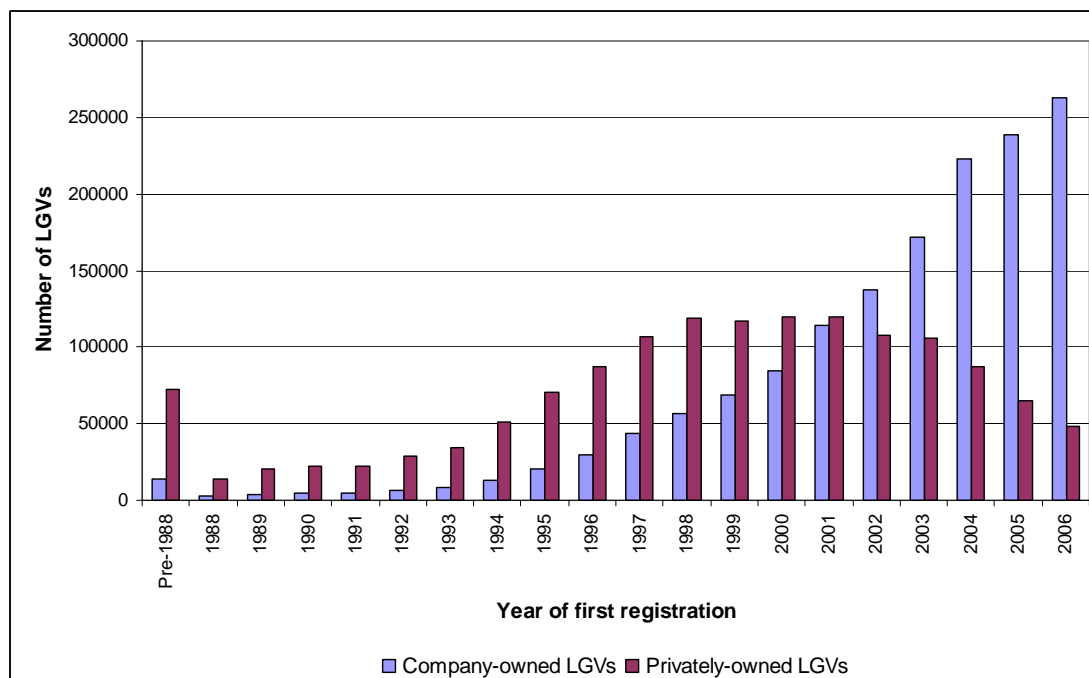
Figure 2: LGV stock in Britain at end of 2006 by year of first registration



Source: DfT, 2008b

Figure 3 shows that there are important differences in the age of privately- and company-owned LGVs. This shows that 48% of company-owned LGVs were registered in the previous 3 years, compared with only 14% of privately-owned LGVs. Only 7% of company-owned LGVs more than 10 years old, compared with 30% of privately-owned LGVs (DfT, 2008b).

Figure 3: LGV stock in Britain at end of 2006 by year of first registration, company- and privately-registered vehicles



Source: DfT, 2008b

4. Segmenting LGVs for calculating external costs

Segmenting LGVs helps to reflect the variety of activity patterns and vehicle attributes that exist in the LGV population. It was decided to attempt to segment LGVs into several different categories that would reflect important differences in the activity levels of these vehicles, their fuel efficiency and their pollutant emissions. Consideration of the differences between the vehicles themselves and the ways in which they are used generated the following list of important factors that determine the potential external impacts of LGVs:

- activity patterns in different sectors using LGVs to provide goods and services (including load factors, empty running, kilometres travelled, locations of activity, speeds etc.)
- vehicle weight
- fuel consumption
- euro engine standard
- vehicle propulsion system

However, our analysis was limited by the data that is available. Despite the Department for Transport having carried out van surveys between 2003-2005 (for example DfT, 2004a and 2004b) these have since been discontinued. In addition, these surveys that were carried out only provide limited insight into detailed breakdowns of LGV activity patterns by commercial sector.

The vehicle licensing data available does not provide details about the euro engine standard or the gross weights of LGVs (only that they are less than 3.5 tonnes). However, it does contain details of vehicle ages, propulsion systems, ownership (company- or privately-owned), and vehicle body types.

There is currently no official data available on the fuel efficiency of LGVs. Data on LGV fuel efficiency and CO₂ emissions was meant to be provided by LGV manufacturers and made publicly available from 1 January 2008 (as is already made available for cars). However, LGV manufacturers are apparently reluctant to publish this data due to difficulties in accounting for variations in factors such as payload, roof height, body length and kerb weight can vary enormously from one model to another. A representative of one manufacturer has recently stated that, "the usage of commercial vehicles is very different from passenger cars, so the actual CO₂ figures a customer will achieve is dependent not only on the specification chosen, but also whether it is laden or unladen, and the duty cycle employed by the customer" (Commercial Motor, 2008). The manufacturers are concerned that the data they publish could potentially mislead the customer and not reflect their actual performance. Manufacturers are now working with the European Commission and the UK Government to try to resolve these issues.

Having examined the data available, decisions were made about the LGV segmentation that would be possible in the study. It was decided that the following attributes for which data was available should be reflected in the LGV categories adopted:

- Ownership (company- or privately-owned) which affects:
 - activity patterns (which in turn affects vehicle kilometres performed),
 - vehicle age (as a proxy for euro engine standard which affects pollutant emissions, as well as VED rate),
 - propulsion system (which affects fuel consumption and pollutant emissions)

- Vehicle weight (by using vehicle body type as a proxy - which affects activity patterns and hence vehicle kilometres, fuel used and pollutant emissions)
- Vehicle fuel efficiency (which affects fuel used and pollutant emissions)

LGVs were subdivided into the eight categories shown in Table 1.

Table 1. LGVs categories adopted in the external cost estimates

LGV categories used in the analysis	Gross weight	Ownership	Propulsion system
Category 1	Up to 1.8 tonnes	Company-owned	Diesel
Category 2	Up to 1.8 tonnes	Company-owned	Petrol
Category 3	Up to 1.8 tonnes	Privately-owned	Diesel
Category 4	Up to 1.8 tonnes	Privately-owned	Petrol
Category 5	1.8 - 3.5 tonnes	Company-owned	Diesel
Category 6	1.8 - 3.5 tonnes	Company-owned	Petrol
Category 7	1.8 - 3.5 tonnes	Privately-owned	Diesel
Category 8	1.8 - 3.5 tonnes	Privately-owned	Petrol

Sections 5-10 explain the elements of data that were available for segmenting LGVs in the study. Section 11 presents the segmentation approach used to allocate annual vehicle kilometres performed to each of the eight LGV categories shown in Table 1.

5. LGV ownership

LGVs can either be company- or privately-owned. An LGV is defined as company-owned “if the registered keeper is a Company or Company (Messrs)”, while it is considered to be privately owned if “the registered keeper is any other category (i.e. Mr, Mrs, Miss, Rev, Dr, “between keepers” (DfT 2004b). Details of the registered keeper of the vehicle are held on DVLA records. The overwhelming majority of privately-owned LGVs will be used for providing goods and services. Few LGVs are purchased by private owners solely for non-business use. Table 2 shows the number and proportion of LGVs that were company- and privately-owned in Britain at the end of 2006.

Table 2. LGVs in Britain by ownership at end of 2006

Company-owned LGVs	Privately-owned LGVs	All LGVs
1,508,031 (52%)	1,418,860 (48%)	2,926,891 (100%)

Source: calculated from data provided by DfT, 2008b.

6. LGV propulsion system

LGVs can be powered by the following fuel sources:

- Diesel
- Petrol
- Other fuel sources (including gas, electric, hybrid gas-petrol and gas-diesel)

The proportion of diesel-powered LGVs has risen over recent years and the proportion of petrol-powered LGVs has fallen. The total number of petrol LGVs licensed fell by 24% between 2001 and 2005 (Momenta, 2006). In 2006, only approximately 7,000 petrol-powered LGVs were registered for the first time, compared with 321,000 diesel-powered LGVs (DfT, 2008a, DfT, 2008b). Therefore, given low rate of new registrations, petrol-powered LGVs are likely to represent a diminishing proportion of LGVs over the coming years. There is a higher proportion of petrol-powered privately-owned LGVs than company-owned, but this is as much a reflection of the longer replacement cycle among private owners rather as it is a greater preference among private users for petrol vehicles.

Diesel engines are popular because of their fuel efficiency, their hardwearing nature and the fact that due to technological advances such as fuel injection and turbo charging it is now possible to produce the power and torque required for the larger, heavier LGVs (Momenta, 2006). Table 3 shows the propulsion system used by LGVs licensed at the end of 2006.

Table 3. LGVs in Britain by propulsions system and ownership at end of 2006

Propulsion system	Company-owned LGVs	Privately-owned LGVs	All LGVs
Diesel	1,454,718 (96.5%)	1,253,434 (88.3%)	2,708,152 (92.5%)
Petrol	40,407 (2.7%)	161,530 (11.4%)	201,937 (6.9%)
Other*	12,906 (0.9%)	3,896 (0.3%)	16,802 (0.6%)
Total	1,508,031 (100%)	1,418,860 (100%)	2,926,891 (100%)

Notes:

* Other includes gas, electric, hybrid gas-petrol and gas-diesel

Source: calculated from data provided by DfT, 2008a.

LGVs powered by alternative fuels represent only approximately 0.5% of all LGVs. New registrations of alternatively-fuelled LGVs increased by 170% between 2001 and 2003, but then declined by 50% between 2003 and 2005 (Momenta, 2006). This may well be related to the removal of government grants to help fund the purchase of these vehicles. In addition, difficulties with refuelling infrastructure and loss of loading space and payload are also likely to be factors in the lack of growth of alternatively fuelled LGVs.

7. LGV euro engine standards

Vehicle licensing data from DfT that provided details of when LGVs were first registered in Britain was used as a proxy for the euro engine standard of the vehicle. The euro engine standard of LGVs were determined for the eight LGV categories defined (by ownership, gross weight, and fuel propulsion). The results of this analysis are shown in Table 4.

Table 4. Euro engine standards of LGVs in Britain in 2006 by ownership, gross weight and propulsion.

	Up to 1.8 tonnes				1.8 – 3.5 tonnes			
	Company-owned		Privately-owned		Company-owned		Privately-owned	
	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol
Pre Euro I	2%	19%	12%	53%	3%	40%	14%	61%
Euro I	8%	13%	26%	22%	6%	7%	18%	6%
Euro II	9%	14%	21%	13%	8%	8%	17%	7%
Euro III	48%	43%	37%	11%	49%	35%	42%	19%
Euro IV	33%	11%	4%	1%	34%	10%	10%	7%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Source:: calculated from data provided by DfT, 2008b.

The results in Table 4 show that, in general, there are a greater proportion of older LGVs that are privately-owned than are company-owned. Also, there are a greater proportion of older petrol-powered LGVs than diesel-powered LGVs, regardless of ownership.

8. LGV gross weight

LGVs vary in weight considerably, ranging from vehicles that are identical in weight to their car equivalents (i.e. car-derived vans) up to LGVs that maximise the gross weight allowance of 3.5 tonnes. The gross weight of the vehicle will, together with other factors, have an important influence on the fuel efficiency of the vehicle.

However, DVLA vehicle registration data contains no information about the gross weights of LGVs currently registered in Britain (other than that they are less than 3.5 tonnes gross weight). This dataset does, though, contain details of the “body type” of the LGV. As noted by the Department for Transport (DfT), “these body types relate to the physical construction of the vehicle but not the way in which it is currently being used” (DfT, 2008a). There are 37 different categories of body type recorded in the DVLA dataset. These are listed in Table 5.

Table 5. LGV body types in vehicle registration database

LGV body types in the DVLA vehicle registration data	
• Airport Support Unit	• Luton Van
• Box Van	• Mobile Plant
• Breakdown Truck	• Motor Home/Caravan
• Car Derived Van	• Panel Van
• Car Transporter	• Pantehnicon
• Concrete Mixer	• Pick-Up
• Curtain Sided	• Refuse Disposal
• Dropside Lorry	• Skeletal Vehicle
• Flat Lorry	• Skip Loader
• Float	• Solid Bulk Carrier
• Front Dumper	• Special Mobile Unit
• Glass Carrier	• Specially Fitted Van
• Goods	• Tanker
• Insulated Van	• Tipper
• Light 4 by 4 Utilities	• Tractor
• Light Goods	• Truck
• Light Van	• Van
• Livestock Carrier	• Van/Side Windows
• Low Loader	

Source: provided by DfT, 2008b.

As explained in section 2, motor homes / caravans can be removed from this listing as they are not used to carry out the provision of goods and services. This leaves 36 categories of LGV body type. It is not possible from the body types to determine the sector in which the vehicle is used or its operating pattern.

However, it is possible to isolate “car-derived vans” as a separate body type. These are the lightest category of LGVs, being built on the same chassis as the equivalent car model. We have assumed that these car-derived LGVs have a gross weight of up to 1.8 tonnes (this same assumption was made in a study for DfT – Momenta, 2006). We assumed that all the other 35 LGV body types are heavier vehicles, and have allocated these to a 1.8 – 3.5 tonnes gross weight category. Table 6 shows the number of LGVs in each of these weight categories.

Table 6. LGVs in Britain by gross weight, ownership and propulsion system in 2006

Propulsion system	Up to 1.8 tonnes			1.8 – 3.5 tonnes			Total LGVs
	Company-owned	Privately-owned	All	Company-owned	Privately-owned	All	
Diesel	327,434	334,156	661,590	1,127,284	919,278	2,046,562	2,708,152
Petrol	11,354	27,073	38,427	29,053	134,457	163,510	201,937
Other*	3,378	1,138	4,516	9,528	2,758	12,286	16,802
Total	342,166	362,367	704,533	1,165,865	1,056,493	2,222,358	2,926,891

Note: calculated using data provided by DfT, 2008b.

Using this approach, LGVs up to 1.8 tonnes gross weight account for 24% of all LGVs. Information subsequently obtained from the SMMT suggests that they estimate that 28% of currently-registered LGVs are in the up to 1.8 tonnes gross weight category (SMMT, 2008). So the body-type approach used to segmenting LGVs by gross weight would appear to produce acceptable results.

There was little change in the total number of car-derived LGVs (up to 1.8 tonnes gross weight) licensed between 2001 and to 2005. Over the same period the number of heavier LGVs (1.8-3.5 tonnes gross weight) licensed has increased substantially (Momenta, 2006). This suggests buyers have altered their LGV purchasing patterns away from the 1.8 tonnes category to heavier LGVs.

9. Vehicle kilometres performed by LGVs

The DfT publishes annual data produced from traffic counts showing the vehicle kilometres travelled by LGVs on different road types (Table 7). Motorways, rural roads and urban roads accounted for 18%, 45% and 37% respectively of the total distance travelled by LGVs in Britain in 2006.

Table 7. Vehicle kilometres by LGVs in Britain in 2006 by road type

Road type	Vehicle kilometres (billion)
Motorways	11.8
All rural 'A' roads	17.5
Minor rural roads	11.2
All urban 'A' roads	9.4
Minor urban roads	14.4
All roads	64.3

Source: DfT, 2007a.

An alternative source of the vehicle kilometres performed by LGVs are the DfT Company Van Survey 2003 (DfT, 2004a) and Survey of Privately-Owned Vans 2002/2003 (DfT, 2004b). This approach has the additional advantage of also provide insight into body type of the LGVs. Data for “car-derived vans” are provided in both of these surveys. Therefore, using the same assumption as in section 6 (that car-derived vans are up to 1.8 tonnes gross weight, and all other van body types are 1.8-3.5 tonnes gross weight), it is possible to separate the 2003 vehicle kilometre data from the DfT surveys into the two weight categories. It is also possible to calculate the average distance travelled by an LGV with respect to ownership (company- or privately-owned) and weight from this survey data. Table 8 shows this vehicle kilometre data separated into the two LGV weight categories we are using.

Table 8. Vehicle km performed by LGVs in Britain in 2003 by ownership and gross weight

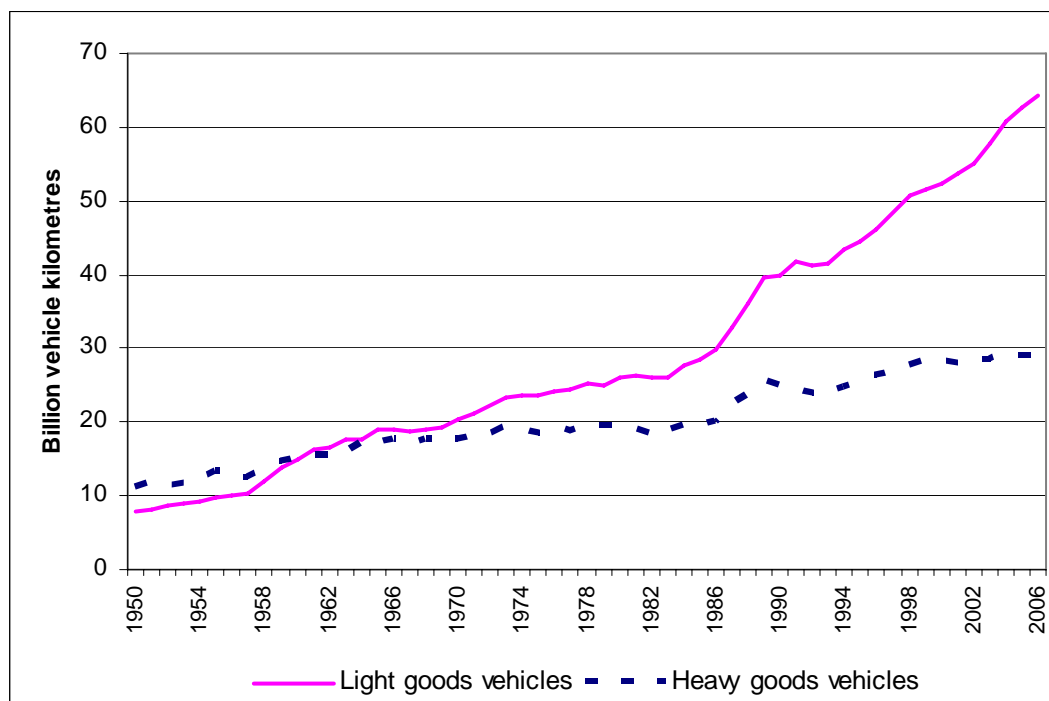
	Company-owned		Privately-owned		All LGVs
	Up to 1.8 tonnes	1.8 – 3.5 tonnes	Up to 1.8 tonnes	1.8 – 3.5 tonnes	
Annual vehicle km (billion)	9.1	25.5	5.4	9.8	49.9
% of annual LGV vehicle km	18.2%	51.2%	10.9%	19.7%	100%
Average km per vehicle per year	23,705	24,317	15,056	15,631	20,596

Source: calculated using data in DfT, 2004a and 2004b.

These two estimates of the annual distance travelled by LGVs in Britain from the DfT (one based on road traffic counts and the other based on surveys of company-owned and privately-owned LGV operators) produce different results. The DfT road traffic count data estimates that LGVs performed a total of 64.3 billion vehicle kilometres on British roads in 2006. Meanwhile, the DfT van surveys of 2003 (the only year in which both the company- and privately-owned van surveys took place) provide an estimate of 49.9 billion vehicle kilometres. If the LGV operator survey results are revised upwards by the change in LGV vehicle kilometres estimated by the road traffic count data between 2003 and 2006 (11%) this provides an estimate of 55.4 billion vehicle kilometres in 2006 according to the van surveys. Therefore, there is a discrepancy of 8.9 billion vehicle kilometres between these two methods of estimation.

As the number of LGVs licensed in Britain has risen significantly in recent decades, so too has the total distance travelled. Figure 4 shows the increase in the distance travelled in Britain by LGVs and HGVs since 1950 using Road Traffic Statistics data (i.e. the higher estimate of vehicle kilometres).

Figure 4. Road traffic in Britain: LGVs and HGVs, 1950-2006



Source: DfT, 2007a

The total activity by LGVs in 2006 compares with between 22.4 billion and 29.1 billion vehicle kilometres performed by HGVs on British roads in 2006 (depending on whether the estimate is based on the Continuing Survey of Road Goods Transport (DfT, 2007b) or road traffic statistics (DfT, 2007a)). Therefore, LGVs performed more than twice as many vehicle kilometres than HGVs in Britain in 2006. However, not all this activity was concerned with goods movement (see section 12 for more discussion). Growth in vehicle kilometres travelled by LGVs over the last ten years has been greater than the growth in HGV vehicle kilometres.

10. Segmenting vehicle kilometres into the eight LGV categories

The data in Table 8 provides the proportion of vehicle kilometres accounted for by LGVs based on their weight and ownership (based on vehicle kilometres data from the DfT Van Surveys). Using the LGV propulsion system data for LGVs by ownership and weight (discussed in section 6) it is possible to estimate the vehicle kilometres performed by LGVs for the eight LGV categories (see Table 1). The proportions of vehicle kilometres accounted for by each of the eight categories of LGV in the DfT Van Survey were then also applied to the DfT road traffic count estimate of annual LGV kilometres to produce an alternative estimate of the vehicle kilometres performed by the eight categories of LGVs in 2006. The proportion of LGV kilometres performed on motorways, rural and urban roads provided by the DfT traffic count data was used to estimate how the LGV kilometres from both sources were allocated across different road types (assuming that each LGV category performs the same proportion of its vehicle kilometres activity on the various types of road). The results are shown in Table 9.

It should be noted that official data showing the actual distance travelled by LGVs according to their propulsion system is not available – the estimate of total distance in Table 10 assumes that the distance travelled by LGVs according to their propulsion system is proportional to the number of LGVs registered by propulsion system. Similarly, official data only reflects the distance travelled on various types of road by all LGVs, not according to ownership, weight and propulsion system – it has therefore been necessary to assume that the proportion of distance travelled by road type for each of the eight categories of LGV is the same as for all LGVs.

Table 9. Estimate of vehicle km performed by LGVs in Britain in 2006 by ownership, gross weight and propulsion

	Up to 1.8 tonnes				1.8 – 3.5 tonnes				All LGVs
	Company-owned		Privately-owned		Company-owned		Privately-owned		
	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	
Van Survey km estimate									
Motorways	1.8	0.1	1.0	0.1	5.1	0.1	1.8	0.3	10.2
Rural	4.4	0.2	2.5	0.2	12.3	0.3	4.2	0.6	24.7
Urban	3.6	0.1	2.1	0.2	10.2	0.3	3.5	0.5	20.5
Total	9.8	0.3	5.6	0.5	27.7	0.7	9.5	1.4	55.4
Traffic count km estimate									
Motorways	2.1	0.1	1.2	0.1	5.9	0.2	2.0	0.3	11.8
Rural	5.1	0.2	2.9	0.2	14.3	0.4	4.9	0.7	28.7
Urban	4.2	0.1	2.4	0.2	11.9	0.3	4.1	0.6	23.8
Total	11.3	0.4	6.5	0.5	32.1	0.8	11.0	1.6	64.3
No. of LGVs (thousand)									
	331	11	335	27	1,137	29	922	135	2,927
% of all LGVs									
	11.3%	0.4%	11.5%	0.9%	38.8%	1.0%	31.5%	4.6%	100%
% of all LGV km									
	17.6%	0.6%	10.0%	0.8%	49.9%	1.3%	17.2%	2.5%	100%

Note: Vehicle kilometre data is billion vehicle kilometres.

Source: calculated using data provided by DfT, 2008b, and data in DfT, 2007b and DfT, 2004b..

Table 9 provides information about the proportion of total LGVs accounted for by each of the eight categories, as well as the proportion of total LGV kilometres. This reflects whether each LGV category is estimated to be responsible for more or less vehicle kilometres than would be expected if kilometres performed was proportional to vehicles. The results suggest company-owned diesel-powered LGVs of both weight categories perform proportionally far more kilometres than there are vehicles. Meanwhile, it is estimated that company-owned diesel-powered LGVs with a weight of 1.8 - 3.5 tonnes perform proportionally far fewer kilometres than there are vehicles.

11. LGV fuel efficiency

As explained, there is currently no official data available on the fuel efficiency of LGVs. Instead it was necessary to consult industry experts to determine suitable fuel efficiency assumptions to use in the external cost calculations. These assumptions are shown in Table 10.

Table 10. Fuel efficiency assumed for LGVs in the analysis (miles per gallon)

LGV gross weight	Petrol engine	Diesel engine
Up to 1.8 tonnes	30	40
1.8 – 3.5 tonnes	20	28

These fuel efficiency assumptions were used to calculate the total fuel consumed by LGVs in 2006 according to ownership, gross weight and propulsion system. The results are shown in Table 11 for both the lower and higher estimates of annual LGV vehicles kilometres.

Table 11. Estimate of fuel used by LGVs in Britain in 2006 by ownership, gross weight and propulsion

	Up to 1.8 tonnes				1.8 – 3.5 tonnes				All LGVs
	Company-owned		Privately-owned		Company-owned		Privately-owned		
	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	
Van Survey km estimate									
Fuel used (million litres)	690	32	393	42	2790	101	960	197	5205
Traffic count km estimate									
Fuel used (million litres)	801	37	456	49	3240	117	1115	228	6043
No. of LGVs (thousand)	331	11	335	27	1,137	29	922	135	2,927
% of all LGVs	11.3%	0.4%	11.5%	0.9%	38.8%	1.0%	31.5%	4.6%	100%
% of all LGV km	17.6%	0.6%	10.0%	0.8%	49.9%	1.3%	17.2%	2.5%	100%
% of all LGV fuel use	13.3%	0.6%	7.5%	0.8%	53.6%	1.9%	18.4%	3.8%	100%

12. LGV trip types and purposes

LGVs are involved in the collection and delivery of goods (as are HGVs). However, they are also used to carry out a wide range of other types of trips, which may or may not include the carriage of goods.

A classification system has been proposed that distinguishes between the various “trip types” and “trip purposes” of LGVs (Browne et al., 2002). These terms are defined below.

LGV trip type: can be described as either ‘Freight’ or ‘Non-Freight’. ‘Freight’ refers to all goods and service trips in which commodity flow is the main reason for the trip. Goods delivered to shops, for example, are therefore defined as freight. Products being carried for the purpose of installation at the destination/trip end would typically be considered as freight. However, workers' tools and equipment carried on a vehicle as part of a service activity, rather than solely for the purpose of delivering these tools/equipment to someone, would not be considered to constitute a freight trip.

‘Non-Freight’ refers to trips in which commodity flow is not the main reason for the trip. Non-Freight therefore includes service trips in which the main purpose is to carry out the service, rather than deliver goods, parts, tools or equipment. Other types of non-freight trip include an LGV used for collection and deliveries performing empty running, the carrying of persons to service tasks, travelling between service jobs, and travelling to/ from a garage for maintenance/repair of the vehicle. Non-freight trips in goods vehicles are not usually dealt with in more than a limited way in transport analysis, usually by determining a fraction of goods vehicles movements that are run empty. Non-Freight also includes trips to visit relatives and friends, journey to work, and leisure trips.

LGV trip purpose: can be described as either ‘Commercial’ or ‘Personal’. This refers to whether the trip is carried for a commercial (i.e. business) purpose or for a personal (i.e. private) purpose (e.g. personal shopping, visiting friends and relatives etc.). Personal trips carried out in LGVs (either for freight or non-freight trip types) have been largely ignored by researchers as they fall into the gap between freight and passenger transport data collection and analysis.

Using this LGV trip type/purpose approach there are four options for LGV trips: i) Commercial freight trip, ii) Commercial non-freight trip, iii) Personal freight trip, and iv) Personal non-freight trip. Commercial non-freight trips can be further disaggregated into commuting trips (i.e. journeys to and from work) and all other commercial non-freight trips (i.e. service-related trips), giving a total of five types/purposes for LGV trips. Table 12 shows these various LGV trip type and trip purpose options.

Many commercial non-freight trips take place in urban areas that involve a service engineer visiting establishments (either residential or commercial) in a vehicle to carry out some service task. These activities differ from goods distribution which simply involves the delivery or collection of goods. Examples of service-related activities that generate LGV commercial non-freight trips associated with commercial establishments include the servicing of photocopiers, security and fire alarms, lifts and escalators, vending machines, air conditioning, telephones, gas, electricity and water supplies, drain cleaning, pest control and general cleaning and decorating services.

As explained commercial 'freight' and 'non-freight' LGV trips are distinguished from each other by whether the main reason for the trip is to carry out a servicing activity at the premises rather than solely deliver or collect goods/equipment. However, this distinction between 'freight' and 'non-freight' can be difficult to apply to certain types of trip and is becoming increasingly difficult over time as the nature of activities change. For instance LGV trips can include both delivery/collection and servicing tasks as part of the same trip. Some goods delivery trips now involve the driver in value-added activities such as stacking goods onto shelves at the delivery point, while many service trips involve the movement of commodities necessary as part of the servicing activity. Many service engineers also have to take equipment and tools to the establishments where the service is to be provided. However, in these service trips, goods delivery/collection is not the primary purpose of the trip.

As explained, we have suggested that the trip should be considered to be 'commercial freight' if it is solely for the purpose of delivery/collection of goods/equipment, while any trip that involves tasks in addition to delivery/collection should be considered as 'commercial non-freight' (i.e. service trip).

Table 12. Definition of LGV trip types and purposes

Trip type/ purpose no.	Trip type	Trip purpose	Name of trip type/purpose	Examples
1.	Freight trip	Commercial	Commercial: freight (i.e. collection and/or delivery of goods/equipment)	<ul style="list-style-type: none"> • Parcel delivery to business address • Grocery home delivery to residential address
2.	Non-Freight trip	Commercial	Commercial: non-freight (i.e. Service trip)	<ul style="list-style-type: none"> • Photocopy engineer visiting customer for routine servicing • Electrician driving to customer to make quotation • Delivery vehicle running empty
3.	Non-Freight trip	Commercial	Commuting	<ul style="list-style-type: none"> • Commuting trips to and from work
4.	Freight trip	Personal	Personal: freight	<ul style="list-style-type: none"> • Plumber making grocery shopping trip • Telephone engineer taking their domestic garden waste to refuse site
5.	Non-Freight trip	Personal	Personal: non-freight	<ul style="list-style-type: none"> • Plumber making personal trip to visit relatives • Telephone engineer making personal trip to sporting event

Note: based on Browne et al., 2002.

Commercial non-freight LGV trips have been largely ignored in (urban) freight transport research and policy considerations, and research directed at understanding the role, functions and determinants of trip generation by service industries has certainly been omitted to date. Many of these trips are picked up in household interview and trip diary surveys, but are not usually identifiable as service industry trips as personal trip-making is the focus of the survey rather than the activities associated with these trips.

Similarly households also generate LGV commercial non-freight trips for renovations, gardening, electrical and plumbing trades, health, childcare and many other activities. Commercial freight trips by LGV also take place to households for the home delivery of goods (especially parcels), takeaway food, removals and waste collection.

In the DfT Company Van Survey of 2003-2005 respondents were asked to indicate the reason for the trips carried out on the survey day. Several different reasons for trips were provided on the survey form. Table 13 shows these reasons for LGV trips provided in the Company Van Survey and then indicates how these relate to the trip types/purposes defined in Table 12.

In the DfT Company Van Survey, the delivery and collection of goods and equipment are grouped together. In classifying these reasons for trips to a trip type/purpose all deliveries and collections have been classified as commercial: freight (i.e. delivery and collection of goods), regardless of whether they involve goods or equipment. Even though it is impossible to disaggregate the trips involving goods from those involving equipment in the DfT Survey, it is reasonable to count all these trips as commercial freight trips (i.e. delivery or collection of goods) as the respondents has indicated that the delivery or collection was the main reason for the trip rather than one of the reasons assigned to the commercial non-freight trip type/purpose.

Table 13. Relating reasons for LGV trips in the DfT Company Van Survey to trip types/purposes

Reason for trip in DfT Company Van Survey	LGV trip type/purpose
Carrying of persons	Commercial: non-freight
Travelling between jobs, e.g. servicing and repair trips, meter readings	Commercial: non-freight
Empty mileage of goods carrying vehicles	Commercial: non-freight
Travelling to/ from garage for servicing/ repair	Commercial: non-freight
Other business use	Commercial: non-freight
Travelling to work from home	Commuting
Travelling to home from work	Commuting
Delivery of goods/equipment	Commercial: freight
Collection of goods/equipment	Commercial: freight
Collection & delivery of goods/equipment	Commercial: freight
Shopping	Personal: freight
Social	Personal: non-freight
Other personal use	Personal: non-freight
Other - not specified	Unknown

Source: based on WSP, 2008.

Using the categorisation approach shown in Tables 12 and 13 it is possible to produce estimates of the vehicle kilometres and vehicle trips for each of these LGV trip types/purposes for company-owned and privately-owned LGVs using data from the DfT Company Van Survey 2003-5 and from the DfT Survey of Privately-Owned Vans in 2003 – this is shown in Table 14.

Table 14 indicates that in the case of company-owned LGVs commercial freight, commercial non-freight and commuting trips each accounted for a similar proportion of vehicle kms (33%, 29% and 32% respectively). Personal trips account for 4% of vehicle kms by company-owned LGVs (3% for non-freight and 1% for freight trips).

By comparison, for privately-owned LGVs commuting accounted for the greatest proportion of vehicle kms (45%), followed by commercial freight (23%). Commercial non freight trips account for 15% of vehicle kms, while personal trips account for 17% of vehicle kms (far greater than for company-owned LGVs).

When the data for company-owned and privately-owned LGVs is combined, the most important trip types/purposes in terms of vehicle kms are in order of importance: commuting, commercial freight and commercial non freight trips (accounting for 36%, 30% and 25% respectively). Personal trips account for 8% of total LGV vehicle kms.

Table 14. Vehicle kms and vehicle trips accounted for by LGV trip types/purposes

Trip type/purpose	Company-owned LGVs		Privately-owned LGVs		All LGVs	
	Vehicle km	Trips	Vehicle km	Trips	Vehicle km	Trips
Commercial: non-freight	30%	30%	15%	17%	25%	23%
Commuting	32%	41%	45%	38%	36%	39%
Commercial: freight	34%	22%	23%	21%	30%	22%
Personal: freight and non-freight	4%	8%	17%	23%	8%	16%
Total	100%	100%	100%	100%	100%	100%

Note: Company-owned LGV data is average for 2003-2005. Privately-owned LGV data is for October 2002- September 2003.

Source: calculated from data provided in DfT, 2007b and DfT, 2004b.

When considering LGV trips rather than vehicle kms, the data provides a different split between the various trip types/purposes (see Table 14). The difference between the importance of a particular trip type/purpose in terms of the proportion of vehicle kilometres and trips it accounts for is explained by the difference in average length of trip for these differences trip types/purposes (see Table 15). This shows that according to the DfT survey results, the average trip lengths varies considerably by both trip type/purpose and also by company- and privately-owned LGVs.

The results in Table 14 indicate differences in the importance of various trip type/purpose categories for company- and privately-owned LGVs (with a greater proportion of trips and distance travelled accounted for by personal trips, and a greater proportion of distance travelled (but not trips) accounted for commuting in the case of privately-owned LGVs).

Table 15 indicates that commercial freight trips by company-owned LGVs have substantially greater average trip lengths than commercial non-freight LGV trips. Personal trips made in company-owned LGVs have the shortest average trip lengths.

Within commercial freight trips by company-owned LGVs, collection only trips have an average trip length of 31 km, delivery only trips an average trip length of 61 km, and combined collection/delivery trips an average trip length of 92 km.

Table 15. Average length of trip for LGVs by trip type/purpose

Trip type/purpose	Average trip length (km)		
	Company-owned LGVs	Privately-owned LGVs	All LGVs
Commercial: non-freight (i.e. service)	42	15	32
Commuting	33	21	27
Commercial: freight (i.e. delivery/collection)	63	19	41
Personal: freight and non-freight	21	13	15
All trip types/purposes	44	18	30

Note: Company-owned LGV data is average for 2003-2005. Privately-owned LGV data is for October 2002- September 2003.

Source:calculated from data provided in DfT, 2007b and DfT, 2004b.

Privately-owned LGV trips can be seen to have substantially shorter average trip lengths than company-owned LGVs for all trip types/purposes. The greatest difference between privately- and company-owned LGV average trip lengths is for commercial freight trips (19 km and 63 km respectively).

It is estimated that LGVs performed a total of 55.4 or 64.3 billion vehicle kilometres on British roads in 2006 (depending on estimation method – see section 8). As Table 14 indicates that commercial freight trips (i.e. collection/delivery of goods) account for 30% of all LGV vehicle kms, it can be estimated that LGV commercial freight trips resulted in 17-19 billion vehicle kilometres in 2006. This compares with 22.4-29.1 billion vehicle kilometres performed by HGVs on British roads in 2006. This suggests that annual LGV vehicle kms associated with the delivery and collection of goods was only approximately 30% less than HGV vehicle kms in 2006. In addition, other types of LGV trips accounted for another 39-45 billion vehicle kilometres in 2006. Table 16 shows the estimated split of LGV vehicle kms between the various trip types/purposes in Britain in 2006 for the lower and higher estimates of LGV vehicle kms (lower estimate derived from the DfT Van Surveys, and higher estimate from DfT Road Traffic Statistics).

Table 16. Estimated LGV vehicle kms in Britain in 2006 by trip type/purpose and vehicle ownership (billion vehicle kms)

Trip type/purpose	Lower vehicle km estimate from DfT Van Surveys			Higher vehicle km estimate from DfT Road Traffic Statistics		
	Company-owned LGVs	Privately-owned LGVs	All LGVs	Company-owned LGVs	Privately-owned LGVs	All LGVs
Commercial: non-freight (i.e. service)	11.5	2.5	14.0	13.3	2.9	16.2
Commuting	12.5	7.7	20.1	14.5	8.9	23.4
Commercial: freight (i.e. delivery/collection)	13.0	3.9	16.8	15.1	4.5	19.6
Personal: freight and non-freight	1.5	2.9	4.4	1.7	3.4	5.2
Total	38.4	17.0	55.4	44.6	19.7	64.3

Notes:

Vehicle kms performed on trips with an “unknown” trip purpose in the DfT Company Van Survey have been reallocated across the five trip types/purposes. Company-owned LGV data is average for 2003-2005. Privately-owned LGV data is for October 2002- September 2003. Source: calculated from data provided in DfT, 2007b and DfT, 2004b.

However, it is likely that LGVs are far less important than HGVs in terms of total tonnes lifted and moved. The Department for Transport (DfT, 2007b) has estimated that company-owned LGV activity accounts for approximately 7% of all road freight tonne kilometres in Britain by British-registered vehicles. But, if the quantity of goods lifted and moved by LGVs was expressed in terms of the value of the goods it is likely that LGVs would account for a greater proportion of total road freight activity in Britain than is reflected by product weight alone – this is due to their role in the last leg of many supply chains moving finished, often high value, time-sensitive goods.

Table 17 shows the vehicle kilometres performed by trip type/purpose disaggregated by vehicle ownership, weight and propulsion system. It is important to note that operational data is not available to calculate the precise distance performed by trip type/purpose by vehicle weight and propulsion system. Instead the data in Table 17 has been derived by applying the importance of the various trip types/reasons by LGV ownership (i.e. either company- or privately-owned) shown in Table 14, to the vehicle kilometre estimates presented in Table 9.

Table 17. Estimate of vehicle km performed by LGVs for various trip types/purposes in Britain in 2006 by ownership, gross weight and propulsion

	Up to 1.8 tonnes				1.8 – 3.5 tonnes				All LGVs
	Company-owned		Privately-owned		Company-owned		Privately-owned		
	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	
Van Survey km estimate									
Commercial: non-freight	2.9	0.1	0.8	0.1	8.3	0.2	1.4	0.2	14.0
Commuting	3.2	0.1	2.5	0.2	9.0	0.2	4.3	0.6	20.1
Commercial: freight	3.3	0.1	1.3	0.1	9.3	0.2	2.2	0.3	16.8
Personal: freight & non-freight	0.4	0.0	1.0	0.1	1.1	0.0	1.6	0.2	4.4
Total	9.8	0.3	5.6	0.5	27.7	0.7	9.5	1.4	55.4
Traffic count km estimate									
Commercial: non-freight	3.4	0.1	1.0	0.1	9.6	0.2	1.6	0.2	16.2
Commuting	3.7	0.1	2.9	0.2	10.4	0.3	5.0	0.7	23.4
Commercial: freight	3.8	0.1	1.5	0.1	10.8	0.3	2.5	0.4	19.6
Personal: freight & non-freight	0.4	0.0	1.1	0.1	1.3	0.0	1.9	0.3	5.2
Total	11.3	0.4	6.5	0.5	32.1	0.8	11.0	1.6	64.3

Note: Data is billion vehicle kilometres.

Source: calculated using data provided by DfT, 2008b, and in DfT, 2007b and DfT, 2004b.

13. LGV trip types and purposes by land use

The DfT Company Van Survey collected details about the land uses at the origin and destination of LGV trips. Table 18 shows the proportion of company-owned LGV vehicle kms by land use at origin for the various trip types/purposes defined in section 10. The results indicate the importance of residential land uses in LGV vehicle kilometres (accounting for trip origins for 36% of all LGV vehicle kms). Residential land uses can be seen to be especially important in relation to commuting trips (as expected), commercial non-freight trips (i.e. service trips) and commercial freight trips (collection and delivery of goods). The importance of residential land uses in LGV activity is likely to be very different to HGV activity patterns.

For commercial freight trips (i.e. delivery and collection trips) the most important land use origin in terms of LGV vehicle kms is warehousing, accounting for approximately one-third of all commercial freight vehicle kms. Other types of land use origins for all LGV trips range in importance from 8%-15% of total LGV vehicle kms.

Table 18. Proportion of vehicle kms in company-owned LGVs by land use at origin of trip, annual average 2003-2005

Trip type/purpose		Residential	Industry	Offices	Retail	Construction	Warehousing	Other	% all vkm
Commercial: non-freight		10.5%	3.8%	4.1%	1.6%	2.0%	1.9%	5.4%	29%
Commuting		17.6%	2.4%	2.2%	1.1%	4.8%	0.7%	3.1%	32%
Commercial: freight (i.e. delivery/collection)	Bulk products	0.4%	0.5%	0.1%	0.5%	0.1%	0.5%	0.3%	2%
	Chemicals/fertilisers	0.2%	0.1%	0.0%	0.2%	0.0%	0.7%	0.2%	1%
	Empty	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0%
	Food & drink	0.7%	0.5%	0.1%	1.4%	0.0%	1.9%	0.7%	5%
	Miscellaneous	2.5%	3.7%	1.6%	1.9%	0.2%	6.6%	3.5%	20%
	Tools/equipment	1.0%	0.4%	0.4%	0.3%	0.3%	0.5%	0.5%	3%
Total all goods		4.9%	5.4%	2.4%	4.3%	0.6%	10.2%	5.3%	33%
Personal: non-freight		2.1%	0.0%	0.0%	0.2%	0.0%	0.1%	0.6%	3%
Personal: freight		0.4%	0.0%	0.0%	0.3%	0.0%	0.0%	0.1%	1%
Unknown		0.4%	0.1%	0.2%	0.1%	0.2%	0.1%	0.8%	2%
Total		35.9%	11.8%	8.9%	7.6%	7.6%	13.1%	15.3%	100%

Source: WSP, 2008 from DfT Company Van Survey 2003-2005.

Tables 19 and 20 focus on land use origins and destinations specifically for commercial freight trips (i.e. delivery and collection trips) by LGVs. These tables are taken from work by WSP (2008) in which special tabulations of the Company Van

Survey 2003-2005 were obtained from the Department for Transport. Table 19 provides results based on LGV trips, while Table 20 provides results based on LGV vehicle kms.

Table 19. Percentage of trips by land use at destination for LGV collection/delivery trip purpose only for each origin land use type, annual average 2003-2005

Origin land use	Destination land use							
	Residential	Industry	Offices	Retail	Construction	Warehousing	Other	All
Residential	54%	10%	5%	10%	3%	11%	7%	100%
Industry	10%	66%	4%	5%	3%	7%	6%	100%
Offices	9%	9%	47%	6%	10%	7%	12%	100%
Retail	23%	6%	5%	48%	3%	5%	10%	100%
Construction site	9%	13%	15%	15%	16%	27%	4%	100%
Warehousing	9%	5%	3%	11%	5%	61%	6%	100%
Other	4%	4%	5%	9%	2%	6%	69%	100%
All origin types	17%	17%	8%	15%	4%	20%	18%	100%

Note: "Other" includes agriculture; forestry, open land and water; minerals and landfill; outdoor recreation; defence; transport and utilities; community services (schools, doctors, hospitals); and vacant land.

Source: WSP, 2008 from special tabulation of DfT Company Van Survey 2003-2005.

Table 20. Percentage of vehicle km by land use at destination for LGV collection/ delivery trip purpose only for each origin land use type, annual average 2003-2005

Origin land use	Destination land use							All	Total vkm*
	Residential	Industry	Offices	Retail	Construction	Warehousing	Other		
Residential	78%	5%	3%	3%	3%	5%	3%	100%	1,693
Industry	6%	73%	2%	7%	2%	3%	6%	100%	1,863
Offices	6%	7%	64%	2%	7%	7%	7%	100%	818
Retail	10%	3%	2%	77%	1%	4%	4%	100%	1,490
Construction site	4%	15%	15%	6%	30%	26%	4%	100%	204
Warehousing	4%	2%	2%	4%	2%	80%	4%	100%	3,530
Other	2%	5%	2%	3%	1%	5%	81%	100%	1,821
All origin types	16%	15%	7%	14%	3%	28%	17%	100%	11,419
Total vkm*	1,826	1,741	796	1,586	329	3,239	1,902	11,419	

Notes:

* - million vehicle kilometres per year.

“Other” includes agriculture; forestry, open land and water; minerals and landfill; outdoor recreation; defence; transport and utilities; community services (schools, doctors, hospitals); and vacant land.

Source: WSP, 2008 from special tabulation of DfT Company Van Survey 2003-2005.

Table 19 shows that, in terms of vehicle trips, five types of land use are responsible for the vast majority of commercial freight (i.e. collection/delivery) trip destinations, and each account for between 15-20% of trips. These are: warehousing (20% of trips), other (18%), residential (17%), industry (17%), and retail (15%). In addition, offices are the destination for 8% of trips and offices for 4% of trips. The multi-leg nature of LGV journeys is reflected in the proportion of trips that have the same land use origin and destination (80% in the case of trips with origins at a warehouse, 66% for industrial sites, 54% for residential land uses, and 48% for retail land uses).. Only in the case of LGV trips originating at construction land uses are trip destination land uses more evenly spread.

Table 20 shows that, in terms of vehicle kilometres, warehousing is responsible for more commercial freight (collection/delivery) trip destinations (28%) than any other land use. This is followed by other (17%), residential (16%), industry (15%), and retail (14%). The greater importance of warehousing land use destinations in terms of

vehicle kms compared to trips is explained by the greater trip length for these warehousing trips compared with other trip destinations.

14. Sectors in which LGVs are used

LGVs are used in a wide range of business sectors. Table 21 shows the number and proportion of LGV vehicle kms performed by type of business for both privately- and company-owned LGVs.

Table 21. LGV vehicle kilometres per annum by type of business

	Company –owned LGVs		Privately–owned LGVs	
	Vehicle Kms		Vehicle Kms	
Type of business	Millions	%	Millions	%
Personal use only ¹	-	-	2,015	13%
Agriculture, forestry and fishing	1,049	3%	799	5%
Energy and water supply ²	757	2%	382	3%
Other manufacturing industries ³	5,288	15%	420	3%
Construction ⁴	10,721	31%	6,309	41%
Wholesale & retail trade, repairs and hotels	7,043	20%	1,930	13%
Transport, storage, communication	4,265	12%	1,173	8%
Banking, finance & insurance, business services & leasing	2,762	8%	190	1%
Health, social work and other community services	1,191	3%	163	1%
Education, public admin & defence, extra-territorial orgs	1,139	3%	83	1%
Other services	-	-	1,774	12%
Unspecified	385	1%	-	-
Total	34,599	100%	15,238	100%

Notes:

1. Personal use is the main use of the van.

2. Includes electricity and gas supply.

3. Includes extraction of minerals and ores, other than fuels.

4. Includes electric installation, plumbing, plastering, painting and glazing.

Company-owned LGV data is average for 2003-2005. Privately-owned LGV data is for October 2002- September 2003.

Source: DfT, 2007b and DfT, 2004b.

Table 21 shows that the business sector generating by far the greatest proportion of LGV vehicle kms for both privately- and company-owned LGVs is construction (which includes electric installation, plumbing, plastering, painting and glazing). Other major sectors in terms of vehicle km generation are i) wholesale and retail trade, repairs and hotels; ii) transport, storage and communication; iii) other manufacturing

industries (in the case of company-owned LGVs); iv) other services (in the case of privately-owned LGVs); and v) personal use (in the case of privately-owned LGVs).

Table 21 may appear somewhat contrary to the results by land use at trip origin (Table 17) which showed that construction only accounted for approximately 8% of vehicle kms. However it is important to note that Table 17 shows only the land use at trip origin not destination, and that respondents may have provided details of the intended land use at the origin even if it was currently a construction project. Therefore, using construction as a land use probably fails to capture the full extent of LGV trips to buildings currently being built or undergoing refurbishment, or other building-related servicing such as plumbing, plastering and decorating.

15. Types of goods/equipment carried by LGVs

Table 22 shows the type of goods and/or equipment carried by both privately- and company-owned LGVs in terms of vehicle kilometres travelled. The goods/equipment categories used in both surveys was not completely identical and this is reflected in Table 22. The results indicate that the most important goods/equipment carried by LGVs were tools, equipment and other materials which accounted for 31% of vehicle kms for privately-owned LGVs and 45% of vehicle kms for company-owned LGVs (in the case of the survey of privately-owned LGVs this category was referred to as “construction related machinery and equipment”). Three of the other categories also relate to tools, equipment and materials associated with providing services (i.e. non-freight commercial trips). These are: transport equipment, other machinery and transport equipment, and agricultural related machinery and equipment. These three categories are also relatively important in terms of vehicle kms performed by privately- and company-owned LGVs, accounting for 8% and 9% of vehicle kms respectively.

In terms of goods carried for commercial freight trips (i.e. collections and deliveries by businesses), bulk products is an important category in terms of vehicle kms performed by privately- and company-owned LGVs, accounting for 8% and 4% of vehicle kms respectively. Food and drink is also important, accounting for 7% and 6% of privately- and company-owned LGV vehicle kms respectively. Paper, mail & parcels (i.e. express parcels and courier sector) accounts for 4% of privately-owned LGV vehicle kms, and 7% of company-owned LGV vehicle kms. Meanwhile,

personal freight trips for household shopping account for 0.7% of privately-owned LGV vehicle kms and 0.2% of company-owned LGV kms.

Empty vehicle kms are a major category for both privately- and company-owned LGVs, accounting for 28% and 15% of vehicle kms respectively.

Table 22. LGV vehicle kilometres per annum by type of goods/equipment carried

	Company-owned LGVs		Privately-owned LGVs	
	Vehicle km		Vehicle km	
	Millions	%	Millions	%
Food, drink & tobacco				
Live animals	94	0.3%	337	2.2%
Other farming	169	0.5%	79	0.5%
Other agricultural products	170	0.5%	93	0.6%
Beverages	192	0.6%	113	0.7%
Other foodstuffs	1,471	4.3%	398	2.6%
Bulk products				
Wood and cork	80	0.2%	114	0.7%
Sand, gravel and clay	-	-	814	5.3%
Building materials	493	1.4%	-	-
Textiles	407	1.2%	234	1.5%
Pulp paper	-	-	55	0.4%
Coal, coke and other fuel	49	0.1%	33	0.2%
Crude materials	286	0.8%	-	-
Chemicals, petrol & fertiliser				
Fertilisers	700	2.0%	11	0.1%
Miscellaneous products				
Construction related machinery and equipment	-	-	4,742	31.1%
Tools, equipment and other materials	15,632	45.2%	-	-
Agricultural related machinery and equipment	133	0.4%	58	0.4%
Transport equipment	1,205	3.5%	-	-
Other machinery and transport equipment	1,792	5.2%	1,117	7.3%
Furniture	308	0.9%	213	1.4%
Manufacture of metals	868	2.5%	-	-
Other miscellaneous manufactures	2,708	7.8%	264	1.7%
Paper, mail & parcels	2,276	6.6%	616	4.0%
Household shopping	58	0.2%	104	0.7%
Other construction	-	-	297	1.9%
Other miscellaneous articles nes	187	0.5%	1,309	8.6%
Empty	5,085	14.7%	4,238	27.8%
Unspecified	235	0.7%	-	-
All commodities	34,599	100.0%	15,238	100.0%

Notes:

* - not elsewhere specified

Company-owned LGV data is average for 2003-2005. Privately-owned LGV data is for October 2002- September 2003.

Source: DfT, 2007b and DfT, 2004b.

Table 23 provides a comparison of the type of goods and/or equipment carried by company-owned LGVs in terms of both vehicle kilometres travelled and tonne-kilometres performed. While vehicle kilometres reflect the importance of each commodity category in terms of only distance travelled, tonne-kilometres reflect the importance of distance travelled and total weight of commodities carried. Therefore heavier vehicle payloads will have increased importance and lighter payloads reduced importance when expressing the importance of commodities in tonne-kilometres rather than vehicle kilometres. Many of the commodities are more important in terms of tonne-kilometres than vehicle kilometres, especially important are “other miscellaneous manufactures”, “paper, mail and parcels”, and “other foodstuffs”. The key commodity type that becomes far less important when expressing results in tonne-kilometres rather than vehicle kilometres is “tools, equipment and other materials”. This is due to the relatively low total weight of these items carried on commercial non-freight trips (i.e. for servicing trips) compared with well-laden LGVs used for commercial freight trips (i.e. collection and delivery) of commodities with a high bulk density.

Table 23. Company-owned LGV vehicle kilometres and tonne-kilometres per annum by type of goods/equipment carried; annual average 2003-2005

	Vehicle km		Tonne-km	
	Millions	%	Billions	%
<i>Food, drink & tobacco</i>				
Live animals	94	0.3%	31	0.3%
Other farming	169	0.6%	135	1.2%
Other agricultural products	170	0.6%	158	1.4%
Beverages	192	0.7%	235	2.1%
Other foodstuffs	1,471	5.0%	1,381	12.2%
<i>Bulk products</i>				
Wood and cork	80	0.3%	33	0.3%
Building materials	493	1.7%	229	2.0%
Textiles	407	1.4%	313	2.8%
Coal, coke and other fuel	49	0.2%	44	0.4%
Crude materials	286	1.0%	186	1.6%
<i>Chemicals, petrol & fertiliser</i>				
Fertilisers	700	2.4%	545	4.8%
<i>Miscellaneous products</i>				
Tools, equipment and other materials	15,632	53.0%	1,004	8.9%
Agricultural related machinery and equipment	133	0.5%	42	0.4%
Transport equipment	1,205	4.1%	839	7.4%
Other machinery and transport equipment	1,792	6.1%	811	7.2%
Furniture	308	1.0%	280	2.5%
Manufacture of metals	868	2.9%	544	4.8%
Other miscellaneous manufactures	2,708	9.2%	2,108	18.6%
Paper, mail & parcels	2,276	7.7%	2,303	20.3%
Household shopping	58	0.2%	13	0.1%
Other miscellaneous articles nes*	187	0.6%	100	0.9%
<i>Unspecified</i>	235	0.8%	4	0.0%
All commodities	29,513	100.0%	11,338	100.0%

Notes:

* - not elsewhere specified

Empty vehicle kilometres have been excluded from the vehicle km travelled by company-owned LGVs, so that a comparison with tonne-kms is possible as, by definition, there are no empty tonne-kms.

The DfT did not collect data about the amount of tonnes lifted by LGVs as part of the Company Van Survey, but information collected about vehicle utilisation per trip and vehicle capacity were used by the DfT to produce estimates of tonnes moved (tonne kilometres). See section 16 for further details of LGV utilisation per trip.

Source: Calculated from data provided in DfT, 2007b

16. Utilisation of vehicle capacity on LGV trips

The DfT collected details of the utilisation of vehicle volume capacity on LGV trips in the company-owned Van Survey. Table 24 shows the results by weight category of LGV. A sizeable proportion of total vehicle kilometres travelled by company-owned LGVs took place with the vehicle relatively poorly loaded (i.e. less than 25% vehicle

fill by volume) – 45% of vehicle kms for LGVs with a gross weight up to 1.8 tonnes and 36% for LGVs with a gross weight of 1.8 – 3.5 tonnes.

Table 24. Utilisation of vehicle capacity by company-owned LGVs: annual average 2003 – 2005 (proportion of total vehicle kilometres travelled)

LGV weight category	Utilisation of vehicle volume capacity*				Total
	0-25%	26-50%	51-75%	76-100%	
Up to 1.8 tonnes	45%	25%	18%	12%	100%
1.8 – 3.5 tonnes	36%	28%	21%	15%	100%
All LGVs	38%	27%	21%	14%	100%

Notes:

* - For journeys with four or fewer stops the utilisation of the vehicle volume capacity at the start of the journey was obtained. For journeys with greater than four stops, summary journey information was obtained, including an estimate of the utilisation of the vehicle volume capacity for the majority of the journey.

Calculated from data provided in DfT, 2007b.

From the DfT company-owned LGV data it is possible to estimate that, on average, the proportion of vehicle volume capacity that was utilised on trips was 40% between 2003 and 2005.

17. Comparing LGV and HGV fleets and activity

Several sections in this report have mentioned HGV data in comparison with LGVs. This section brings together direct comparisons possible between these types of goods vehicles. Table 25 contains comparisons including fleet size, vehicle kilometres travelled, road types of which they operate, empty running, tonne-kilometres performed and capacity utilisation on trips. Unless otherwise stated, the LGV data in Table 25 refers to all LGVs (i.e. company- and privately-owned).

Table 25. Comparisons between LGV and HGV fleets and operations in Britain

Trip type/purpose	LGVs	HGVs
Vehicle fleet in 2006	2,926,891	446,000
Vehicle km in 2006 (billion v km) (DfT Van and CSRTG surveys)	55.4 (16.8)	22.4
Vehicle km in 2006 (billion v km) (DfT Road traffic counts) ¹	64.3 (19.6)	29.1
Motorways in 2006 (% of vehicle km)	18	28
Rural roads in 2006 (% of vehicle km)	37	45
Urban roads in 2006 (% of vehicle km)	45	27
Average length haul (km) in 2006	87	86
Tonne-kilometres ² (billion) (annual average 2003-2005)	11.3	152.2
Empty running ³ (% of vehicle km) (annual average 2003-2005)	18.7	26.9
Lading factor ⁴ (annual average 2003-2005)	0.40	0.57

Notes:

Unless otherwise stated below, the LGV data refers to all LGV activity, not only commercial freight (i.e. delivery and collection) trips by LGVs.

1. For LGVs, both total vehicle kilometres and commercial freight trip vehicle kilometres are shown. The latter is shown in brackets.

2. Company-owned LGVs only included (privately-owned LGVs not included).

3. For LGVs, empty running means no goods or equipment carried. Data used: company owned LGVs - 2003-2005 average, privately-owned LGVs - October 2002-September 2003.

4. For LGVs refers to proportion of vehicle volume carrying capacity utilised. Company-owned LGVs only (privately-owned LGVs not included).

Calculated from data provided in DfT, 2004b, 2007a, 2007b, 2008a, 2008b. .

LGVs therefore accounted for approximately 70% of total vehicle kilometres performed by commercial vehicles (LGVs and HGVs) in 2006. If only commercial freight trips (i.e. goods collection and delivery trips) by LGVs are considered, it is estimated that LGVs accounted for approximately 40% of total vehicle kilometres performed by road freight-carrying commercial vehicles (LGVs and HGVs) in 2006. In terms of goods moved, LGVs accounted for 11% of road freight tonne-kilometres in 2006 performed by road freight-carrying commercial vehicles in 2006.

18. VED rates for LGVs

LGVs are charged varying rates of Vehicle Excise Duty (VED) depending on when they were first registered (and engine capacity if registered before 1st March 2001). Table 26 shows the four different categories of VED charged for LGVs currently registered in Britain.

Table 26. Vehicle Excise Duty categories and rates for LGVs

LGV taxation class	VED code	VED current annual rate (£)	Description
Private/light goods not over 1549 cc	TC11	120	LGVs registered before 1 March 2001 (based on engine size).
Private/light goods over 1549 cc	TC11	185	LGVs registered before 1 March 2001 (based on engine size).
Euro 4 light goods vehicles	TC36	120	LGVs registered between 1 March 2003 and 31 December 2006 and which are Euro 4 compliant.
Light goods vehicles	TC39	180	LGVs registered on or after 1 March 2001.

Source: DVLA, 2008.

Table 27 shows an estimate of the VED paid by LGVs in Britain in 2006 based on data on LGVs registered provided by DfT.

Table 27. VED received from LGVs by taxation category in Britain in 2006

	VED categories						All LGVs
	TC11 (up to 1549 cc)	TC11 (1549 cc and over)	TC39	TC36	Exempt	Unknown	
No. of LGVs	52,918	1,224,287	113,808	1,413,724	98,530	2,3624	2,926,891
% of LGVs	1.8%	41.8%	3.9%	48.3%	3.4%	0.8%	100%
Licence cost (£)	120	185	180	120	0	151*	
Total VED (£ million)	6.4	226.5	20.5	169.6	0	3.6	426.6**

Notes:

* - It has been assumed that LGVs for which the VED category is unknown pay a VED rate that is the average rate paid by all other LGVs.

** - includes VED paid by alternatively-fuelled LGVs (in addition to petrol and diesel LGVs).

Source: calculated using data provided by DfT, 2008b.

Using data about the age of the LGV fleet and its engine capacity it is possible to calculate the amount of VED generated by government from each of the eight categories that we have segmented LGVs into (Table 28).

Table 28. VED paid by LGV categories in Britain in 2006 by ownership, gross weight and propulsion

	Up to 1.8 tonnes				1.8 – 3.5 tonnes				All LGVs
	Company-owned		Privately-owned		Company-owned		Privately-owned		
	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	
Total VED (£ million)	47.5	1.5	55.2	3.5	152.7	3.7	144.2	16.6	424.8*
No. of LGVs (thousand)	331	11	335	27	1,137	29	922	135	2,927
Average VED per vehicle (£)	143.6	129.6	164.5	130.2	134.3	127.1	156.5	122.8	145.2

Notes:

* - The total VED paid by all LGVs is £1.8 million less than that shown in Table 12. This is because VED paid by alternatively-fuelled LGVs has been omitted from the data in this table.

Source: calculated using data provided by DfT, 2008b.

19. Total taxes and duties paid by LGVs

In addition to VED, LGV operators also pay fuel tax (at a duty rate of 50.35 pence per litre (ppl) for petrol or diesel) and Value Added Tax (VAT) on this fuel at a rate of 17.5% of the full retail price. Although most LGV operators are VAT-registered and can recover this tax through VAT transactions, VAT passes along the supply chains and it is finally borne by one of the direct or indirect transport users. Hence, VAT is included in the estimate of the income generated by duties and taxes from LGV operators. Table 29 shows the results of the calculation of the total tax and duties paid by the eight LGV categories, for both the upper and lower estimates of vehicle kilometres.

Table 29 also shows the average tax and duty charged per vehicle and per vehicle kilometre for each LGV category. The results indicate that the average tax and duty was £1,409 per vehicle for all LGVs in 2006 (when using the estimate of vehicle kilometres from road traffic counts). This ranged from £898 to £2579 per vehicle across the eight LGV categories analysed.

The results suggest that the average tax and duty was 6.4 pence per vehicle kilometre for all LGVs in 2006 (when using the estimate of vehicle kilometres from Van Surveys). This ranged from 4.7 pence to 9.7 pence across the eight LGV categories analysed.

Table 29. Estimate of total taxes and duties paid by LGVs in Britain in 2006 by ownership, gross weight and propulsion.

	Up to 1.8 tonnes				1.8 – 3.5 tonnes				All LGVs
	Company-owned		Privately-owned		Company-owned		Privately-owned		
	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	
Van Survey km estimate									
Fuel duty (£ million)	325.0	15.0	185.1	20.0	1314.2	47.4	452.2	92.6	2451.4
VAT (£ million)	96.7	4.6	56.0	6.1	390.9	14.4	136.8	28.4	733.8
VED (£ million)	47.5	1.5	55.2	3.5	152.7	3.7	144.2	16.6	424.8
Total costs (£ million)	469.2	21.1	296.2	29.7	1857.7	65.6	733.1	137.5	3610.1
Vehicle km (billion)	9.8	0.3	5.6	0.5	27.7	0.7	9.5	1.4	55.4
No. of vehicles	330,699	11,467	335,209	27,158	1,136,573	29,292	921,684	134,809	2,926,891
Ave tax & duty per vehicle per year (£)	1419	1839	884	1092	1635	2239	795	1020	1233
Ave tax and duty per km (pence)	4.8	6.2	5.3	6.6	6.7	9.2	7.7	9.9	6.5
Traffic count km estimate									
Fuel duty (£ million)	377.3	17.4	214.9	23.2	1525.8	55.1	525.0	107.5	2846.2
VAT (£ million)	112.2	5.3	65.0	7.1	453.8	16.8	158.8	32.9	852.0
VED (£ million)	47.5	1.5	55.2	3.5	152.7	3.7	144.2	16.6	424.8
Total costs (£ million)	537.1	24.2	335.0	33.9	2132.3	75.5	828.0	157.0	4123.1
Vehicle km (billion)	11.3	0.4	6.5	0.5	32.1	0.8	11.0	1.6	64.3
No. of vehicles	330,699	11,467	335,209	27,158	1,136,573	29,292	921,684	134,809	2,926,891
Ave tax & duty per vehicle per year (£)	1624	2114	999	1247	1876	2579	898	1165	1409
Ave tax and duty per km (pence)	4.7	6.2	5.2	6.5	6.6	9.1	7.5	9.7	6.4

Source: calculated using data provided by DfT, 2008b, and in DfT, 2007b and DfT, 2004b.

20. Conclusions

Light goods vehicles play a key role in providing goods and services to businesses and other organisations in Britain, resulting in important economic and social benefits. Against these benefits, however, must be set a range of environmental and infrastructural costs, many of which are borne by the community at large rather than the companies operating LGVs. These costs are associated with the emission of air pollutants and greenhouse gases, traffic noise, accidents, congestion and road wear.

In order to better understand the relationship between the costs and benefits of LGV operations it is necessary to gain a more detailed appreciation of the roles that these vehicles are fulfilling. It is hoped that this document has helped to improve this understanding to some extent using official data sources. Research is now commencing in Work Module 9 (Urban Freight Transport) of the Green Logistics project in a selection of important supply chains within which LGVs are used. The intention is to obtain greater insight into the changes in LGV use in these supply chains and the rationale for these changes. This research is also intended to gain insight into the scope for greater efficiency in the use of LGVs in these supply chains as well as the barriers to achieving such efficiency improvements.

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