

Food Transport Indicators to 2010

Four key indicators measure the environmental and social impact of food transport for UK consumers: urban food kilometres, HGV food kilometres, air food kilometres and CO₂ emissions from food transport. Transport of exported food is not covered.

This statistics notice updates the four indicators with data for 2010 and revises previous data.

Key Messages

- No strong evidence of change in the impacts of food transport
- Despite rises in 3 of the 4 indicators, the underlying trends may not have changed
 - Increase in Indicator 1 is not statistically significant
 - Increase in Indicator 2 is thought to be a re-adjustment broadly in line with changes to other national economic outputs measures
 - Increase in feed imports from USA due to short term demand is unlikely to be sustained

Indicator	Rationale when indicators were first developed in 2005
Urban food km in the UK to 2010, split by car, LGV, HGV. (Proxy for urban road congestion)	Urban food km account for most of the accident and congestion costs. The impact of air pollution is also much higher in urban areas. An alternative proxy for congestion and accident costs would be car food km.
HGV food km to 2010, split by HGV transport in the UK and HGV transport overseas. (Proxy for infrastructure costs)	This covers HGV transport both in the UK and overseas. HGV transport is responsible for the majority of infrastructure, noise and air pollution costs.
Air food km to 2010	Air freight of food was rapidly growing and has a high environmental impact relative to other modes of transport.
Total CO₂ emissions from food transport to 2010	Emissions of CO ₂ from the transport sector are highly significant and were growing. This indicator includes estimated CO ₂ from transport fuel use both in the UK and other countries. Currently excludes CO ₂ and other greenhouse gas emissions from refrigeration during transport.

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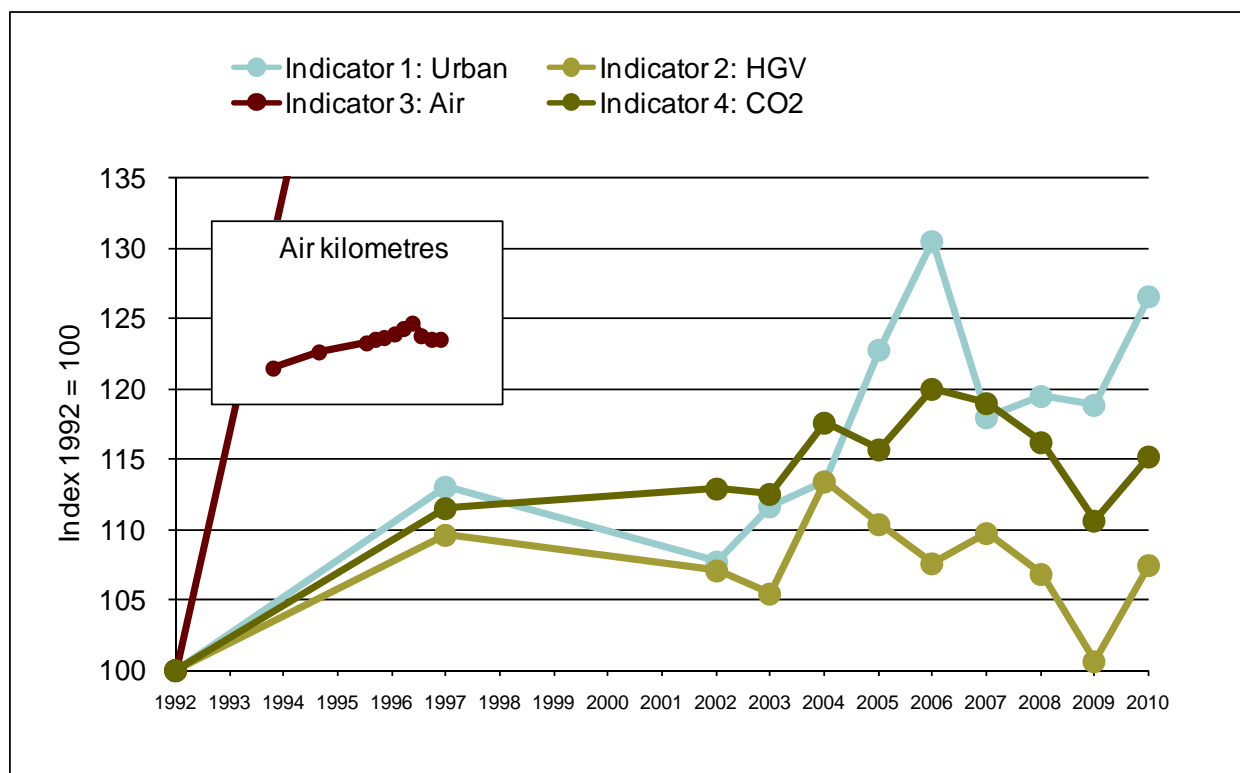
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Indicators overview

Indicators of the External Impact of Food Transport for UK Consumers

	Indicator 1		Indicator 2		Indicator 3		Indicator 4	
	UK Urban food kilometres (millions)	Index 1992 = 100	HGV food kilometres (millions)	Index 1992 = 100	Air food kilometres (millions)	Index 1992 = 100	Carbon dioxide emissions (kilotonnes)	Index 1992 = 100
1992	10,620	100	6,467	100	10	100	13,359	100
1997	12,009	113	7,092	110	18	186	14,893	111
2002	11,438	108	6,927	107	23	236	15,081	113
2003	11,862	112	6,819	105	25	263	15,028	112
2004	12,043	113	7,334	113	26	269	15,702	118
2005	13,040	123	7,140	110	28	288	15,448	116
2006	13,855	130	6,960	108	31	321	16,024	120
2007	12,524	118	7,099	110	34	351	15,897	119
2008	12,688	119	6,908	107	27	285	15,522	116
2009	12,620	119	6,505	101	26	265	14,775	111
2010	13,433	126	6,953	108	25	262	15,382	115
Change 2009/10	6.4%		6.9%		-1.4%		4.1%	
Change 2006/10	-3.0%		-0.1%		-18.4%		-4.0%	

(a) The drops in 2002 and 2007 coincide with changes to the way the National Travel Survey was run. The direction of the change is considered to be reliable however the scale of the change may be less reliable. In 2002 there was a change of contractor to run the survey. In 2007 there was a redesign of the survey diary.



- Indicator 1: UK urban food kilometres increased by 6.4 per cent from 2009 to 2010. The increase in this indicator is not expected to be statistically significant as the change in car travel is not. There is little evidence of a clear trend in the data.

- Indicator 2: HGV food kilometres increased by 6.9 per cent in 2010 broadly in line with other national economic outputs measures. A downward trend in HGV food kilometres since 2004 is apparent despite the increase in 2010.
- Indicator 3: Air food kilometres have fallen after a period of rapid growth up to 2007, with some evidence that this is stabilising at about the levels in 2003.
- Indicator 4: Despite an increase in 2010, indicator 4 remains 4 per cent lower than it was in 2006 suggesting an underlying downward trend remains.

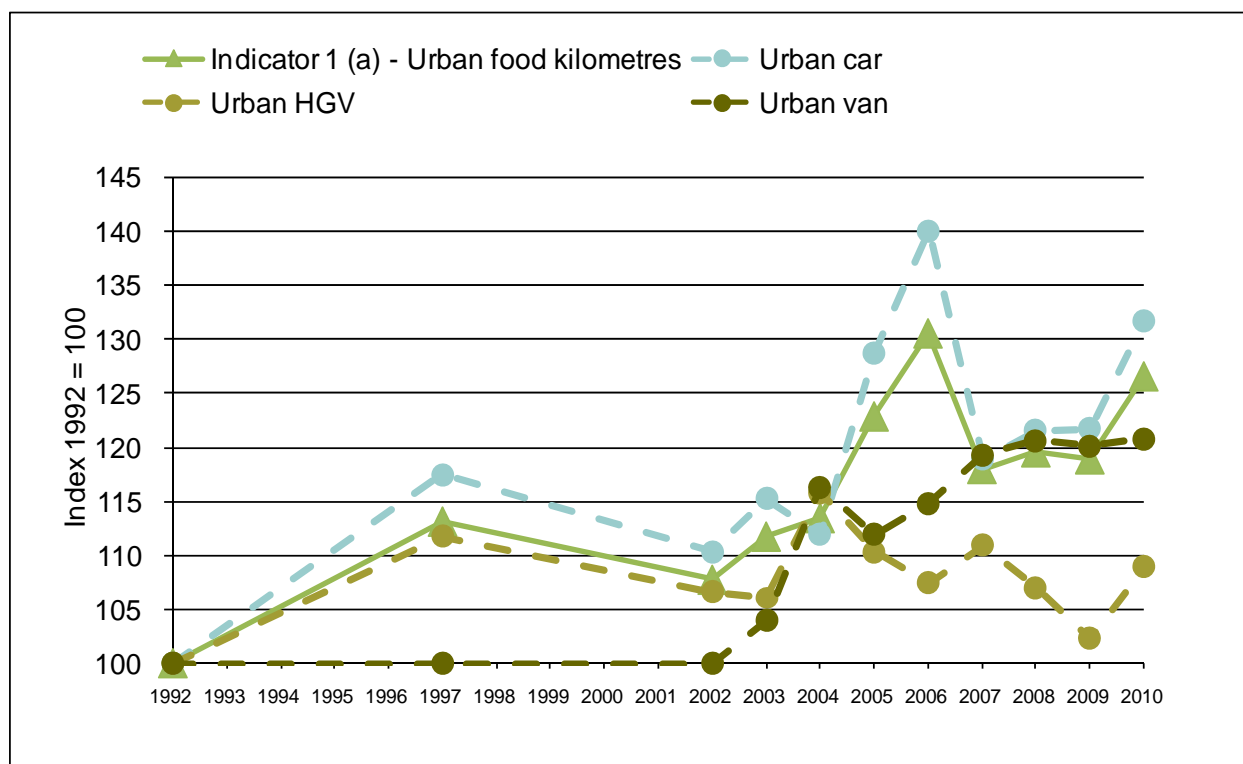
Indicator 1. UK urban food transport (proxy for urban road congestion)

Urban food kilometres are a proxy for the impact that food transport has on road congestion. Urban food kilometres include car shopping journeys, light goods vehicles (vans) transporting food and heavy goods vehicles transporting food. No allowance is made for the time of day of the transport.

	Indicator 1 ^(a) Index 1992 = 100	Urban food kilometres (millions)	of which car ^(a)	of which HGV	of which LGV ^(b)
1992	100	10,620	6,998	1,389	2,234
1997	113	12,009	8,223	1,552	2,234
2002	108	11,438	7,723	1,481	2,234
2003	112	11,862	8,066	1,473	2,323
2004	113	12,043	7,835	1,608	2,600
2005	123	13,040	9,007	1,532	2,501
2006	130	13,855	9,797	1,492	2,565
2007	118	12,524	8,317	1,541	2,667
2008	119	12,688	8,506	1,487	2,695
2009	119	12,620	8,514	1,421	2,685
2010	126	13,433	9,221	1,513	2,699
Change 2009/10	6.4%	6.4%	8.3%	6.5%	0.5%
Change 2006/10	-3.0%	-3.0%	-5.9%	1.4%	5.2%

(a) The drops in 2002 and 2007 coincide with changes to the way the National Travel Survey was run. The direction of the change is considered to be reliable however the scale of the change may be less reliable. In 2002 there was a change of contractor to run the survey. In 2007 there was a redesign of the survey diary.

(b) Data for food transport by van is not available for years prior to 2003. An estimation for these years is based on a 1992/93 study by the Department for Transport. For more information see Annex 1 of the report by AEA Technology Environment, <http://www.defra.gov.uk/statistics/files/defra-stats-foodfarm-food-transport-foodmiles-050715.pdf>



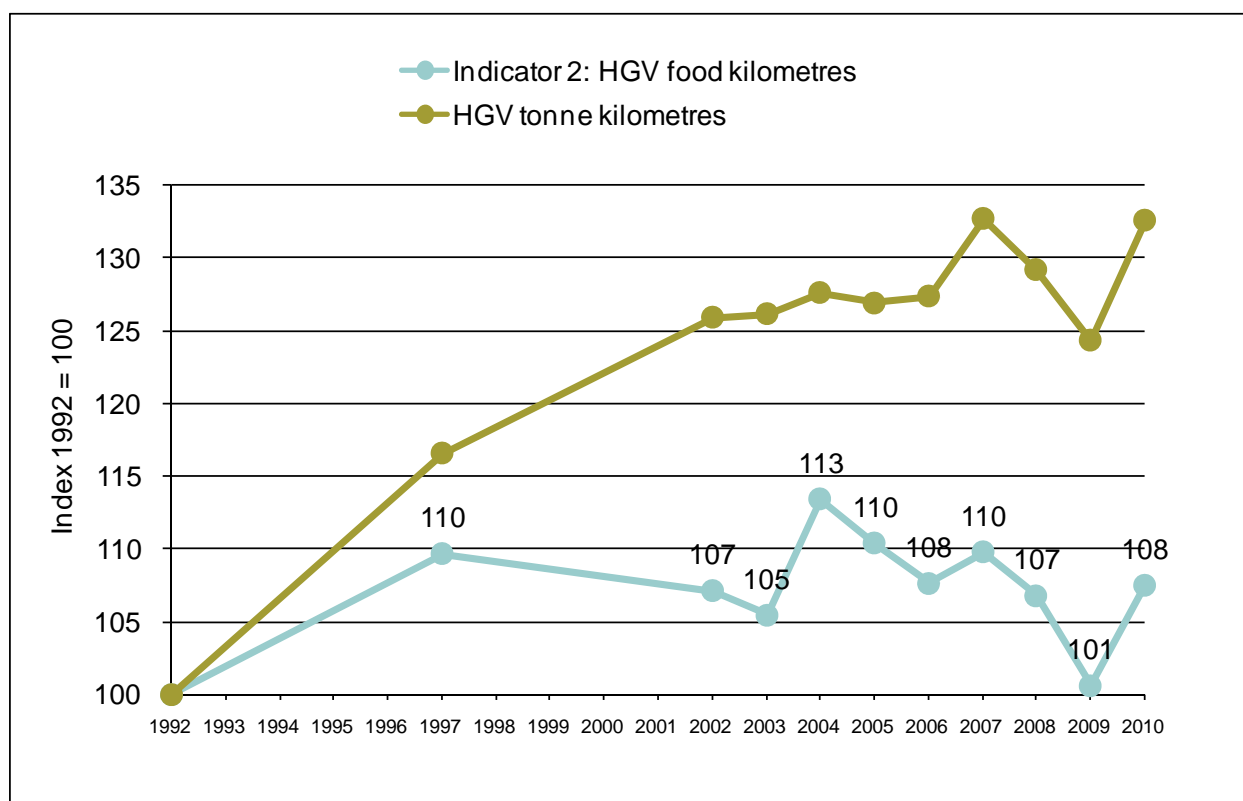
- UK urban food kilometres increased by 6.4 per cent from 2009 to 2010. This increase was mostly due to an increase in car travel which accounts for about 90 per cent of this indicator. The increase in this indicator is not expected to be statistically significant as the change in car travel is not.
- There is little evidence of a clear trend in the data. In making this interpretation it is relevant to note that the scale of the drops in urban car food kilometres in 2002 and 2007 are less reliable since these coincide with moderate changes in the way the National Travel Survey was run.
- The NTS is primarily designed to track long-term development of trends and so care should be taken when drawing conclusions from short-term changes, in particular year-on-year changes. Typically, year on year changes of above 10 per cent can be considered to be statistically significant.
- HGV figures have been revised down slightly following revisions to the Department for Transport's (DfT) vehicle licensing data for 2006 to 2009 – see revisions section on page 11.
- The LGV data for 1992, 1997 and 2002 is estimated based on a 1992/93 study by DfT. There has been no survey of LGV activity which collects information on commodities since 2005¹. 2006 to 2010 figures are based on 2005 figures and adjusted to reflect changes in LGV population. LGV data was revised down by around 1 per cent from 2006 to 2009 due to revisions to DfT's vehicle licensing data.
- Whilst there have been dramatic changes in food prices and also GDP over the last 5 years, this does not appear to have translated into changes in urban food kilometres.

¹ There was a van survey conducted in 2008, but this did not collect commodity information.

Indicator 2. HGV transport of food for UK consumption (proxy for infrastructure costs)

Vehicle kilometres covered by HGV transport of food are a proxy for the impact of food transport on infrastructure damage to the road network. The indicator includes all HGV transport in the supply of food for UK consumption, but excludes journeys exporting food. HGV tonne kilometres are shown alongside the indicator to show the extent to which the amount of food transported by HGV has changed without having an effect on the indicator.

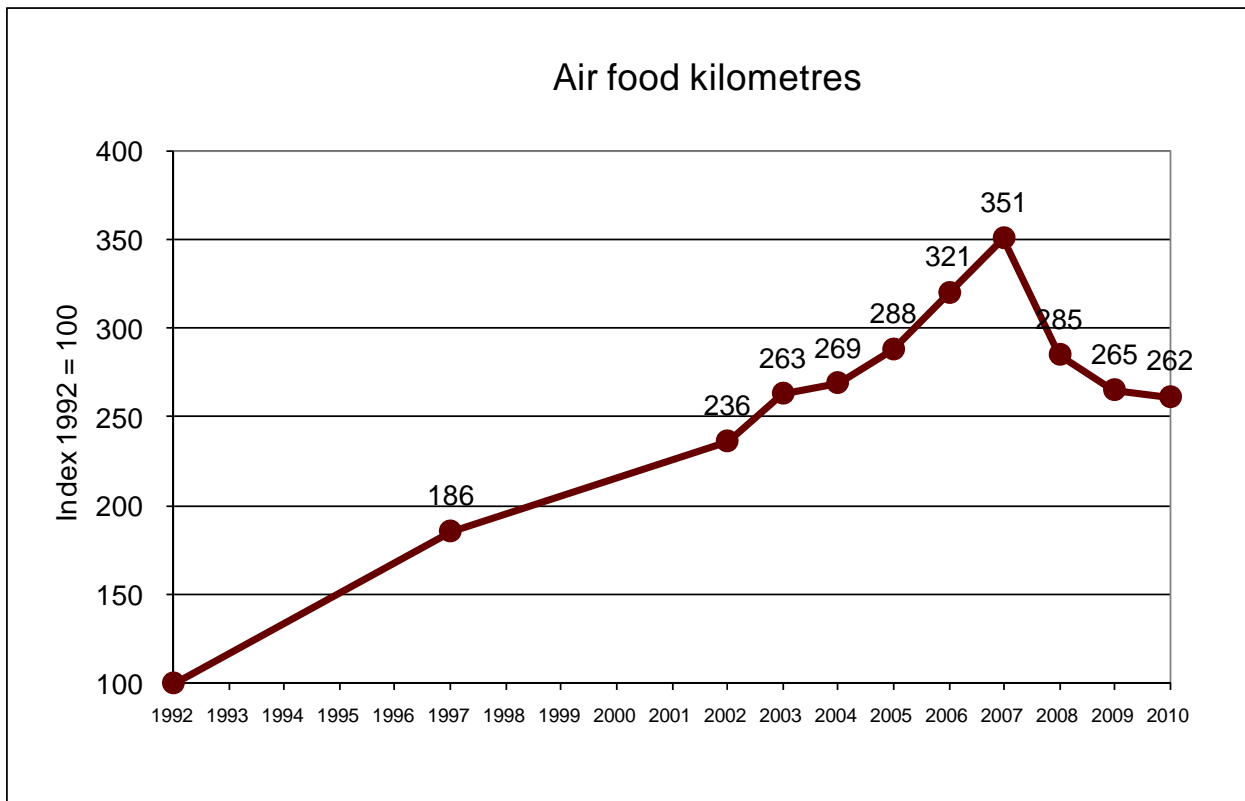
	Indicator 2 Index 1992 = 100	HGV food kilometres (millions) ^(b)	of which overseas	of which within UK	HGV tonne kilometres (millions)
1992	100	6,467	1,837	4,631	47,506
1997	110	7,092	1,917	5,174	55,377
2002	107	6,927	1,988	4,940	59,815
2003	105	6,819	2,043	4,776	59,922
2004	113	7,334	2,163	5,171	60,601
2005	110	7,140	2,186	4,954	60,285
2006	108	6,960	2,092	4,868	60,515
2007	110	7,099	2,068	5,031	63,024
2008	107	6,908	2,071	4,837	61,354
2009	101	6,505	1,882	4,623	59,041
2010	108	6,953	2,030	4,922	62,960
Change 2009/10	6.9%	6.9%	7.9%	6.5%	6.6%
Change 2006/10	-0.1%	-0.1%	-3.0%	1.1%	4.0%



- HGV food kilometres increased by 6.9 per cent in 2010, after a 6.0 per cent decrease between 2008 and 2009. The indicator remains 5.2 per cent lower than its level in 2004.
- HGV food kilometres can be split into UK kilometres and overseas kilometres. UK HGV food kilometres saw a 6.5 per cent increase in 2010 following a 4 per cent decline in 2009. Overseas HGV food kilometres rose by 7.9 per cent in 2010 and cover 28 per cent of all HGV food kilometres.
- A downward trend in HGV food kilometres since 2004 is apparent despite an increase in 2010.
- HGV tonne kilometres, a measure of the amount of food moved by HGV, increased by 6.6 per cent in 2010, returning to their 2007 level.
- A combined measure of uncertainty for the full indicator is not available. However, considering all the sources and available information on sampling errors, the increase in Indicator 2 from 2009 to 2010 is overall expected to be statistically significant; the downward trend over the period 2004 to 2010 is also expected to be genuine.
- Between 2007 and 2009, the amount of HGV food kilometres and HGV tonne kilometres decreased by 8.4 per cent and 6.3 per cent respectively before rising by 6.9 and 6.6 per cent in 2010. In recent years, these trends in the amount of goods moved by road have been broadly in line with other national economic outputs measures such as manufacturing and construction output and to a lesser extent GDP.
- A rise of 2 per cent in the volume of all food imports increased the external impacts of food transport in 2010. The majority of this rise can be attributed to increases in imports of animal feed compounds and their ingredients (such as soya meal and brewing waste) from the USA. The extra demand for these products was a result of shortages of winter forage stocks as well as high cereals and oilseed prices in 2010, necessitating increased use of compounds by UK livestock farmers. The milder winter and settling down of prices from harvest 2011 should mean demand for extra compounds is overall lower in 2011.

Indicator 3. Air freight of food

Transport of food by air has the highest CO₂ emissions per tonne, and has been the fastest growing mode. Although air freight of food accounts for only 1 per cent of food tonne kilometres and 0.1 per cent of vehicle kilometres, it produces 12 per cent of the food transport CO₂ equivalent emissions.

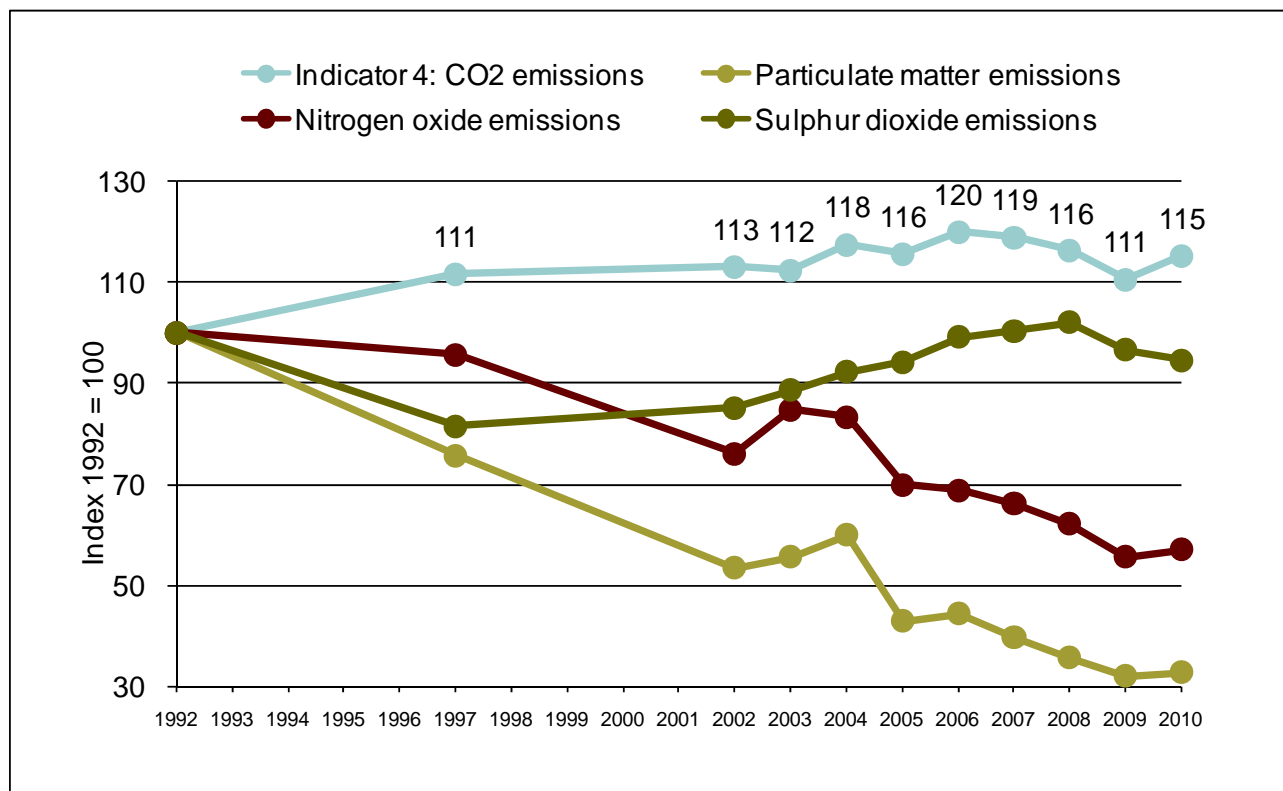


- Food transport by air experienced the most rapid growth of any mode between 1992 and 2007, with air kilometres more than tripling.
- Since 2007 air food kilometres have decreased to around 2003/2004 levels, with a 19 per cent decrease in 2008, a 7 per cent decrease in 2009 and a 1 per cent decrease in 2010.
- The decrease in air food kilometres in 2008 was driven by a reduction of the proportions of fresh grapes imported by air from the USA and South Africa, with more being transported by sea. A reduction in the imported tonnage of air freighted fresh green beans from Kenya also contributed to the decrease.
- Air freight of food has the highest environmental impact per tonne of any mode and in 2010 accounted for 12 per cent of CO₂ emissions from food transport.

Indicator 4. Total CO₂ emissions from food transport

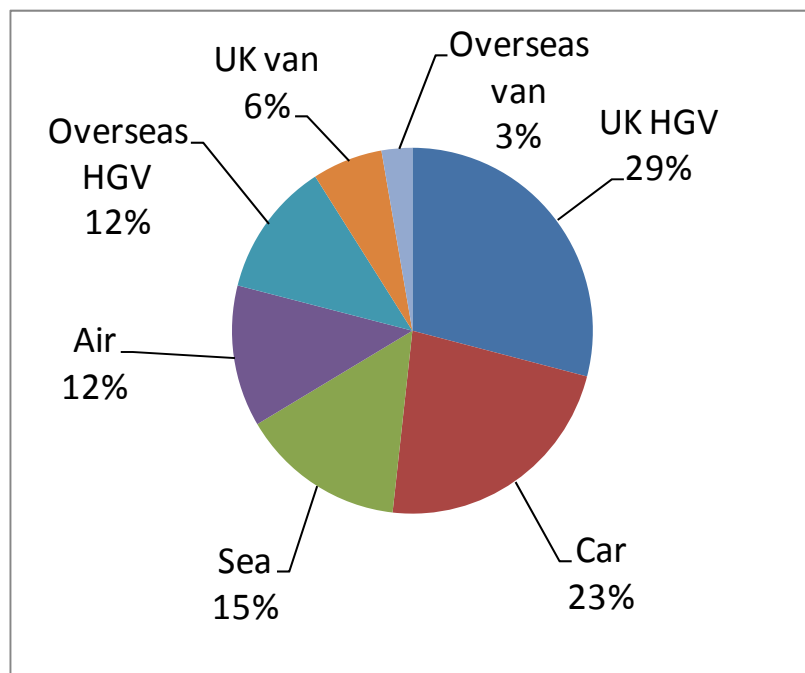
Around 9 per cent of Greenhouse Gas (GHG) emissions in the UK food chain are attributed to commercial transportation of food for UK consumption (based on estimates across the food chain in 2007). This indicator also includes emissions from household food shopping trips.

emissions in kilotonnes	Indicator 4 Index 1992 = 100	Carbon dioxide emissions (CO ₂)	Particulate matter (PM ₁₀)	Nitrogen oxides (NO _x)	Sulphur dioxide (SO ₂)
1992	100	13,359	7	158	41
1997	111	14,893	6	151	33
2002	113	15,081	4	120	35
2003	112	15,028	4	134	36
2004	118	15,702	4	132	38
2005	116	15,448	3	111	38
2006	120	16,024	3	109	40
2007	119	15,897	3	105	41
2008	116	15,522	3	98	42
2009	111	14,775	2	88	39
2010	115	15,382	2	90	38
Change 2009/10	4.1%	4.1%	1.9%	2.5%	-2.2%
Change 2006/10	-4.0%	-4.0%	-26.3%	-17.1%	-4.6%



- Emissions of CO₂ from food transport, including emissions from overseas transport, increased by 4 per cent in 2010 following a decrease of 5 per cent in 2009.

- Despite an increase in 2010, indicator 4 remains 4 per cent lower than it was in 2006 suggesting an underlying downward trend remains.
- In 2010, UK HGV food kilometres contributed the most to CO₂ emissions. UK HGV accounted for 29 per cent of the emissions, car for 23 per cent, sea for 15 per cent, air for 12 per cent and overseas HGV 12 per cent.



- In 2010, 99 per cent of food imports travelled by sea compared with less than 1 per cent by air. However, air transport of food accounts for 12 per cent of CO₂ emissions.
- Emissions of PM₁₀ and NO_x from food transport have decreased significantly since 1992 with the introduction of European emission standards for road vehicles. In 2010 emissions of all pollutants apart from SO₂ increased.

Revisions

Since the previous publication of the indicators in March 2011, revisions have been made to the HGV and emissions data. Full details are given in the [note on method and assumptions](#) which accompanies this publication. The changes are:

- Figures for activity by UK registered HGVs in the UK for 2006-2009 have been revised downwards as a result of revisions to DfT's vehicle licensing data. These reduced the licensed vehicle stock figures and resulted in a decrease in the HGV population of about 3.5 per cent. These revisions have resulted in changes to Indicator 2 and small changes to Indicator 1 and Indicator 4. For more information on the revisions to vehicle licensing data, see note 2.e. on page 4 of <http://assets.dft.gov.uk/statistics/releases/road-freight-statistics-2010/notes-and-definitions.pdf>
- Indicator 4 has been revised downwards due mainly to reductions in HGV kilometres as mentioned above but also the use of higher quality emissions factors for 2009. Revisions to the emissions factors account for around half of the change in 2009.

Indicators of the External Impact of Food Transport for UK Consumers		2004	2005	2006	2007	2008	2009
Indicator 1							
UK Urban food kilometres	2011 publication	12,043	13,040	13,939	12,611	12,799	12,731
	Revised	12,043	13,040	13,855	12,524	12,688	12,620
	Change	0.0%	0.0%	-0.6%	-0.7%	-0.9%	-0.9%
Indicator 2							
HGV food kilometres	2011 publication	7,330	7,135	7,136	7,271	7,137	6,746
	Revised	7,334	7,140	6,960	7,099	6,908	6,505
	Change	0.1%	0.1%	-2.5%	-2.4%	-3.2%	-3.6%
of which within UK	2011 publication	5,171	4,954	5,033	5,200	5,063	4,867
	Revised	5,171	4,954	4,868	5,031	4,837	4,623
	Change	0.0%	0.0%	-3.3%	-3.3%	-4.5%	-5.0%
of which overseas	2011 publication	2,160	2,180	2,103	2,070	2,073	1,879
	Revised	2,163	2,186	2,092	2,068	2,071	1,882
	Change	0.2%	0.3%	-0.5%	-0.1%	-0.1%	0.2%
Indicator 3							
Air food kilometres	No revisions						
Indicator 4							
CO ₂ emissions	2011 publication	15,697	15,556	16,299	16,177	15,616	14,976
	Revised	15,702	15,448	16,024	15,897	15,522	14,775
	Change	0.0%	-0.7%	-1.7%	-1.7%	-0.6%	-1.3%

Uses of the indicators

The indicators are used by Defra and the Food and Drink Federation to monitor progress towards reductions in the external impacts of the food chain (they were used to track progress towards the Food Industry Sustainability Strategy target for the food chain to reduce its external impacts by 20% by 2012 compared to 2002). The Institute of Grocery Distributors (IGD) Efficient Consumer Response UK Sustainable Distribution Initiative aims to save 80 million HGV miles over the period 2010-12 in the grocery sector.

Indicators 1 and 2 feature in theme 2 of the Food Strategy “Ensuring a resilient, profitable and competitive food system” in terms of congestion and infrastructure costs of transport (Food Transport).

Indicator 4 is incorporated into Defra’s overarching estimates of greenhouse gas emissions from the UK food supply chain (2007). In 2007 this showed that food transport accounted for 9 per cent of food chain emissions.

Reliability of the indicators

In general the trends revealed by the indicators are reliable but individual year on year changes are subject to sampling errors. Sampling errors may be as much as 5 per cent, therefore we can only detect year on year changes above 10 per cent. Non-sampling errors occur as well but are difficult to quantify. A summary of sampling and non-sampling errors for each of the indicators is given in the methodological note which accompanies this notice.

Two cases of non-sampling errors are visible in the indicators:

- a. Indicator 1, food shopping trips by car. The drops in 2002 and 2007 coincide with changes to the way the National Travel Survey was run. In 2002 there was a change of contractor to run the survey and a substantial increase in the sample size. In 2007 a redesigned survey diary was introduced for respondents to record their car journeys resulting in a drop in short shopping trips by car, although it is likely that some of the decrease is genuine.
- b. Indicator 2, HGV kilometres. There is a small spike apparent in 2004 which coincides with and is partly explained by an improved method to estimate the amount of empty running. For both 2003 and 2004 the estimates are the best available, although the reliability of the apparent rise in HGV kilometres between 2003 and 2004 is low.

Although there are both sampling errors and non-sampling errors in the data the trends revealed by the indicators detailed in this notice are considered reliable.

Glossary

Tonne kilometres	The distance travelled in kilometres multiplied by the weight in tonnes for each foodstuff. For example, a load of 12 tonnes transported 100 kilometres represents 1200 tonne kilometres.
Vehicle kilometres	The sum of the distances travelled by each vehicle carrying food regardless of the amount carried.
HGV	Heavy Goods Vehicle. In the Continuing Survey of Road Goods Transport for Great Britain and Northern Ireland, these are defined as vehicles of more than 3.5 tonnes gross plated weight, but excluding certain special categories such as recovery vehicles and mobile cranes that are heavy vehicles but do not carry freight.
LGV	Light goods vehicle. These are defined as vehicles not exceeding 3.5 tonnes gross vehicle weight in the light goods taxation class with van body types according to DVLA records
Urban roads	Urban roads are major and minor roads within an urban area with a population of 10,000 or more.
Overseas	Ireland is counted as overseas.

Notes for editors

- 1) The food transport indicators and a methodology were originally proposed in the report [“The Validity of Food Miles as an Indicator of Sustainable Development”](#) by AEA Technology Environment, published on the Defra website in July 2005.
- 2) The report concluded that the major external cost was in terms of road congestion and that a single figure of total number of vehicle kilometres transporting food was too simplistic.
- 3) The four food transport indicators are updated periodically by Defra.
- 4) The food transport indicators are included in the [‘Indicators for a sustainable food system’](#) which provide evidence to track progress of Food 2030
- 5) The four indicators were included in the [Food Industry Sustainability Strategy](#) as key performance indicators.
- 6) An associated [note on method and assumptions](#) describes the data sources, how the data is combined and clarifies the important assumptions.
- 7) Most of the data is sourced from National Statistics published by the Department for Transport and HM Revenue and Customs. Information on other data sources is detailed in the [note on method and assumptions](#)