



Department
of Energy &
Climate Change

Energy Consumption in the UK (2014)

Chapter 2: Transport energy consumption in the UK
between 1970 and 2013

31 July 2014

Energy Consumption in the UK (2014)

Transport energy consumption in the UK between 1970 and 2013

Statistician

Responsible: Julian Prime

**Prepared by: Sabena Khan
Sam Stadnyk
Emily Wilkes**

Energy Consumption in the UK

EnergyEfficiency.Stats@decc.gsi.gov.uk

Contents

Background.....	4
Key terms used in this document.....	4
1. Overall transport energy consumption in 2013.....	5
2. Transport sector energy consumption by type of transport between 1970 and 20136	
3. Transport sector energy consumption by sector between 1990 and 2012.....	9
4. Factors affecting transport energy consumption between 2000 and 2012.....	10
Annex A Publication timetable for ECUK Chapter 2 tables in 2014.....	12
Annex B Related DECC publications.....	14

Background

This factsheet provides a brief overview of the trends and some key drivers that have influenced energy consumption within the transport sector in the UK since 1970. Analysis is based on data from DECC's annual publication 'Energy Consumption in the UK' (ECUK) published on Thursday 31 July 2014: <https://www.gov.uk/government/publications/energy-consumption-in-the-uk>.

This factsheet looks at the change in transport energy consumption by the following sections:

- **Overall** transport energy consumption in 2013.
- Transport sector energy consumption by **type of transport** between 1970 and 2013.
- Transport sector energy consumption by **sector** between 1990 and 2012.
- **Factors affecting transport energy consumption** between 1990 and 2012.

This factsheet also contains publication plans for each table and a summary of related DECC publications in the Annex.

Alongside the ECUK series of datasets and factsheets, a [User Guide](#) is also available which provides the reader with an overview of the content of each chapter within ECUK and explains technical concepts and vocabulary. The User Guide is not intended to offer commentary and interpretation of the data. We value feedback on the content of this factsheet and comments or related queries should be sent to EnergyEfficiency.Stats@decc.gsi.gov.uk.

Key terms used in this document

Thousand tonnes of oil equivalent (ktoe) has been used throughout this factsheet and data tables. This can be defined as a common unit of measurement which enables different fuels to be compared and aggregated. A tonne of oil equivalent (toe) is a unit of energy.

A full glossary of terms used within the energy industry has been provided in Annex B of the DECC statistics publication 'Digest of UK Energy Statistics' (DUKES)¹.

¹ DUKES can be accessed here: <https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes>.

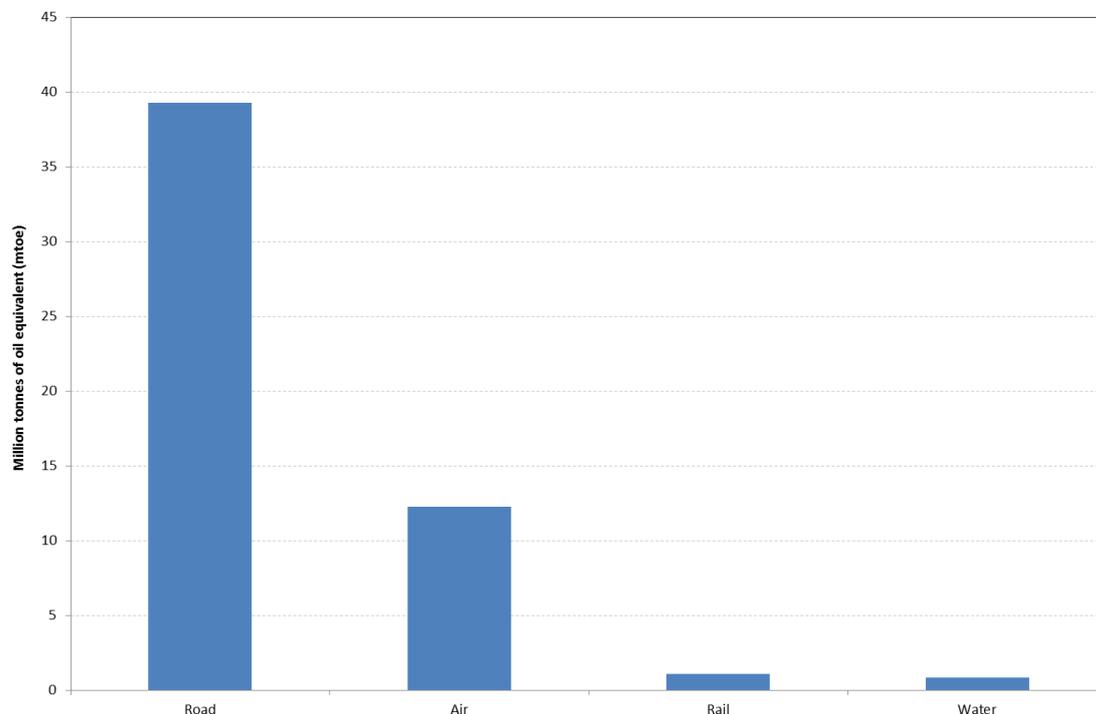
1. Overall transport energy consumption in 2013

Energy consumption in the transport sector in 2013 decreased by 0.7 per cent to 53.4 million tonnes of oil equivalent (mtoe), which was broadly similar to consumption in 2012 of 53.8 mtoe, with small falls in road and air consumption.

Consumption from the transport sector represented 36 per cent of total final consumption of UK energy products in 2013. Total transport energy consumption can be split by four types of transport; road, air, rail and water. In 2013:

- **Road** transport sector accounted for 74 per cent (39.3 mtoe) of total transport energy consumption in the UK, remaining fairly stable compared to 39.5 mtoe in 2012. Of the 39.3 mtoe consumed from road transport, it was estimated that 63 per cent (24.7 mtoe) was consumed from road passenger transport and 37 per cent (15.5 mtoe) from freight transport.
- **Air** transport sector accounted for 23 per cent (12.3 mtoe compared to 12.4 mtoe in 2012).
- **Rail** transport sector accounted for 2 per cent (1.1 mtoe) of total transport consumption remaining stable to consumption in 2012 (1.1 mtoe).
- **Water** transport² sector accounted for just less than 2 per cent (0.8 mtoe) which remained stable to consumption in 2012 (0.8 mtoe).

Chart 1 Transport energy consumption by type of transport, UK (2013)



Source: DECC, ECUK Table 2.01

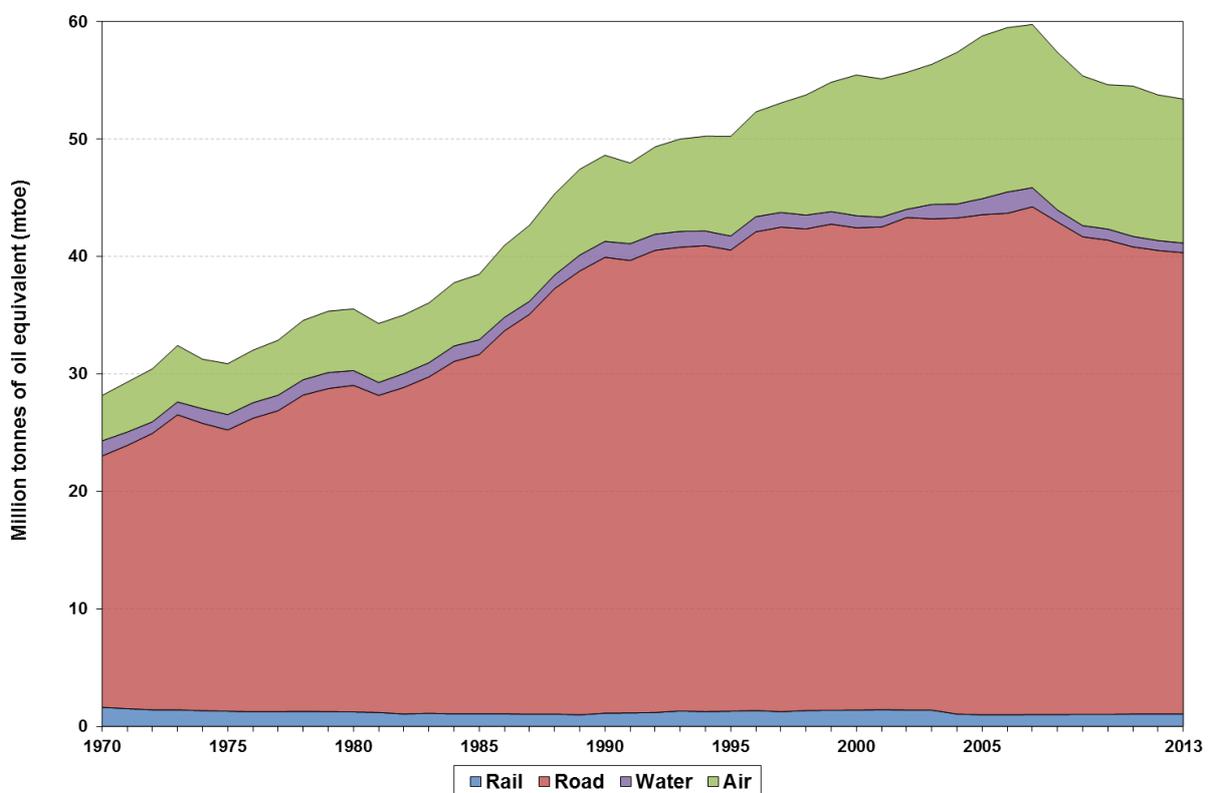
² Water transport includes inland waterways and national navigation. It does not include marine bunkers, which are deliveries to ocean-going and coastal vessels under international bunker contracts.

2. Transport sector energy consumption by type of transport between 1970 and 2013

Chart 2 below shows the increasing trend seen in energy consumption by the transport sector between 1970 and 2007, and the subsequent fall in recent years mainly attributed to the downturn in the economy specifically in 2008 and 2009, less car use for leisure purposes, the increased efficiency in fuel consumption of new cars and improved air efficiency.

Total consumption in 2013 was 11 per cent lower than in 2007. However, much of this fall occurred between 2007 and 2009 (7 percentage points) and was caused mainly by the economic slowdown (Chart 2).

Chart 2 Transport energy consumption by type of transport, UK (1970 to 2013)



Source: DECC, ECUK Table 2.01

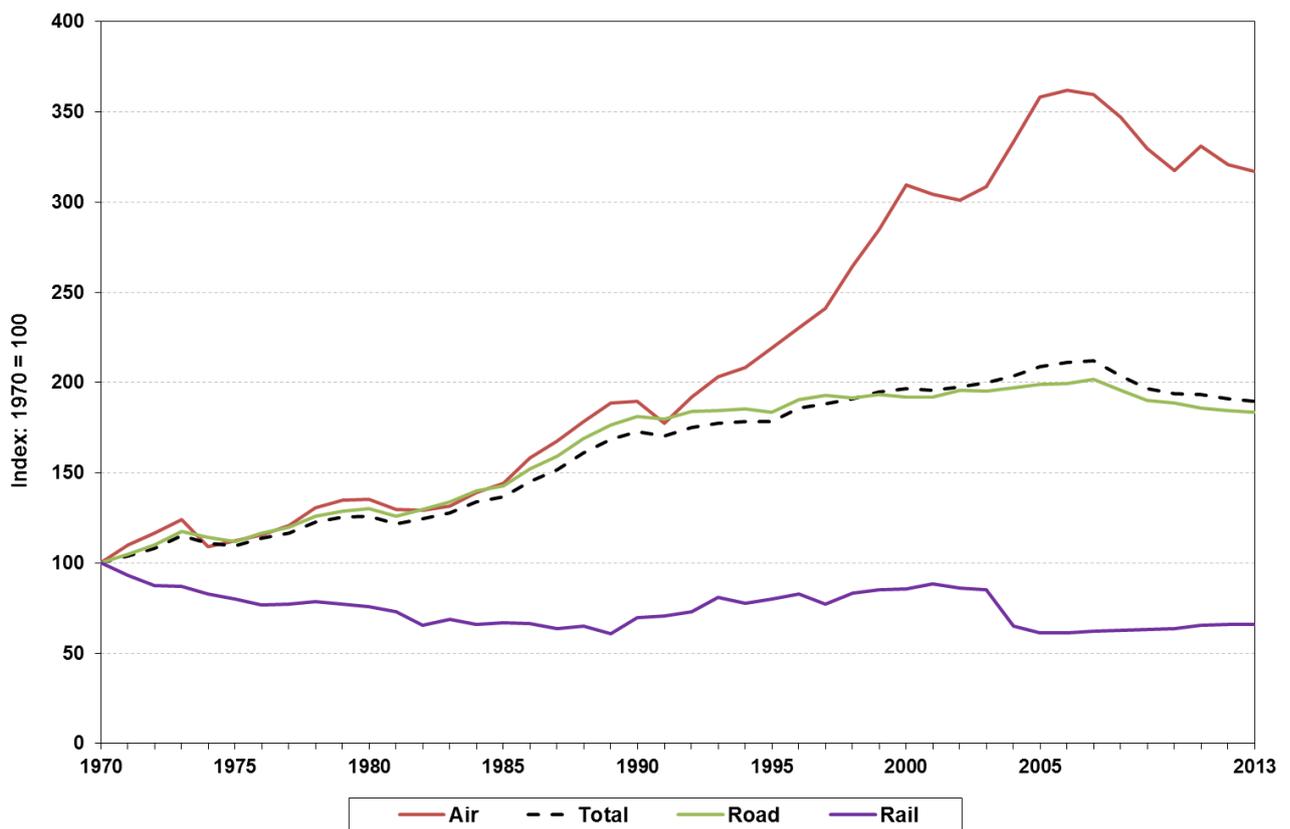
Between the period 1970 to 2013, energy consumption in the:

- **Road** transport sector increased by 83 per cent, from 21.4 mtoe to 39.3 mtoe. Much of the increase happened before 1990, as the rise since then has been 1 per cent.
- **Air** transport more than tripled from 3.9 mtoe to 12.3 mtoe; since 1990 the increase was 67 per cent.
- **Rail** transport sector fell 34 per cent from 1.6 mtoe to 1.1 mtoe; consumption in 2013 was 6 per cent lower than in 1990. The drop in consumption between 2003 and 2004 partially represents a change in methodology, where non-traction electricity consumption had been excluded. This has also impacted the longer term percentage changes.

- **Water** transport sector fell by 18 per cent since 2008. Due to changes in methodology³, comparisons with data earlier than 2008 would not be robust. Therefore, any remaining analysis by sector contained in this factsheet excludes the water transport sector.

Chart 3 shows the change in transport energy consumption by type of transport indexed to 1970.

Chart 3 Transport energy consumption by type of transport, UK (1970 to 2013)

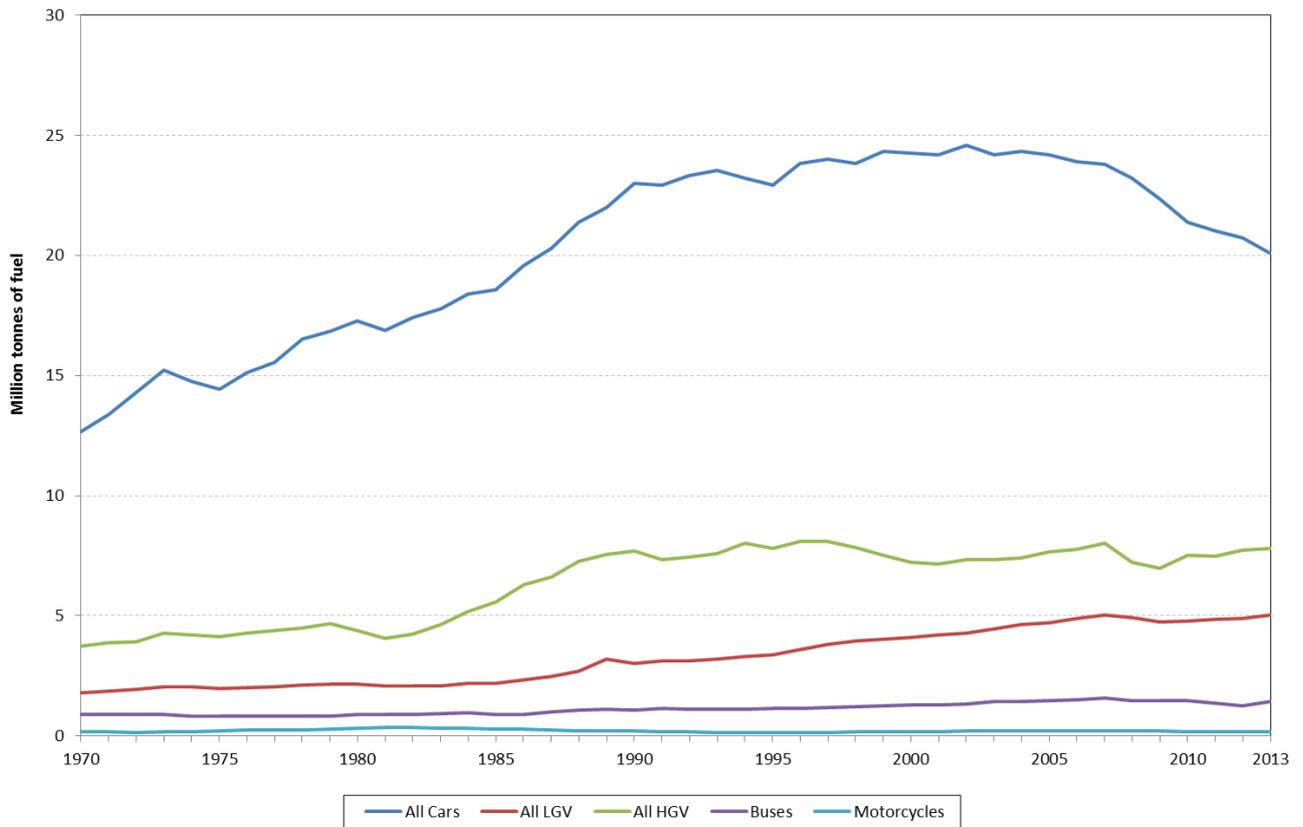


Source: DECC, ECUK Table 2.01

Chart 4 shows road transport energy consumption by different types of road vehicle between 1970 and 2013. Please note, chart 4 does not include LPG fuels which accounts for 0.094 million tonnes of fuel (mtoe) – that is, 0.3 per cent of all road transport consumption.

³ Further detail can be found in the June 2014 edition of Energy Trends: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/326368/ET_June_2014.pdf (page 82).

Chart 4 Road transport energy consumption by type of road vehicle, UK (1970 to 2013)



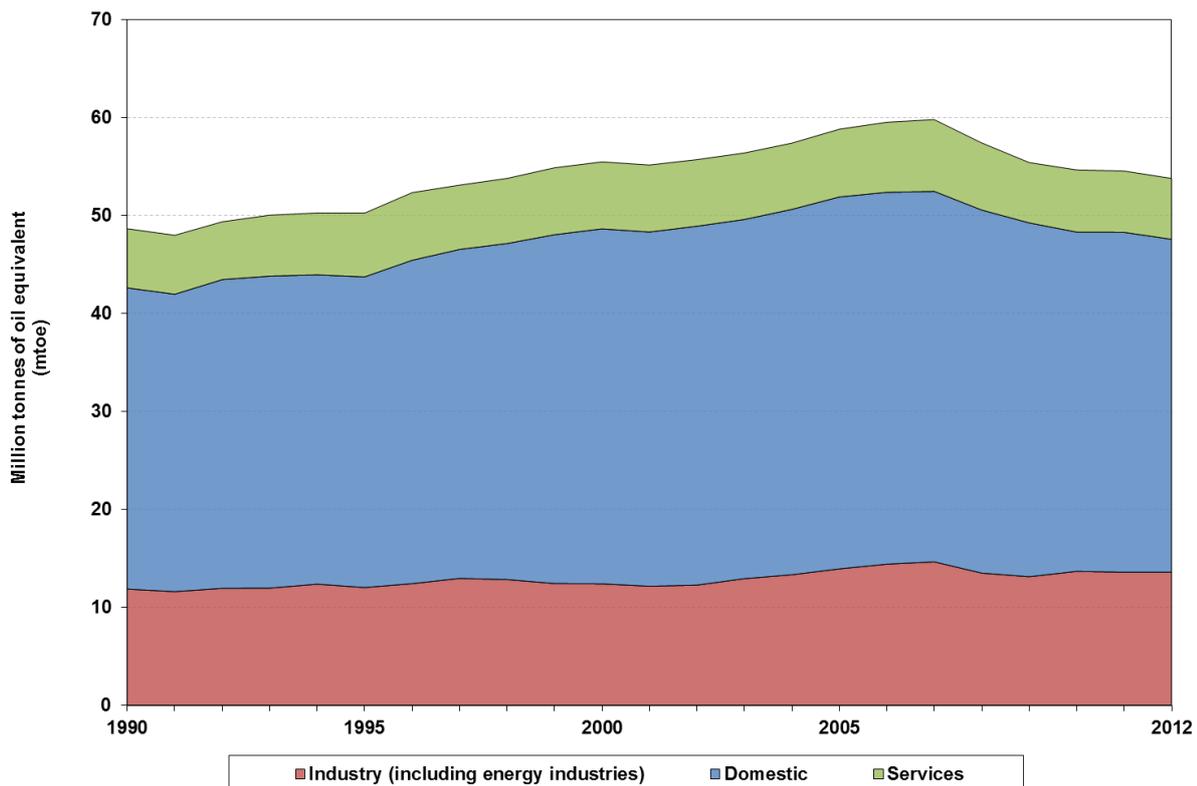
Source: DECC, ECUK Table 2.02

In 2013, cars accounted for 53 per cent of road transport consumption followed by Heavy Good Vehicles (HGV) with 23 per cent and Light Goods Vehicles (LGV) with 15 per cent.

3. Transport sector energy consumption by sector between 1990 and 2012

Within energy balances, energy used for transport is shown in the transport sector. However, transport energy consumption is used to support activity in the industrial, services and domestic sectors. Chart 5 below identifies the level of consumption for transport purposes of each of the three sectors between 1990 and 2012⁴.

Chart 5 Transport energy consumption reallocated to the services, domestic and industrial sectors, UK (1990 to 2012)



Source: DECC, ECUK Table 2.03

Since 1990, the industry and domestic sectors have seen an increase in energy consumption for transport. Transport energy consumption for domestic purposes increased by 11 per cent to 34.0 mtoe in 2012 and consumption for industrial purposes by 14 per cent (to 13.6 mtoe). The services sector saw an increase of 3 per cent to 6.2 mtoe.

Between 2011 and 2012, the domestic and services sectors showed reductions in consumption (decreasing by 0.7 mtoe and 0.1 mtoe respectively). The industrial sector remained constant.

In 2012, it was estimated that 63 per cent of all transport energy demand was from the domestic sector, 25 per cent from the industrial sector and 12 per cent from the services sector. The ratio between the three sectors has varied very little since 1990.

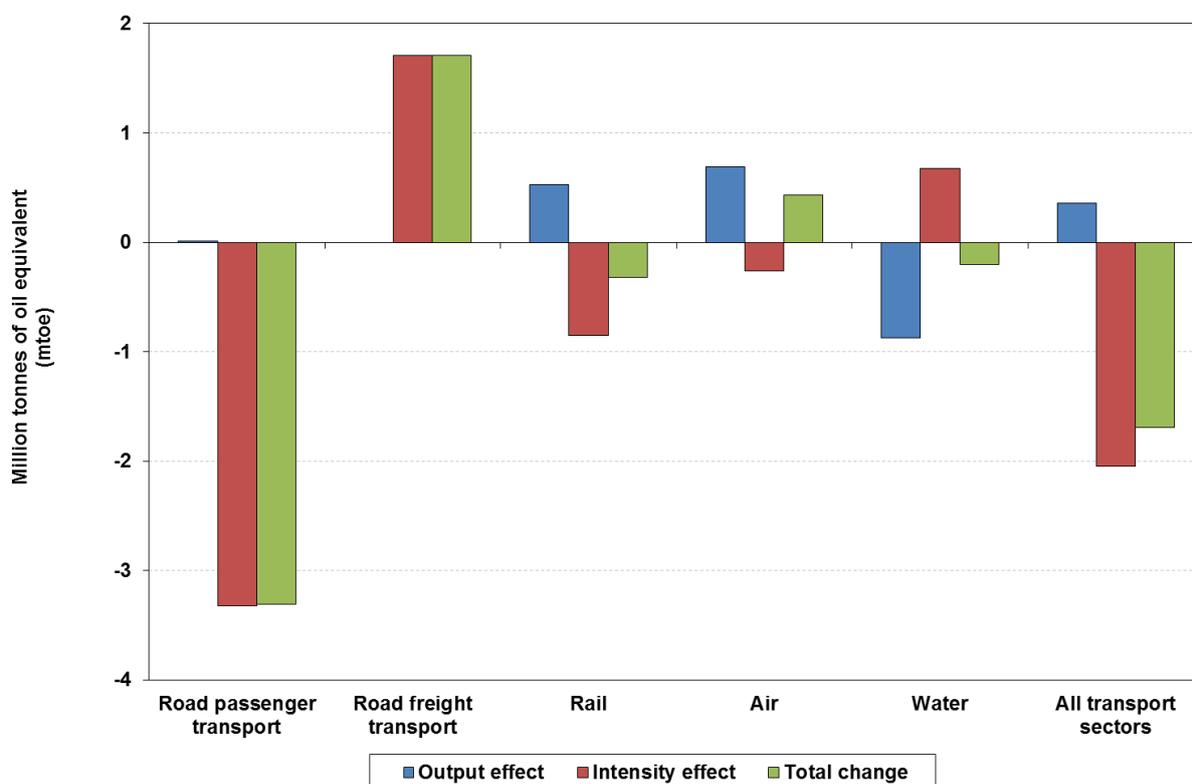
⁴ Some estimates made to construct Chart 5 are based on data published by Department of Transport. The most recent data available by Department of Transport covers 2012 data. Data for 2013 will be published in the July 2015 edition of ECUK.

4. Factors affecting transport energy consumption between 2000 and 2012

Energy consumption by the transport sector has decreased by 1.7 mtoe between 2000 and 2012. Chart 6 shows how this decline in consumption may be attributed to a change in transport use (the output effect is a measurement of how much energy consumption has changed as a result of increased demand for transport) and changes in structure and efficiency/intensity (that is, energy consumed per passenger kilometre or freight tonne kilometre). The decrease seen between 2000 and 2012 was largely driven by improvements in efficiency, rather than by reduced demand for transport services.

Consumption for road freight transport (1.7 mtoe) and air transport (0.4 mtoe) increased, whilst there were reductions in road passenger transport (3.3 mtoe), rail transport (0.3 mtoe) and water transport (0.2 mtoe).

Chart 6 Factors affecting change in transport energy use (between 2000 and 2012)



Source: DECC, ECUK Table 2.10

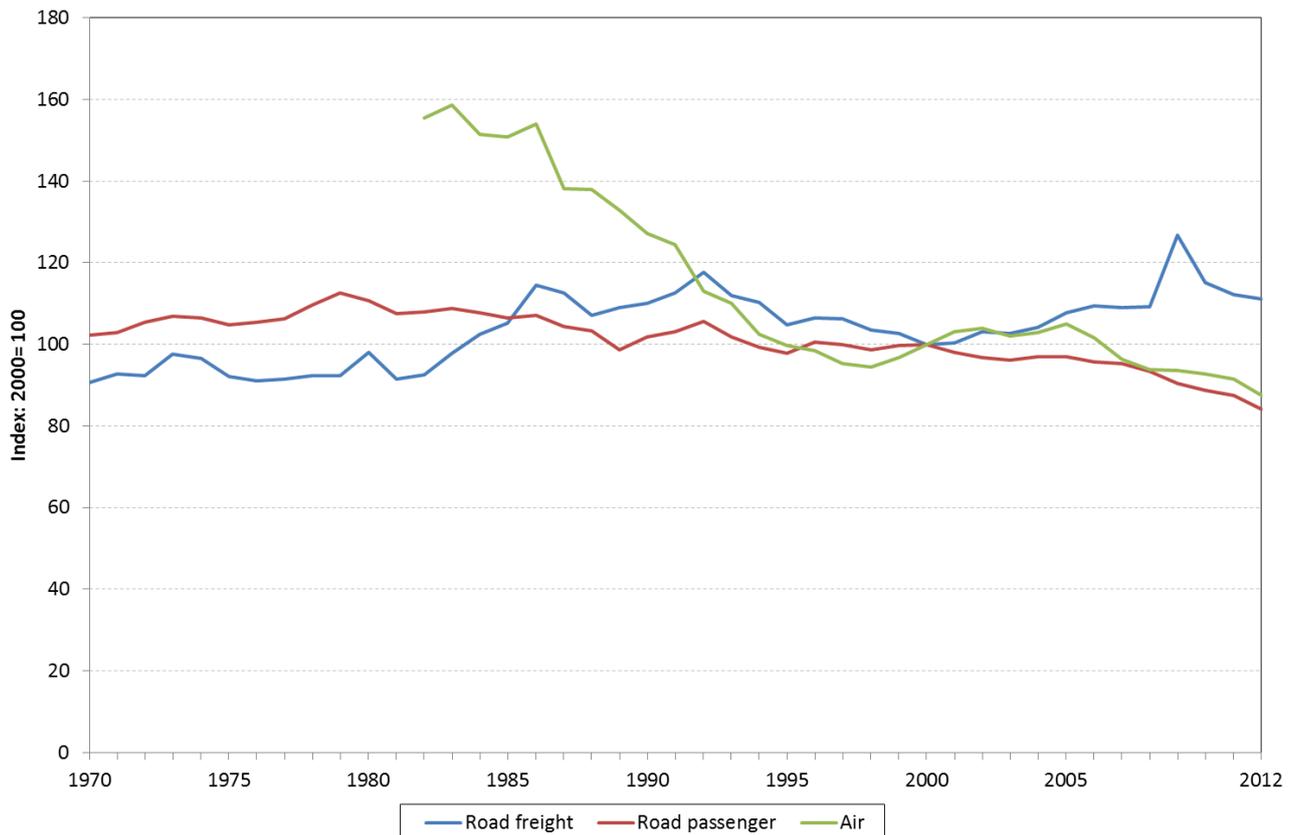
However, it has been estimated⁵ that if there had been no efficiency savings between 2000 and 2012, energy consumption in 2012 would have been 55.8 million tonnes of oil equivalent, 2.0 million tonnes of oil equivalent higher than the actual consumption. By looking at the relationship between energy consumption and distance travelled or load carried it is possible to

⁵ Further information about this estimation is available in Chapter 2 of the User Guide, which can be accessed here: <https://www.gov.uk/government/organisations/department-of-energy-climate-change/series/energy-consumption-in-the-uk>.

measure energy intensity. For road passenger transport, energy intensity is measured in terms of consumption per passenger kilometre. To take into account of the weight carried, road freight transport intensity is measured in relation to freight tonne-kilometres. Air transport energy intensity is measured as energy consumption per passenger kilometre.

The road passenger transport sector had the largest fall in intensity, whilst the road freight transport sector had the highest rise in intensity. The change in intensity is shown in Chart 7, which has been indexed to 2000.

Chart 7 Energy intensities for road passenger, road freight and air transport (between 1970 and 2012)



Source: DECC, ECUK Table 2.11

Since 1970, road freight consumption per tonne-kilometres has increased by 23 per cent to 0.09 mtoe per billion tonne-kilometres lifted. This indicates that energy consumption increased at a higher rate than tonne-kilometres lifted. However, some of this increase may be a result of the economic slowdown seen in the last three years as the intensity increased by 2 per cent since 2007. This factor is also notable in prior recessions (Chart 7).

Between 1970 and 2012, road passenger energy consumption per passenger kilometres fell 18 per cent to 0.04 mtoe per billion passenger kilometres. This reduction comes mainly as a result of increased fuel efficiency of vehicles and consumers transferring from petrol cars to diesel cars. Since 1982, air transport energy consumption per passenger kilometre has fallen 44 per cent to 0.04 mtoe per billion passenger kilometres. The majority of this improved energy intensity occurred during the 1980's and early 1990's, and reflects the trend of more frequent long-haul flights and improved technologies. This is reflected in a reduction in energy consumption of 12 per cent since 1995.

Annex A Publication timetable for ECUK Chapter 2 tables in 2014

Users should note that in this edition of ECUK tables and analysis that contain data directly available from other sources will not be updated. These tables are clearly marked and web links to the published material are provided.

The table below illustrates when each table for this chapter will be published, and if it is not going to be updated, alternate links to the data are provided.

Table **Publication timetable for ECUK Chapter 2 tables in 2014**

Table number in publication (2014)	Table Name	To be published:	Link provided to another publication:
2.01	Transport energy consumption by type of transport and fuel 1970 to 2013	July	-
2.02	Road transport energy use by vehicle type, split by DERV and petrol 1970 to 2013	July	-
2.03	Transport energy consumption re-allocated to domestic, industrial and service sectors 1990 to 2012	July	-
2.04	Passenger kilometres by mode 1970 to 2011	<i>Not updated</i>	TSGB, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/259243/tsqb0101.xls
2.05	Trip distance per person per year by main mode and purpose 1985 to 2011	<i>Not updated</i>	NTS, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/35613/nts0410.xls
2.06	Freight tonne-kilometres by road, rail, air, water and pipeline on a 'Goods moved' basis 1970 to 2011	<i>Not updated</i>	TSGB, https://www.gov.uk/government/statistical-data-sets/tsqb02 Aviation: https://www.gov.uk/government/statistical-data-sets/avi02-employment-and-flight-destinations
2.07	Car use per person and car occupancy rates in Great Britain 1970 to 2011	<i>Not updated</i>	TSGB:https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/259243/tsqb0101.xls https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/200181/nts0905.xls
2.08	Fuel consumption factors for cars and lorries 1978 to 2011	<i>Not updated</i>	DfT, https://www.gov.uk/government/statistical-data-sets/tsqb03 (TSGB0303)
2.09	Passenger numbers and seat occupancy rates for UK airlines 1990 to 2011	<i>Not updated</i>	Aviation: https://www.gov.uk/government/statistical-data-sets/avi02-employment-and-flight-destinations
2.10	Output and intensity factors affecting changes in transport energy use between 1990 and 2012	July	-
2.11	Energy intensities by road passenger, road freight and air transport 1970 to 2012	July	-

Annex B Related DECC publications

Energy consumption statistics are also available in:

- **The Digest of UK Energy Statistics (DUKES).**

Much of the data contained in ECUK are based on estimates from DUKES. DUKES is an annual publication which includes tables, charts and commentary covering all the major aspects of energy, it provides a detailed and comprehensive picture of fuel production and consumption during the last three years.

The Digest is also available on the Internet. This includes some additional information including data (available in MS Excel format) from earlier years which are not contained in the printed copy publication. Available from The Stationery Office (0870 600 5522) or www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes

- **Energy Trends**

A quarterly publication which includes tables, charts and commentary covering all the major aspects of energy, it provides a comprehensive picture of energy production and use. Available on subscription (together with Quarterly Energy Prices) from DECC (0300 068 5041).

www.gov.uk/government/collections/energy-trends

- **Sub-national consumption statistics**

The sub-national data contain estimates at regional, local authority and MSOA/LSOA (for electricity and gas consumption statistics) geographies. However, it is worth noting that the data are not comparable with DUKES and ECUK due to differing data sources.

A full summary of the sub-national consumption datasets available, alongwith links to relevant datasets, is included on pages 10 and 11 of the sub-national methodology and guidance booklet, which can be accessed here:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/324877/Sub-national_methodology_and_guidance_booklet.pdf.

- **National Energy Efficiency Data-framework (NEED)**

The National Energy Efficiency Data-Framework (NEED) was set up by DECC to provide a better understanding of energy use and energy efficiency in domestic and non-domestic buildings in Great Britain. The data framework matches gas and electricity consumption data with information on energy efficiency measures installed in homes. It also includes data about property attributes and household characteristics.

www.gov.uk/government/collections/national-energy-efficiency-data-need-framework

Comparisons between DUKES, ECUK and sub-national consumption statistics are summarised in Annex C (page 76) of the sub-national guidance and methodology booklet:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/324877/Sub-national_methodology_and_guidance_booklet.pdf.

© Crown copyright 2014
Department of Energy & Climate Change
3 Whitehall Place
London SW1A 2AW
www.gov.uk/decc

URN 14D/210