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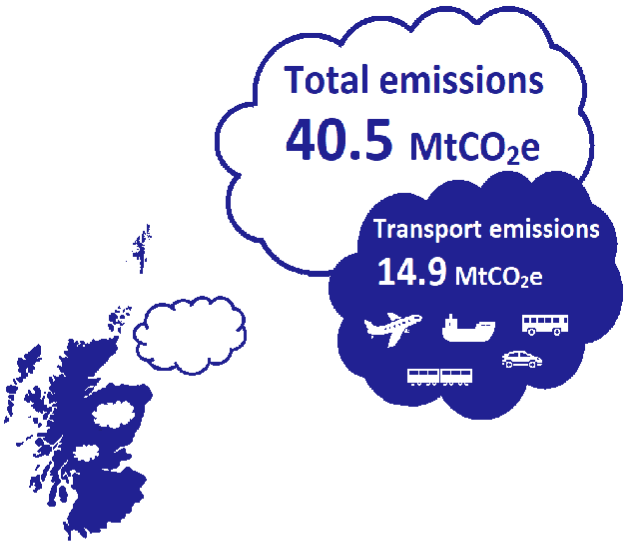
Carbon Account for Transport No. 11: 2019 Edition

EXECUTIVE SUMMARY

The Carbon Account for Transport (CAT) provides a balance sheet for Scotland's greenhouse gas emissions due to transport. This is the eleventh edition of the CAT, and provides analysis of transport emissions for the period between 1990 and 2017. The key findings from volume 11 are illustrated in the infographic summary below.

Transport accounted for 36.8% of Scotland's total greenhouse gas emissions in 2017.

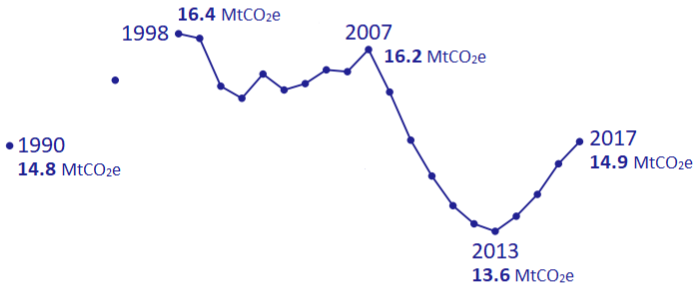
Scotland's total greenhouse gas emissions in 2017 were 40.5 megatonnes of carbon dioxide equivalent ($MtCO_2e$). Transport, including international aviation and shipping, accounted for 14.9 $MtCO_2e$.



2017 was the fourth consecutive year that Scotland's transport emissions have increased.

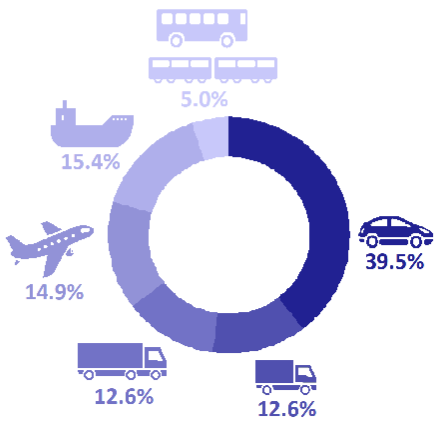
Scotland's transport emissions in 2017 were 2.2% higher than in 2016, and 0.4% higher than in 1990.

Transport emissions have risen every year since the previous low in 2013.



Cars were the most emitting transport mode in 2017.

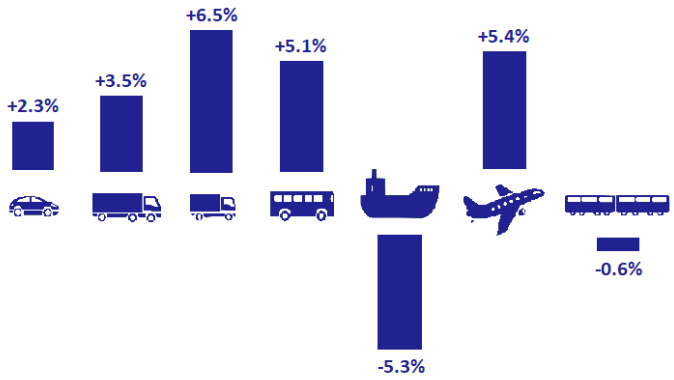
Cars accounted for 39.5% of Scotland's transport emissions in 2017. Goods vehicles contributed 25.2%, aviation and shipping accounted for 14.9% and 15.4%, respectively, and other transport modes accounted for 5.0%.



Road transport and aviation emissions increased between 2016 and 2017, while maritime and rail emissions decreased.

Road transport emissions rose in 2017, with car, HGV, LGV and bus emissions all higher than in 2016. Aviation emissions were also higher than in 2016.

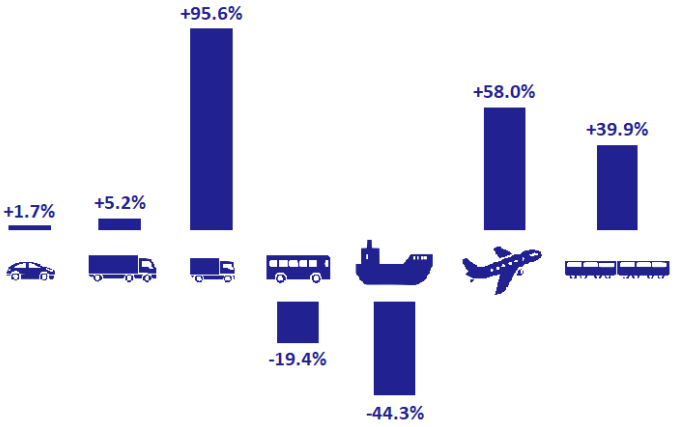
Shipping emissions saw the largest percentage decrease, with rail emissions also falling slightly.



Between 1990 and 2017, LGV emissions saw the largest percentage increase of all transport modes.

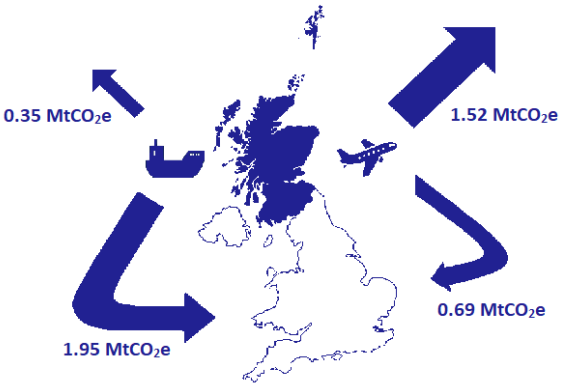
Aviation and rail emissions also increased substantially over this period.

Shipping emissions saw the largest percentage decrease of all transport modes, with bus emissions also falling.



The majority of aviation emissions were from international aviation, while shipping emissions were mostly from domestic shipping.

68.8% of aviation emissions in 2017 were due to international aviation, while just 15.2% of shipping emissions were due to international shipping.



Contents

1. Introduction

The Carbon Account for Transport (CAT) is published annually, and presents a detailed analysis of already published transport emissions data for Scotland. This is the eleventh edition of the CAT, and includes a detailed analysis of the latest emissions data (1990-2017), published by the National Atmospheric Emissions Inventory in June 2019.[1]

1.1 Purpose of the Carbon Account for Transport

Reducing carbon emissions from transport has been a consistent strategic outcome of Scotland's National Transport Strategy, and the 2006 National Transport Strategy included a commitment to publish an annual carbon balance sheet for transport. This commitment is met by the CAT.

The CAT provides updates on the following information:

- Scotland's annual transport emissions from 1990 to 2017;
- emissions efficiency estimates across different modes of transport;
- emissions efficiency of road vehicles registered in Scotland;
- comparison of Scotland's emissions to those of the UK as a whole;
- key leading transport emissions indicators.

Each of the above monitors progress towards reducing transport emissions and supports the development of future policies to meet the statutory emissions reduction targets. However, the CAT is not a decision making tool. Its purpose is to present data and analysis for the consideration of future transport options.

1.2 Policy context

Earlier this year, the First Minister acknowledged that Scotland – like the rest of the world – faces a Climate Emergency and confirmed that the Scottish Government would accept the recommendations of the UK Committee on Climate Change to set a target of **net zero greenhouse gas emissions by 2045** with interim reduction targets of **70% by 2030** and **90% by 2040**. The Scottish Government has committed to updating the Climate Change Plan within six months of the Climate Change Bill receiving Royal Assent so that it reflects the more ambitious targets being established.

The factors affecting transport emissions are numerous and complex. Transport is a derived demand and there is a strong correlation to economic and population growth as well as land use decisions. The largest share of transport emissions comes from cars, which are the dominant mode of transport in Scotland. There is a particular challenge associated with reducing car emissions as a result of an increasing trend in single occupancy car trips.

The transition to zero emission vehicles will reduce carbon emissions significantly. We have already set out a bold ambition to phase out the need for new petrol and

[1] Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2017, National Atmospheric Emissions Inventory, Department for Business, Energy and Industrial Strategy, 2019.

diesel cars and vans by 2032. This year's Programme for Government builds on this commitment to work with public bodies, the automotive sector and Scotland's innovation community to phase out the need for all new petrol and diesel vehicles in Scotland's public sector fleet by 2030.

In order to create successful places in the future means addressing more than just carbon emissions, it also means considering the combined effects of continued car dependency leading to more urban sprawl, inactive lifestyles and congestion. Our National Transport Strategy (NTS2), which is currently out for public consultation, recognises that we need to manage the demand for transport to help create great places for our future.

To do this we will embed the Sustainable Travel Hierarchy in decision making, promoting walking, wheeling, cycling, public transport and shared transport options in preference to single occupancy private car use. At the national level the Sustainable Investment Hierarchy will be used to inform budgetary decisions. This will consider investment aimed at reducing the need to travel unsustainably in the first instance.

This Government is strongly committed to investing in active travel and last year we doubled our annual investment in cycling and walking from £40 million to £80 million. That increased investment will continue, and is currently enabling 11 large-scale projects across Scotland.

Buses provide an essential service to millions of Scots, accounting for almost three quarters of all public transport journeys. In this year's Programme for Government we have committed to bringing forward transformational long term funding for bus of over half a billion pounds to reduce the impacts of congestion on bus services and encourage more people to make sustainable multi-modal journeys. The investment will take the form of a Bus Partnership Fund for local authorities and the roll out of infrastructure for the trunk road network to prioritise high occupancy vehicles, such as buses.

Emissions from aviation cannot be ignored and Scotland has shown global leadership by being the first country to include international aviation and shipping emissions in its statutory climate targets. Our ownership of Highlands and Islands Airports Ltd (HIAL) creates a unique opportunity for Scotland to create the world's first zero emission aviation region and to support the trialling and introduction of low or zero emission planes operating between airports across the Highlands and Islands, with the first such trials taking place in 2021. We will lead the charge to zero emission aviation with work to decarbonise all scheduled flights between airports within Scotland by 2040.

1.3 Background data and sources

All historical emissions data presented in this report were originally published in *Greenhouse Gas Inventories for England, Wales, Scotland and Northern Ireland: 1990-2017* by the National Atmospheric Emissions Inventory. Data from other sources, such as Scottish Transport Statistics, are also presented in the report.

Each year, greenhouse gas inventories are updated to reflect improvements in the methodology used to estimate emissions, which often results in revisions to the entire time series. As such, the data in this report should not be compared to data published in previous editions of the CAT. A number of minor methodological changes have been made in this year's inventory, most notably the revision of several factors used in the calculation of maritime emissions. As a result, historical emissions estimates have generally seen a slight increase compared to previous estimates, with a more substantial revision to the 2016 figures.

Emissions from international aviation and shipping (IAS) were not originally reported in the inventory, but have been included since 2009 under a separate category called *Exports*. The Scottish Government has committed to including emissions from IAS in emissions targets, hence references to maritime and aviation emissions refer to the combined total of domestic and international emissions, unless otherwise stated.

In line with the methodology used to report against the Climate Change (Scotland) Act, emissions from transport only include those at the point of use, also known as tailpipe emissions. Lifestyle and displaced emissions, such as emissions from generating the electricity to power electric trains, are not included.

1.4 Measurement of greenhouse gas emissions

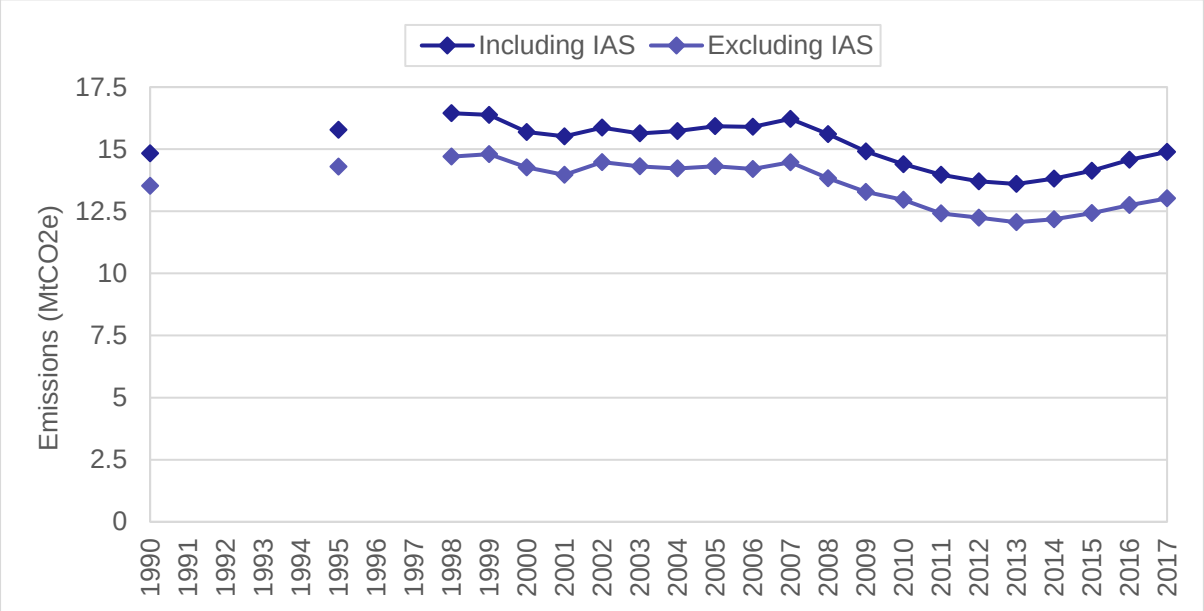
The emissions inventory reports emissions of carbon dioxide (CO_2), methane, nitrous oxide, and the four F-gases (hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride, and nitrogen trifluoride). Overall emissions are given as a single figure, measured in megatonnes or kilotonnes of carbon dioxide equivalent ($MtCO_2e$ or $KtCO_2e$), by weighting non-carbon dioxide gases by their global warming potential (GWP). The GWP of a greenhouse gas is defined as its warming influence relative to that of carbon dioxide over a 100 year period. For example, the global warming potential of methane over 100 years is 21, meaning that each tonne of methane emitted causes the same level of warming over 100 years as 21 tonnes of CO_2. Approximately 99% of equivalent emissions in Scotland's transport sector are due to CO_2, therefore a breakdown of emissions by greenhouse gas is not included in this report.

2. Emissions trends for Scotland

In 2017, Scotland's total emissions, measured at source, were 40.5 $MtCO_2e$. This is a reduction of 3.3% from the 2016 figure of 41.9 $MtCO_2e$, and 46.8% below the 1990 baseline of 76.3 $MtCO_2e$. The general downward trend in total emissions has been driven by a reduction in emissions from the energy supply, business and industrial processes, waste management, and agriculture and related land use sectors.

Transport emissions, including international aviation and shipping, accounted for 14.9 $MtCO_2e$ in 2017; a 2.2% increase from 2016 and 0.4% above the 1990 baseline. It is the fourth consecutive year that transport emissions have risen since the previous low in 2013, and the first year since 2009 that transport emissions have exceeded the 1990 baseline. Figure 1 shows Scotland's annual transport emissions between 1990 and 2017.

Figure 1: Time series of Scotland's total transport emissions, 1990-2017.

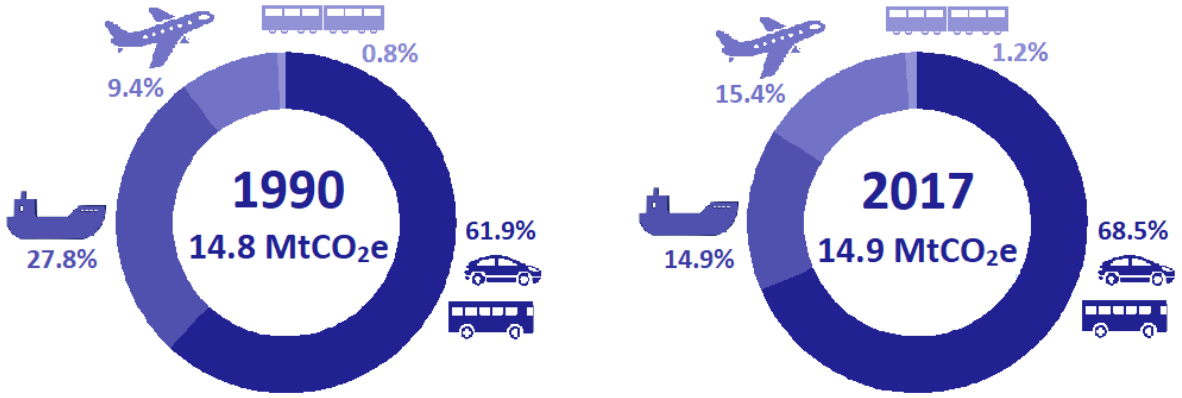


Source: National Atmospheric Emissions Inventory.

Transport (including IAS) was the largest contributing sector to total Scottish greenhouse gas emissions for the third consecutive year in 2017, accounting for 36.8% of Scotland's total emissions.

Road transport accounted for 10.2 $MtCO_2e$ (68.5% of all transport emissions), the largest share of all transport modes. Emissions for shipping and aviation were 2.30 $MtCO_2e$ (15.4%) and 2.21 $MtCO_2e$ (14.9%) respectively, and rail emissions were 0.17 $MtCO_2e$ (1.2%). Since 1990, the share of transport emissions due to shipping has generally fallen, while the shares due to road, rail and aviation have generally increased. Figure 2 illustrates the sectoral contributions to Scotland's transport emissions in 1990 and 2017.

Figure 2: Share of transport emissions by transport sector, 1990 and 2017.



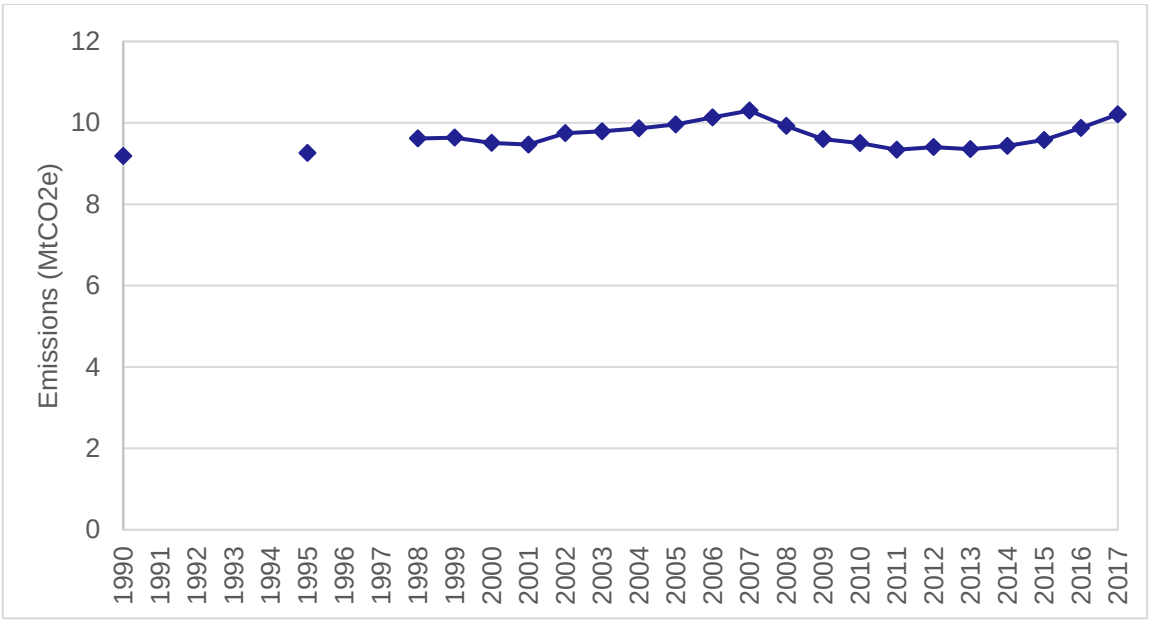
Source: National Atmospheric Emissions Inventory.

A detailed discussion of emissions for each transport sector is presented in sections 2.1-2.4.

2.1 Road transport

Road transport emissions were 10.2 $MtCO_2e$ in 2017, accounting for 68.5% of Scotland's total transport emissions. Figure 3 shows Scotland's annual road transport emissions between 1990 and 2017.

Figure 3: Time series of Scotland's road transport emissions. 1990-2017.



Source: National Atmospheric Emissions Inventory.

A number of factors have influenced the fluctuations in road transport emissions in recent years. While road vehicles have become more fuel efficient, this has largely been offset by an increase in vehicle kilometres. Since 2011, total road vehicle kilometres have increased every year, and in 2017 were higher than at any point in the 10 years prior. Between 2011 and 2017, road emissions increased by 9.3%, while road vehicle kilometres increased by 10.6% over the same period. Conversely,

between 2007 and 2011 road emissions fell by 9.3% while vehicle kilometres fell by 2.9%.[2]

2.1.1 Road emissions by vehicle type

Cars

Car emissions were 5.89 $MtCO_2e$ in 2017, an increase of 2.3% from 2016, and 1.7% above the 1990 baseline. Between 2016 and 2017 car kilometres increased by 2.4%. Cars accounted for 39.5% of all transport emissions, the largest contribution of any transport mode, and 57.7% of road transport emissions. Car emissions have risen every year since 2013, before which they had generally fallen since 2007.

Heavy goods vehicles

HGV emissions were 1.88 $MtCO_2e$ in 2017, an increase of 3.5% from 2016, and 5.2% above the 1990 baseline, accounting for 12.6% of all transport emissions. Between 2016 and 2017 HGV kilometres increased by 2.0%.

Light goods vehicles

LGV emissions were 1.87 $MtCO_2e$ in 2017, an increase of 6.5% from 2016. LGV emissions have increased by 95.6% since 1990, the largest increase of all road transport modes, and have increased every year since 2009. LGV kilometres have also increased significantly in recent years. Between 2016 and 2017 LGV kilometres increased by 7.7%. This has coincided with recent growth in the UK e-commerce market, for which LGVs are a prime means of delivery. The UK e-commerce market grew by 15.8% in 2017, the largest year-on-year increase since 2011.[3]

Buses and coaches

Bus and coach emissions totalled 0.48 $MtCO_2e$ in 2017, 3.2% of all transport emissions. This is an increase of 5.1% from 2016, but is 19.4% lower than the 1990 baseline. In general, bus emissions have gradually declined since 1990. Bus kilometres increased by 3.7% between 2016 and 2017, but have generally been decreasing since 2010.

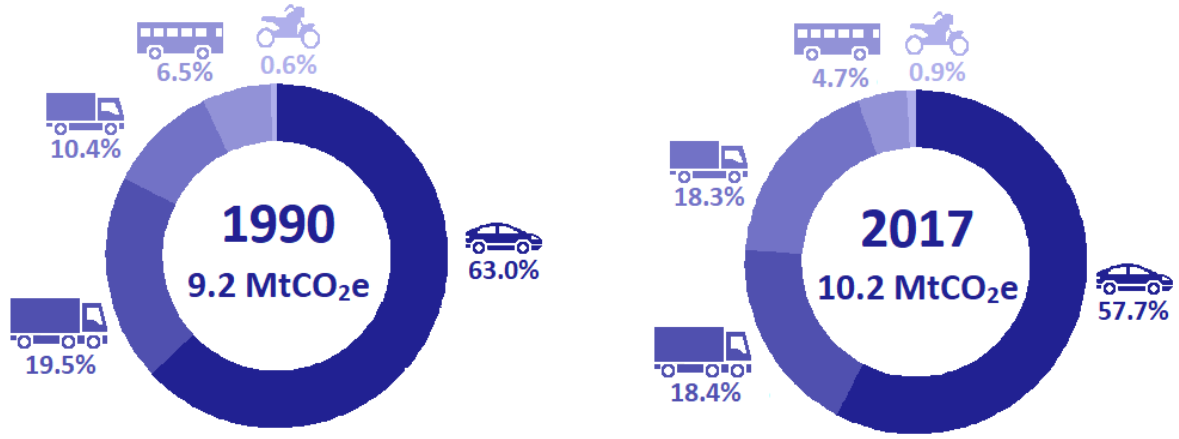
Motorcycles

Motorcycle emissions for 2017 were 0.04 $MtCO_2e$, an increase of 6.2% from 2016, but 8.7% below the 1990 baseline. Between 2016 and 2017, motorcycle kilometres increased by 5.5%. Motorcycles accounted for 0.2% of Scotland's transport emissions in 2017.

Figure 4 shows the proportion of Scotland's total road emissions contributed by each transport mode, in 1990 and 2017.

[2] Scottish Transport Statistics No. 37, 2018 Edition, table 5.3
[3] E-commerce and ICT activity, UK: 2017, Office for National Statistics

Figure 4: Proportion of Scottish road transport emissions by transport mode, 1990 and 2017.



Source: National Atmospheric Emissions Inventory.

2.1.2 Road emissions by type of road

Emissions from motorway driving were 1.94 $MtCO_2e$ in 2017, an increase of 2.7% from the previous year, and accounted for 19.1% of road emissions. Motorway emissions have increased significantly since 1990, with the 2017 figure 73.5% above that of the 1990 baseline. This increase in motorway emissions has coincided with a significant increase in the length of Scotland's motorway network. Between 1990 and 2017 Scotland's motorway network increased in length from 312km to 645km. Motorway vehicle kilometres rose from 3.2 billion in 1990 to 8.1 billion in 2017.[4]

Rural road emissions were 4.52 $MtCO_2e$ in 2017, accounting for 44.6% of road emissions, and urban road emissions were 3.68 $MtCO_2e$ (36.3%). The methodology used to classify between urban and rural roads has changed since the last publication, therefore it is not possible to compare the most recent emissions figures for these roads to previous years. However, between 1990 and 2016 there was a small decrease in urban emissions, and a slight increase in rural emissions.

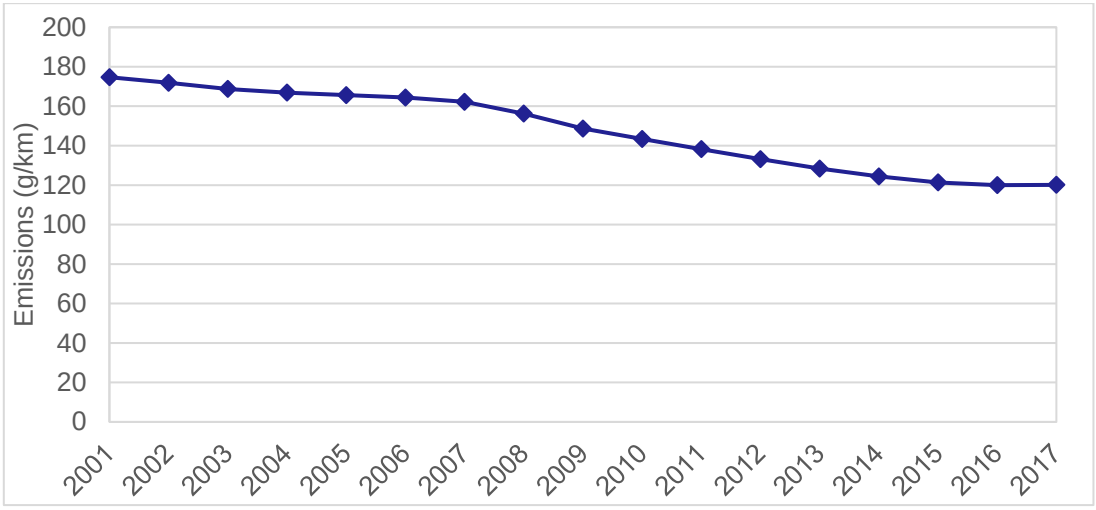
2.1.3 Emissions of licensed vehicles

There were 249,713 new vehicle registrations in Scotland in 2017, a decrease of 7.6% from the previous year. The total number of vehicles registered in Scotland at the end of 2017 was 2.96 million, 1.5% more than at the end of 2016.

The average CO_2 emissions of new cars registered in Scotland in 2017 was 120.2g per kilometre, 0.1% higher than the 2016 all-time low of 120.0 g/km. This was the first time that the average emissions of new car registrations increased since records began in 2001, and is broadly due to a shift towards the registration of larger models. Figure 5 shows the average annual emissions of newly registered cars in Scotland.

[4] Scottish Transport Statistics No. 37, 2018 Edition, tables 4.1 and 5.1

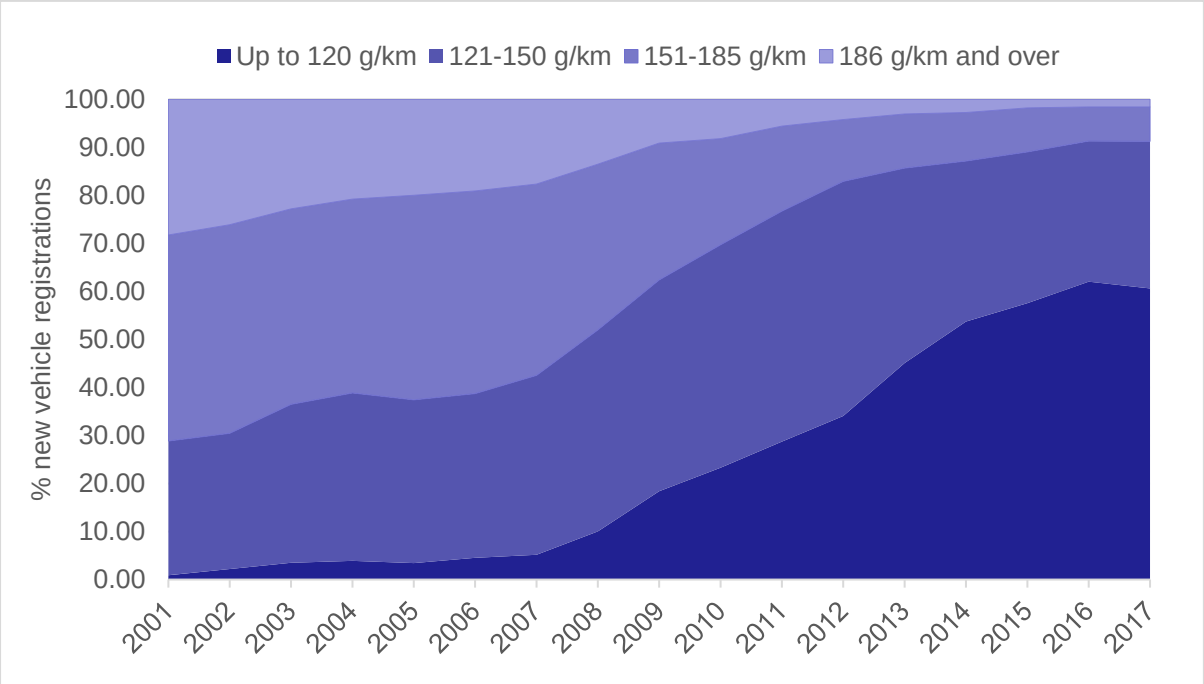
Figure 5: Average emissions of newly registered cars in Scotland, 2001-2017.



Source: Scottish Transport Statistics, table 13.6a.

The proportion of new cars registered in higher emissions bands fell significantly between 2001 and 2017. In 2001, 71% of newly registered cars, for which emissions were known, had emissions of at least 151 g/km, compared with just 9% in 2017.[5] The proportion of newly registered cars with emissions of less than 120 g/km rose from 1% in 2001 to 61% in 2017. Figure 6 illustrates the proportions of newly registered cars in each emissions band.

Figure 6: Newly registered cars in Scotland by emissions band, 2001-2017.

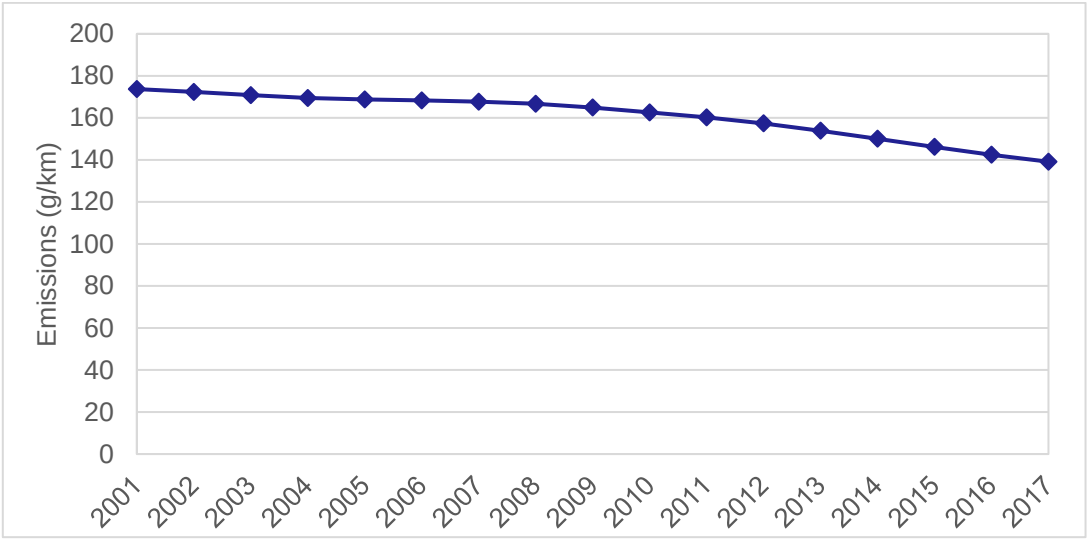


Source: Scottish Transport Statistics, table 13.6a.

[5] The proportions displayed in Figure 6 and Figure 8 are represent vehicles for which the emissions band are known only. In 2001, emissions were not known for 25.6% of new registrations, however this had fallen to less than 2% by 2003.

The improvements in efficiency of newly registered cars between 2001 and 2017 caused the average emissions of all cars licensed in Scotland to decrease every consecutive year during this period. At the end of 2017, the average CO_2 emissions of cars licensed in Scotland was 139.1 g/km, down 2.3% from the previous year, and 19.9% below the 2001 average. Figure 7 shows average annual average emissions of all cars licensed in Scotland.

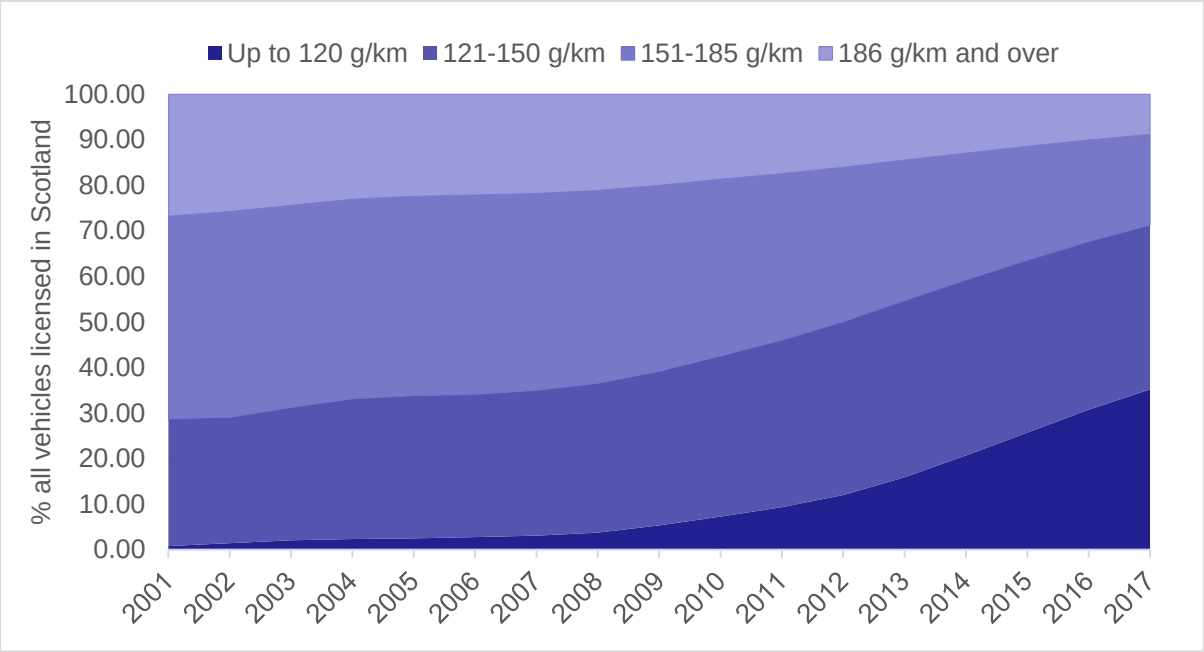
Figure 7: Average emissions of all cars licensed in Scotland, 2001-2017.



Source: Scottish Transport Statistics, table 13.6b.

The proportion of all cars licensed in Scotland emitting 120g/km of CO_2 or less increased from 1% in 2001 to 35% in 2017, while the proportion of cars emitting 186g/km or more of CO_2 fell from 27% in 2001 to 9% in 2017. Figure 8 shows the proportions of all licensed cars by emissions band between 2001 and 2017.

Figure 8: Cars licensed in Scotland by emissions band, 2001-2017.



Source: Scottish Transport Statistics, table 13.6b.

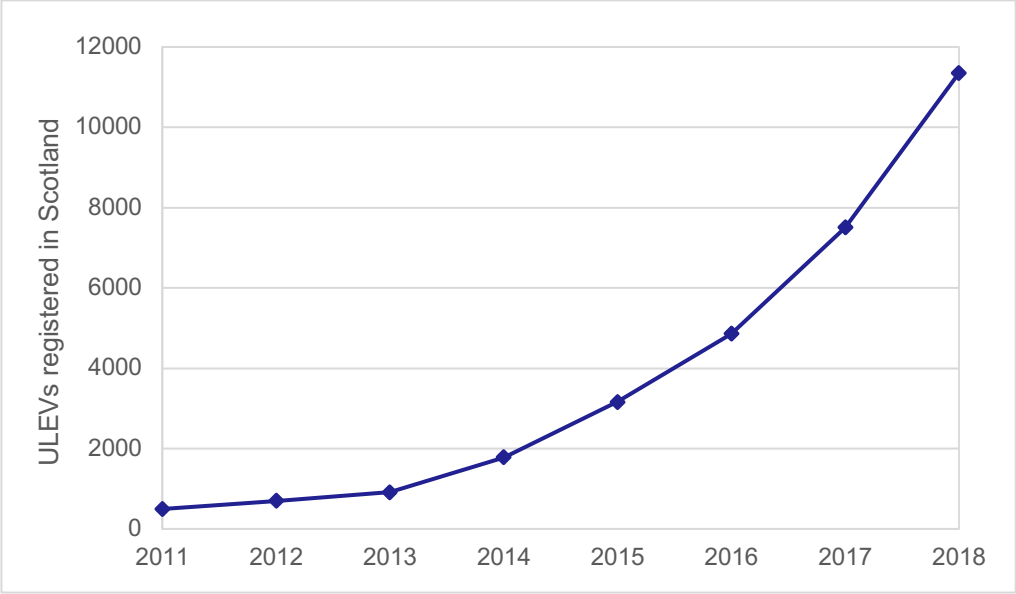
2.1.4 Ultra-low emissions vehicles (ULEVs)

The Scottish Government has committed to phasing out the need for new petrol and diesel cars and vans by 2032. This will be supported by a significant increase in the uptake of ultra-low emissions vehicles.

An ultra-low emissions vehicle (ULEV) is defined as any road vehicle that emits less than 75g of CO_2 per kilometre. ULEVs include battery electric vehicles, hybrid electric vehicles, range-extended electric vehicles, and hydrogen fuel cell vehicles.

The number of ULEVs registered in Scotland has been grown significantly in recent years, from 497 vehicles in 2011 to 11,350 ULEVs registered in Scotland at the end of 2018 Figure 9 shows the total number of ULEVs registered in Scotland at the end of each year, for 2011 to 2018.

Figure 9: Number of ULEVs registered in Scotland at year end, 2011-2018.



Source: Scottish Transport Statistics, table 13.8.

44% of respondents to the 2018 Scottish Household Survey said they would consider buying an electric car or van, an increase from 41% in 2016. For respondents who said they would not consider buying an electric vehicle, the main deterrents were the distance that could be travelled on a single charge (46%) and the availability or convenience of charging points (also 41%).[6]

Scotland's electric vehicle charging network, ChargePlace Scotland, has grown substantially in recent years. At the end of 2017 there were 1,032 public and non-public (workplace) charge points available on the ChargePlace Scotland estate, and by the end of 2018 this had increased by a further 14.8% to 1,185.

In 2017, the ChargePlace Scotland network was used 424,865 times and provided charge for 20.7 million electric vehicle kilometres. In 2018 it was used 590,590 times and provided charge for 32.7 million electric vehicle kilometres.

[6] Transport and Travel in Scotland 2018, tables 49 and 51

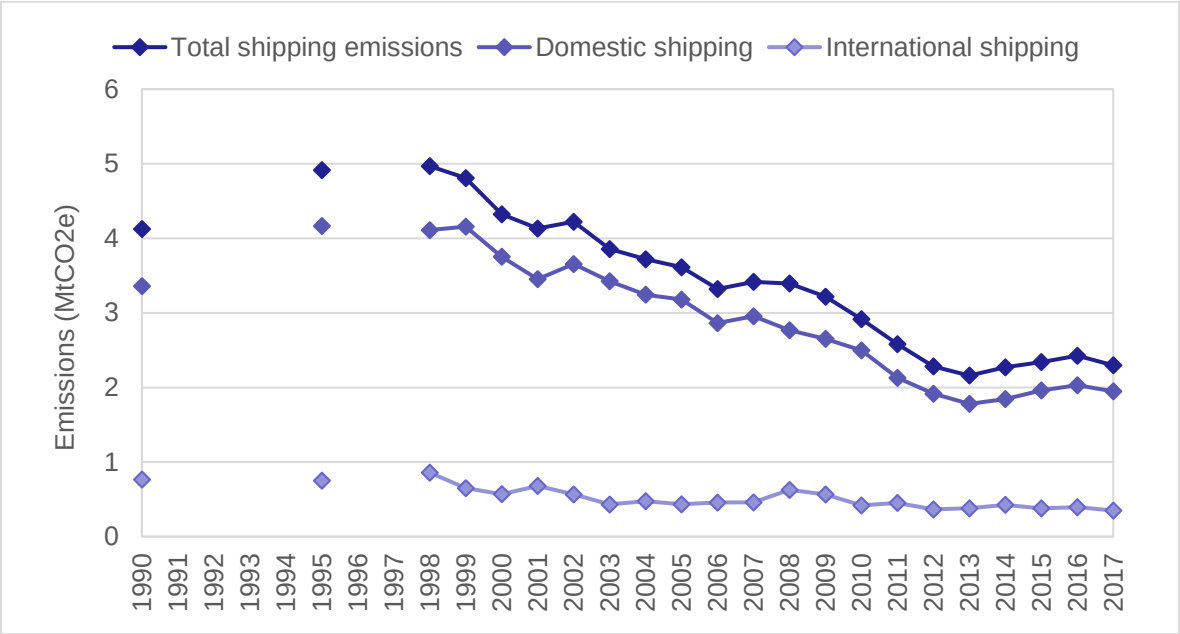
2.2 Shipping

Shipping emissions were 2.30 $MtCO_2e$ in 2017, a decrease of 5.3% from 2016 and 44.3% below the 1990 baseline. This accounted for 15.4% of transport emissions.

Both domestic and international shipping emissions fell in 2017, with domestic shipping accounting for 1.95 $MtCO_2e$ and international shipping accounting for 0.35 $MtCO_2e$. This is an all-time low for international shipping. Since 1990, domestic shipping emissions have fallen by 42% and international shipping emissions have fallen by 54.3%.

Figure 10 shows Scotland's annual shipping emissions between 1990 and 2017.

Figure 10: Time series of Scotland's shipping emissions, 1990-2017.



Source: National Atmospheric Emissions Inventory.

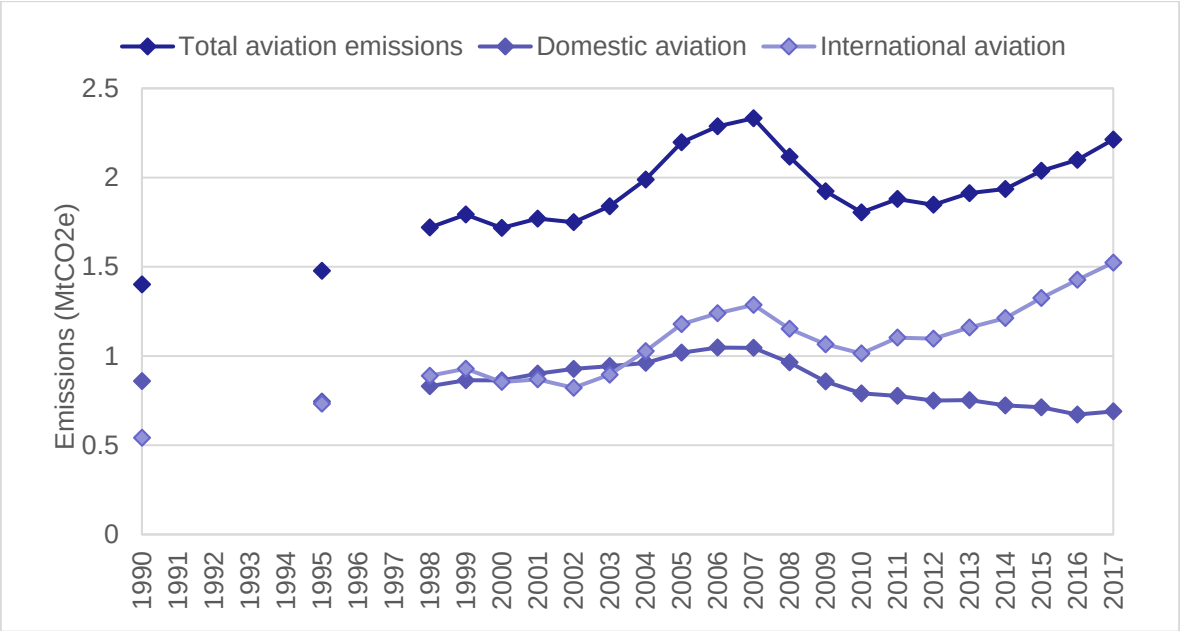
2.3 Aviation

Total aviation emissions, including aircraft support vehicles and military aircraft, were 2.21 $MtCO_2e$ in 2017, an increase of 5.4% from 2016 and 58.0% above the 1990 baseline. Aviation emissions were 14.9% of Scotland's total transport emissions in 2017, the largest share they have ever accounted for.

Both domestic and international aviation emissions rose in 2017, with domestic aviation accounting for 0.69 $MtCO_2e$ and international aviation accounting for 1.52 $MtCO_2e$. Since 1990, domestic aviation emissions have decreased by 19.7% while international aviation emissions have risen by 181.3%.

Figure 11 shows Scotland's annual aviation emissions between 1990 and 2017.

Figure 11: Time series of Scotland's aviation emissions, 1990-2017.

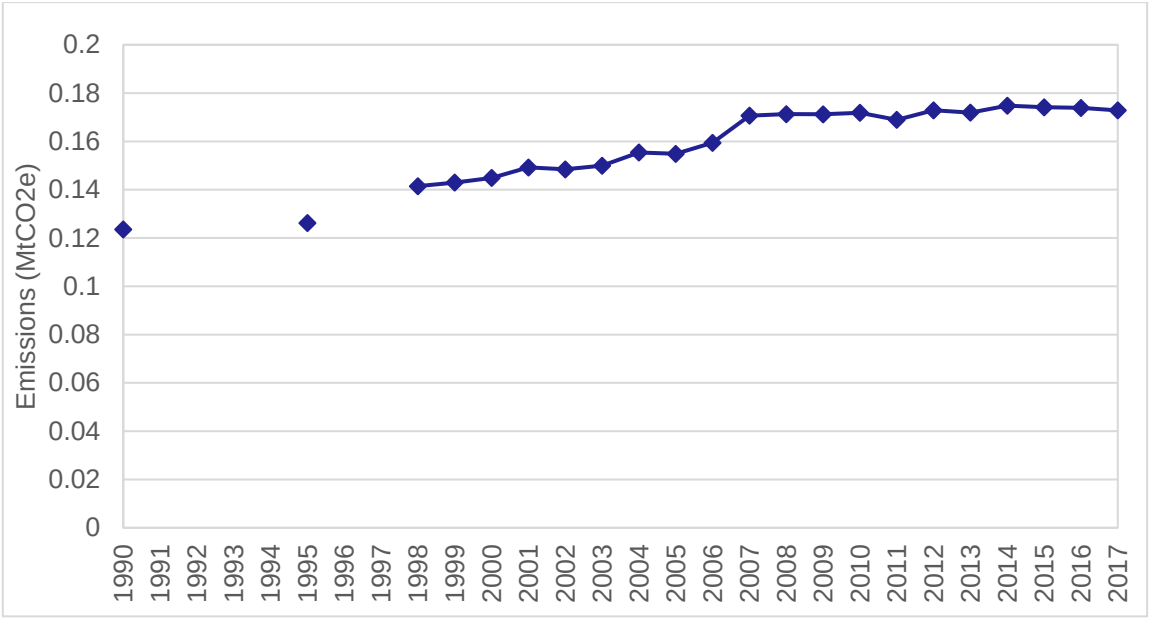


Source: National Atmospheric Emissions Inventory.

2.4 Rail

Rail accounted for 0.17 $MtCO_2e$ (1.2%) of transport emissions in 2017, a decrease of 0.6% from 2016, but 39.9% above the 1990 baseline. Figure 12 shows Scotland's annual rail emissions between 1990 and 2017.

Figure 12: Time series of Scotland's rail emissions, 1990-2017.



Source: National Atmospheric Emissions Inventory.

The general long-term increase in rail emissions has largely been due to a significant increase in the number of rail passengers. In the 10 years to 2017, passenger kilometres increased by 22.0%, and scheduled train kilometres increased by 14.4%.

3. Efficiency of transport modes

The emissions figures for each transport mode presented in the previous section are largely dependent on the usage of that transport mode, therefore they do not give any information on how efficient that mode of transport is for a passenger to travel on. This section presents a discussion of the efficiency of various transport modes, measured in terms of their emissions per passenger kilometre (pkm). The data presented in this section are provided by DEFRA[7] and are for the UK as a whole, not just Scotland.

The table below provides the average efficiencies of key transport modes for the years 2012-2017.

Table 1: Emissions per Passenger Kilometre of key transport modes

Sector	Mode and fuel	gCO_2e/pkm					
		2012	2013	2014	2015	2016	2017
Road	Average petrol car	133	131	128	128	129	124
	Average diesel car	124	121	123	122	123	119
	Average hybrid car	89	87	89	86	89	79
	Average petrol motorbike	119	119	120	120	120	117
	Average bus	112	112	110	109	102	103
	Average coach	29	29	29	29	29	28
Rail	National rail	58	49	47	45	49	47
	Light rail and tram	68	60	62	55	54	44
Ferry	Average foot and car passengers	116	116	116	116	116	116
Aviation	Average domestic flight	182	173	155	158	147	141
	Average short haul international	104	102	88	90	89	95
	Average long haul international	119	120	111	105	101	104

A summary of trends in efficiency for different transport modes is presented below.

Road transport

Petrol cars were more emitting than diesel cars in 2017, although the gap has narrowed compared to previous years. Hybrid cars were substantially more efficient, with emissions of 36.5% and 34.1% less than petrol and diesel cars, respectively.

Improvements in fuel efficiency of cars between 2012 and 2017 were slightly offset by a decrease in the average number of car occupants. The average number of travellers per car decreased from 1.513 in 2012 to 1.500 in 2017,[8] which meant that reductions in emissions per passenger kilometre were proportionately less than reductions in emissions per car kilometre.

[7] Greenhouse gas reporting: conversion factors 2017, Department for Business, Energy & Industrial Strategy
[8] Transport and Travel in Scotland 2017, Table TD9

Rail

Other than coach travel, rail was the most efficient means of transport in 2017. Both national rail and light rail and tram services saw reductions in average emissions per passenger kilometre between 2012 and 2017. A number of factors may have influenced this, including increased electrification of the rail network, improved fuel efficiency of trains, and increased capacity of train services.

Aviation

Despite a reduction in average emissions per passenger kilometre of 22% between 2012 and 2017, domestic aviation remained the least efficient means of travel in 2017. Since a large proportion of aviation emissions is due to take-off and landing, international aviation is on average more efficient than domestic aviation per passenger kilometre.

Passenger ferries

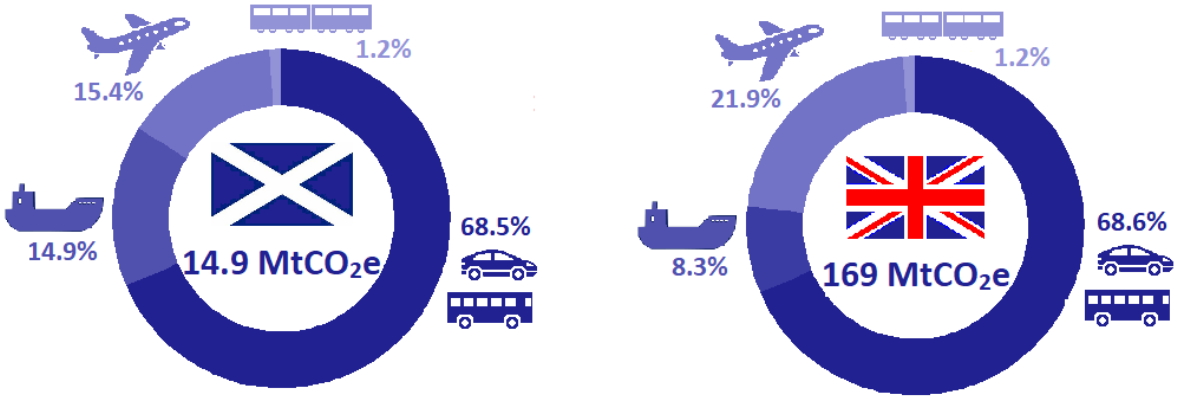
Ferry travel saw little change in efficiency between 2012 and 2017, with average emissions of 116 gCO_2e/pkm throughout the period.

4. Comparison of key Scottish and UK transport emissions statistics

In 2017, Scotland's transport emissions accounted for 8.8% of the UK's total transport emissions including IAS, and 10.3% excluding IAS.

Road and rail accounted for a similar proportion of the UK's total emissions to Scotland; however, a substantially greater proportion of the UK's transport emissions is due to aviation, and a smaller proportion is due to shipping. Figure 13 illustrates the sectoral compositions of total transport emissions for Scotland and the UK in 2017.

Figure 13: Proportions of Scotland and UK transport emissions by transport sector, 2017.



Source: National Atmospheric Emissions Inventory

Domestic aviation and shipping accounted for proportionately more emissions in Scotland compared to the UK as a whole, contributing 32.7% and 32.2% of the UK's total emissions for these transport modes, respectively. Conversely, Scotland contributed proportionately less to international aviation emissions compared to the whole UK, accounting for just 4.4% of the UK's total international aviation emissions.

Between 1990 and 2017, Scotland's transport emissions, including IAS, increased by 0.4%. Over the same period, the UK's transport emissions rose by 14.2%. Excluding IAS, there was a 3.7% fall in Scotland's transport emissions between 1990 and 2017 and a 1.3% rise in the UK's transport emissions. The large rise in total UK emissions over this period is largely attributable to a significant growth in international aviation traffic.

5. Outlook

This report has presented emissions data for Scotland's transport sector between 1990 and 2017. Over this period, Scotland's transport emissions have fluctuated but are now slightly above the 1990 baseline level, and transport is now the largest source of emissions in Scotland. This means the transport sector now plays an increasingly important role in reducing Scotland's emissions.

The emissions data presented in this report are not published until 18 months after the end of the last year reported, therefore it is not possible to present any information about Scottish emissions in 2018 at this stage. However, some indicators of Scotland's transport emissions for 2018 are available:

- *Road vehicle kilometres.* Road vehicle kilometres increased by 0.3% between 2017 and 2018. In comparison, between 2016 and 2017 Scotland's road vehicle kilometres increased by 3.3%.[9]
- *ULEV sales.* The number of ULEVs registered for the first time in Scotland increased from 2,546 in 2017 to 3,537 in 2018, an increase of 38.9%. The total number of ULEVs registered in Scotland increased by 51.2% from 7,508 to 11,350 in 2018.[10]
- *Efficiency of registered vehicles.* The average CO_2 emissions of new car registrations increased from 120.2 g/km in 2017 to 123.6g/km in 2018. However, the average emissions of all cars registered in Scotland fell from 139.1 g/km to 136.5 g/km.[11]
- *Aircraft movements.* The number of aircraft movements decreased from 495,000 in 2017 to 481,000 in 2018.[12]

In addition to the above indicators, 2018 was the first full year in which the Edinburgh to Glasgow railway line was fully electrified; emissions data for 2018 will give an indication of the extent to which this has affected rail emissions.

[9] Road traffic statistics, table TRA0206, Department for Transport
[10] Vehicle licensing statistics, table VEH0132, Department for Transport
[11] Vehicle licensing statistics, tables VEH0206 and VEH0256, Department for Transport
[12] Scottish Transport Statistics No. 37, 2018 Edition, table 8.1

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