Technical Annex 5: Transport

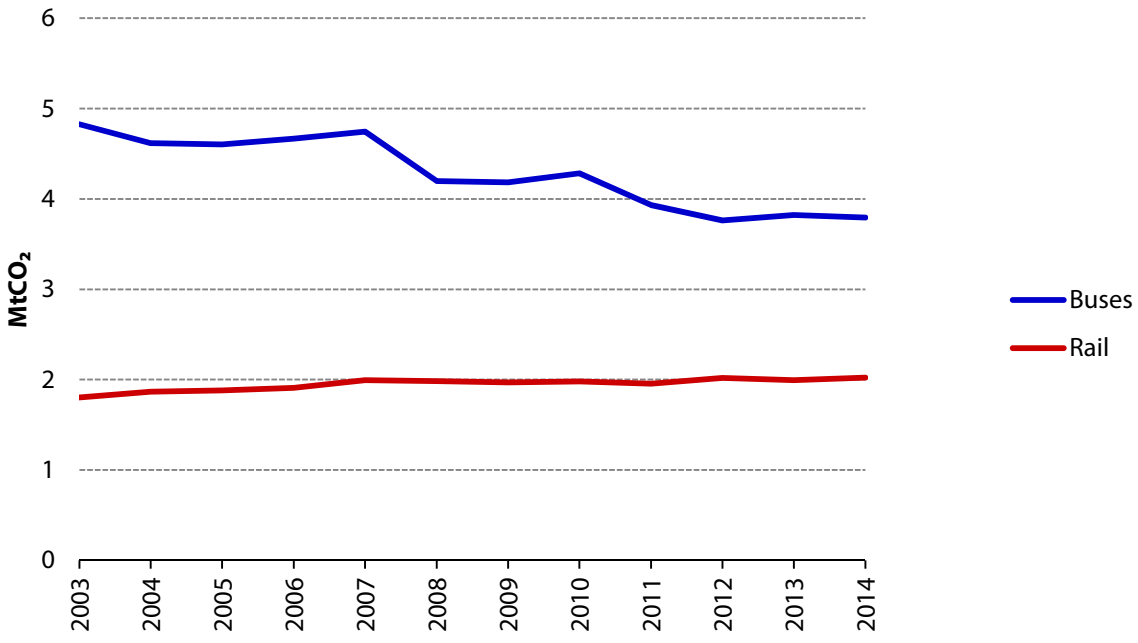
This technical annex supports the transport chapter of the report *Meeting Carbon Budgets - 2016 Progress Report to Parliament*:

- Section 1 - Buses and rail
- Section 2 - New car CO_2 and sales
- Section 3 - Reforms to Vehicle Excise Duty
- Section 4 - Electric vehicles: Global electric vehicle outlook
- Section 5 - Electric vehicles: Range of models available in 2015/16
- Section 6 - Demand-side measures: Eco-driving and speed limiting
- Section 7 - Assessment of current and planned policies
- Section 8 - Surface transport indicators
- Section 9 - Aviation and shipping monitoring indicators

1. Buses and rail

CO_2 emissions from buses and rail make up around 5% of surface transport CO_2 or around 1% of total UK greenhouse gas (GHG) emissions. UK bus and rail emissions have remained broadly flat in the last few years, but measures to reduce these emissions are being rolled out (Figure A5.1, Box A5.1, and Box A5.2).

Figure A5.1. Emissions from buses and rail



Source: DECC (2016) *2014 UK Greenhouse gas emissions: final figures*

Box A5.1. Reducing emissions from buses

There has been strong growth in uptake of low emission buses in recent years, with the number of low emission buses on the road increasing from 1,820 in 2014 to 3,349 in 2015 (Figure A5.2). There are a number of policies supporting this growth:

Funding for low emission buses

The Office for Low Emission Vehicles (OLEV) has introduced the Low Emissions Bus Scheme (LEBS) to replace the Green Bus Fund, which ended in 2014:

- The LEBS is a £30 million fund, to run over three years (2016-2019), which aims to improve air quality and reduce greenhouse gas emissions through stimulating the uptake of low emissions vehicles.
- OLEV will contribute 90% of the cost difference between a low-emissions bus and standard diesel equivalent of the same passenger capacity. For infrastructure changes, 75% will be contributed towards purchase and installation, and OLEV will reward bids that ask for less funding.

Local air quality policies

Poor air quality remains an urgent problem in some areas of the UK. Several cities and regions, including London, Birmingham and Glasgow have been in breach of European air quality directives designed to protect public health. National and local governments are developing strategies to reduce air pollutants from buses, which will also help to reduce greenhouse gas emissions:

- Defra set out plans to improve air quality in cities, which include the introduction of Clean Air Zones from 2020, in Birmingham, Leeds, Southampton, Nottingham and Derby. This will target the most polluting vehicles, including buses.
- London's Ultra-Low Emission Zone (ULEZ) will be effective from September 2020. All vehicles will need to meet exhaust emissions standards, or pay a daily charge when travelling in Central London. Transport for London is also planning for all single decker buses operating in the ULEZ zone to be zero-emission by 2020.
- The newly elected Major of London, Sadiq Khan, is due to launch a policy consultation on measures that could accelerate the introduction of the ULEZ and widen its scope, including:
  - Extending the ULEZ zone to the North Circular Road and the South Circular Road and introducing the ULEZ before 2020.
  - Purchasing only hybrid or zero-emission double-decker buses from 2018.

The Buses Bill

Since 1986, bus services outside of London have been deregulated, which has been linked to a growing disparity in the success of bus services inside and outside the capital. The Buses Bill is due to be introduced this year, and will give local authorities (LAs) with elected mayors greater autonomy to improve bus services and ensure the use of lower emission buses:

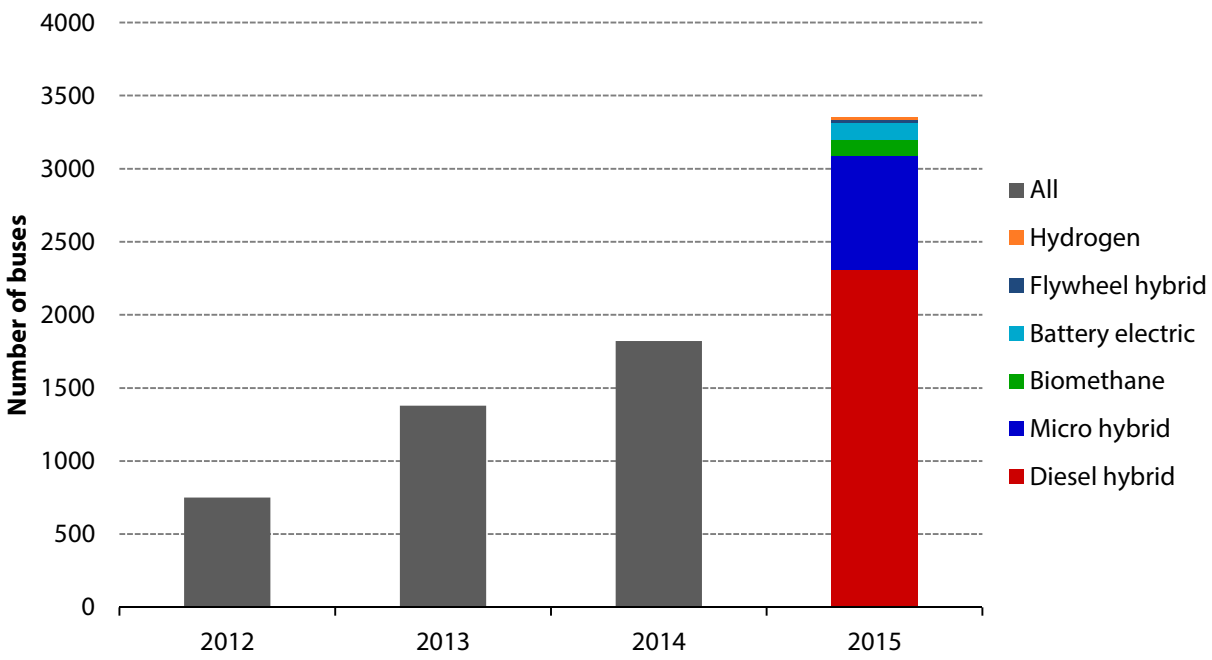
- LAs with elected mayors will be able to franchise bus services and enter into new partnership with providers. This will give these LAs the power to contractually guarantee vehicle emission standards.
- Improved bus services could help to increase bus patronage, which could help to reduce greenhouse gas emissions if chosen as an alternative to car travel. Measures such as smart-ticketing can be made easier when LAs take control of franchising and have been associated with an increase in bus patronage in London:
  - In 2003, London began an electronic ticketing system in a bid to increase the attraction of using public transport and thereby reducing emissions. This has been achieved by offering the most cost-effective method of travel through discounts incentives and increasing the

Figure A5.1. Emissions from buses and rail

convenience of travel. A study by Peter White, finds that the 32% increase in public transport patronage from 1999/00 to 2005/06 is partially due to the introduction of the Oyster smartcard. Similarly, in a survey led by PWC, 91% of London travellers use smart ticketing technologies; up from 41% in 2014.

– Cities such as Greater Manchester and Nottingham are beginning to roll out smart ticketing systems and the new sub-national transport body, Transport for the North, has plans to roll out an integrated system across the whole of the North of England.

Figure A5.2. Low emission buses on the road (2012-2015), by Technology (2015)



Source: Low CVP (2016) *The Journey of the Green Bus*

Source: Low CVP (2016) *The Journey of the Green Bus*; OLEV (2015) *Low Emission Bus Scheme*, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/413022/Low_Emission_Bus_Scheme_bidding_guidance.pdf; London Assembly (2016) https://www.london.gov.uk/press-releases/mayoral/bold-plans-to-clean-up-londons-toxic-air; Urban Transport (2016) *The Bus Service Bill - FAQ*; PWC (2016); Peter White (2009) *Factors behind recent patronage trends in Britain and their implications for future policy*; http://pwc.blogs.com/press_room/2016/03/can-operators-match-the-pace-of-the-smart-ticketing-revolution-pwc-survey.html; System one travel. https://www.systemonetravelcards.co.uk/events/news/get-me-there; Nottingham Post (2015). http://www.nottinghampost.com/Smart-way-travel/story-28074230-detail/story.html. Urban Transport Group (2009), http://www.urbantransportgroup.org/system/files/general-docs/integratedticketingreportFINALOct09.pdf.

Box A5.2. Reducing emissions from rail

Electrification of the rail network is a key measure to reduce emissions. In 2009, the Department for Transport (DfT) announced a programme of electrification of rail across the North of England and Great Western mainlines. There has since been an upward revision to the costs of electrification and some projects have been delayed:

- Network rail aims to complete the Great Western Main Line between London and Bristol by 2016, with the route to Cardiff to be electrified by May 2017 and to Swansea after 2019. The anticipated electrification costs to Cardiff have been revised from £1.7 billion to £2.8 billion.[1]
- The corridor between Manchester and Leeds was scheduled for completion by 2019 but due to delays, it is estimated that the project will not be finished until 2022.
- Network rail had planned the completion of electrification of the route between Bedford and Corby by the end of 2017, Nottingham and Derby at the end of 2019 and Sheffield at the end of 2020. Announcements have since been made stating that total electrification of these lines will be ongoing until 2023.

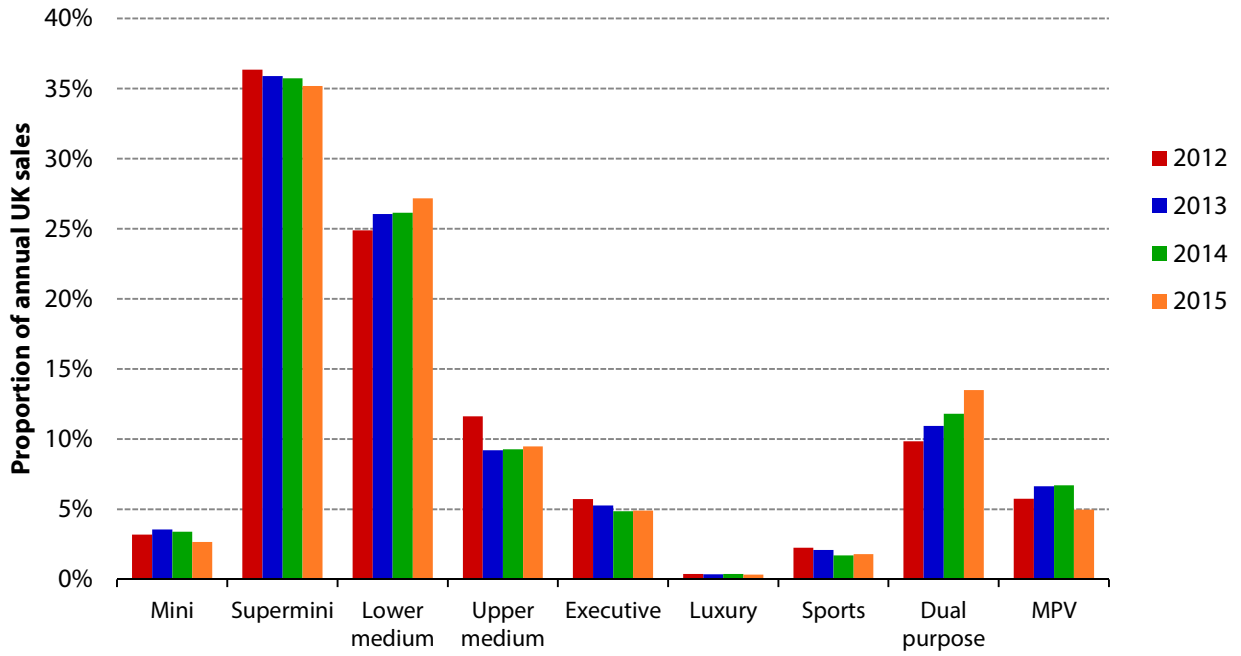
2. New car CO_2 and sales

The Society of Motor Manufacturers and Traders (SMMT) collects data on annual sales and CO_2 intensity (gCO_2/km) of new cars split by segment and fuel type. Figures A5.3 to A5.6 show the UK share of sales and test-cycle gCO_2/km for different segments and fuel types from 2012 to 2015:

- Sales are increasing most rapidly for the Lower/Upper medium and Dual purpose segments (e.g. Sports-Utility Vehicles, or SUVs), with others broadly flat or declining.
- Whilst in previous years new car CO_2 improvements have been relatively evenly distributed across segments, in 2015 these were mainly driven by improvements in the efficiency of larger cars:
  - The most significant CO_2 improvements were for the larger car segments, particularly Executive and Dual purpose, each falling by around 7%.
  - Improvements for Lower and Upper medium segments were relatively limited with a decrease of around 1%.
- Petrol electric hybrids (including plug-in hybrids) have continued to show strong improvements in efficiency with a reduction in test-cycle CO_2 emissions of 10% between 2014 and 2015, following an average annual reduction of 6% between 2012 and 2015.

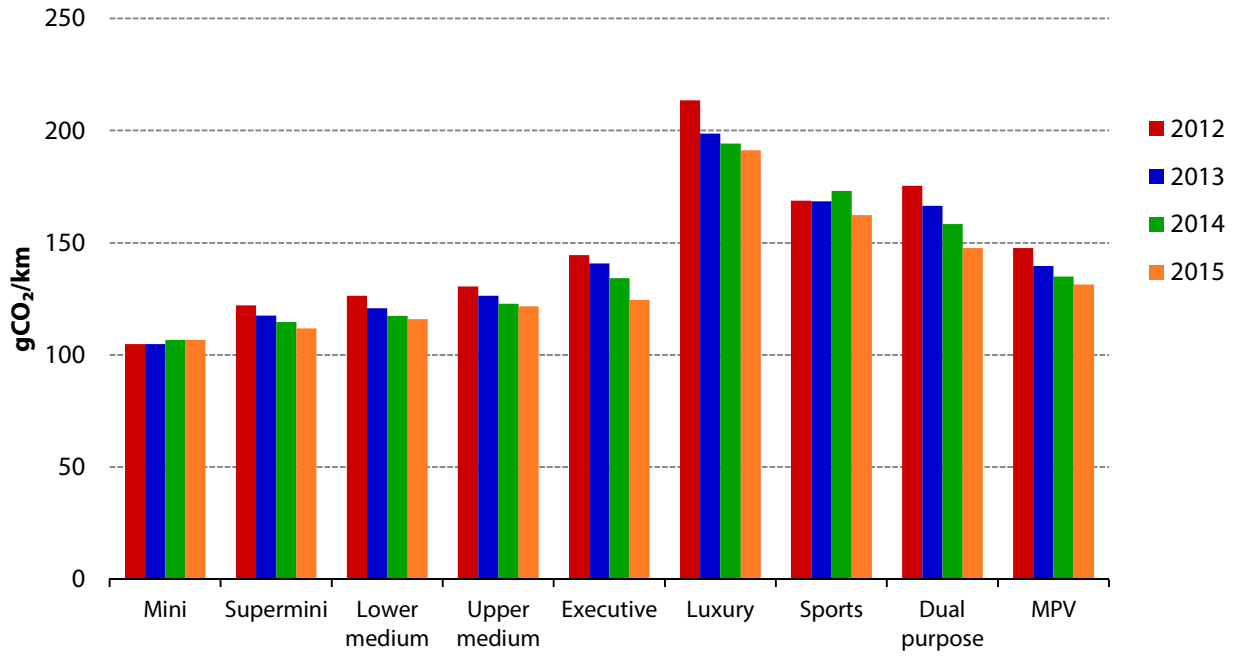
[1] National Rail (2015). Report from Sir Peter Hendy to the Secretary of State for Transport on the replanning of Network Rail's Investment Programme.

Figure A5.3. New sales car segmentation



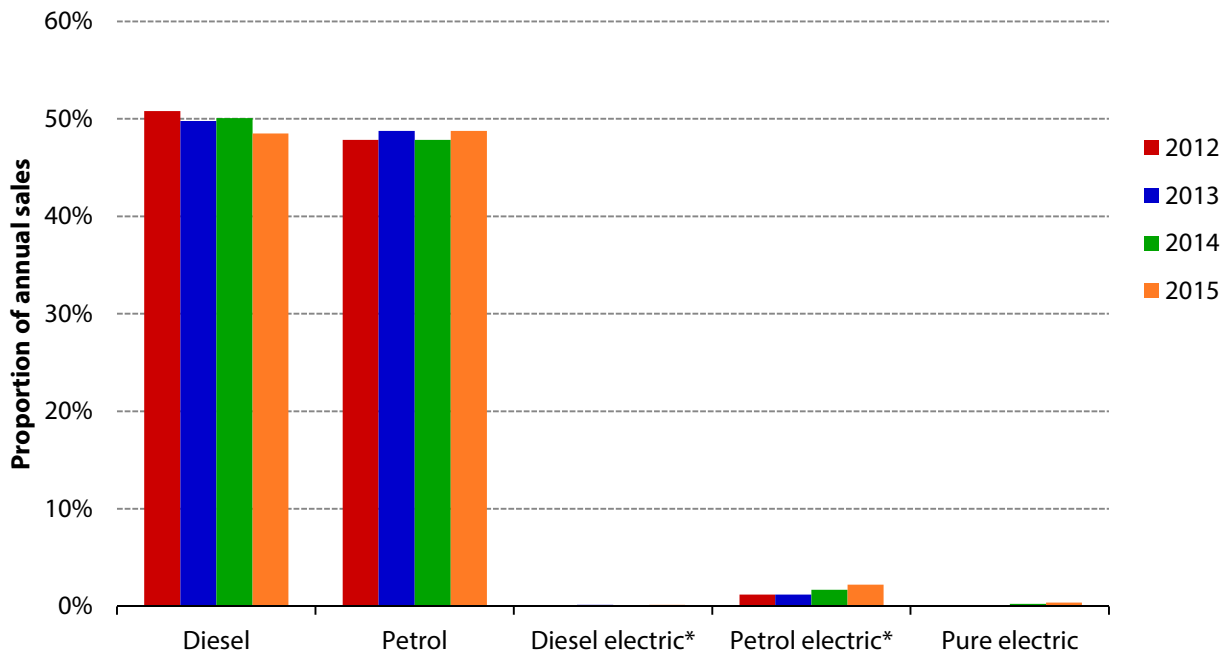
Source: SMMT (2016) *New Car CO_2*

Figure A5.4. New car CO_2 segmentation



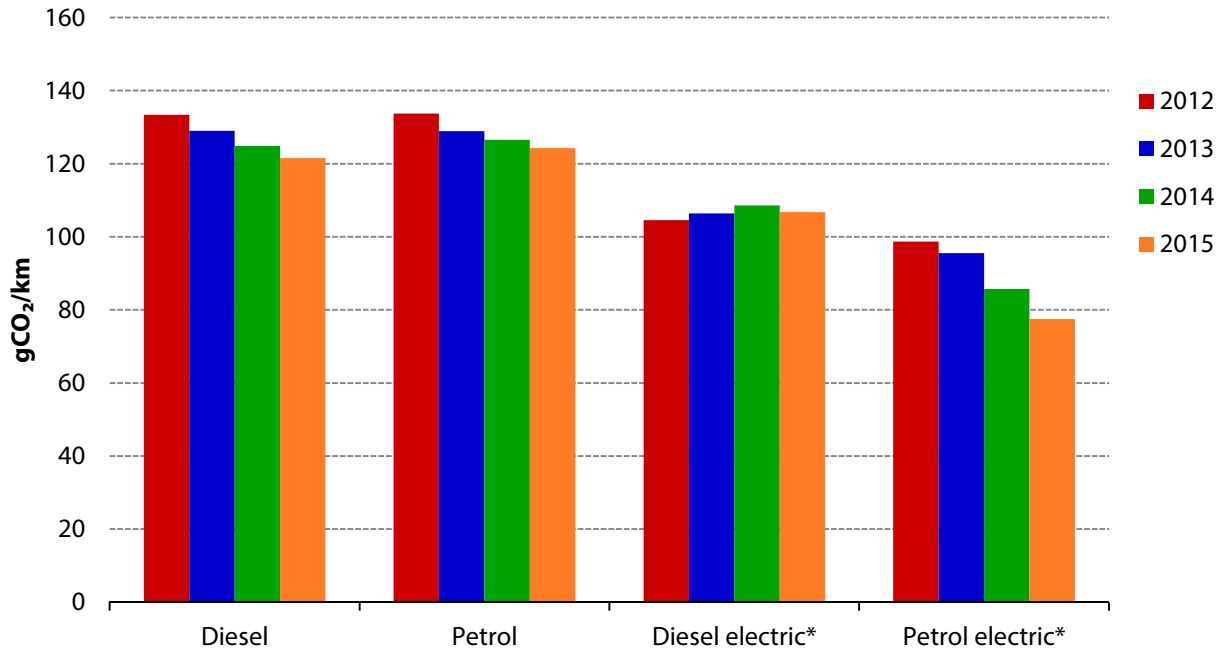
Source: SMMT (2016) *New Car CO_2*

Figure A5.5. New car sales by fuel



Source: SMMT (2016) *New Car CO_2*
Notes: *Hybrid electric, includes plug-in hybrid electric vehicles

Figure A5.6. New car CO_2 by fuel

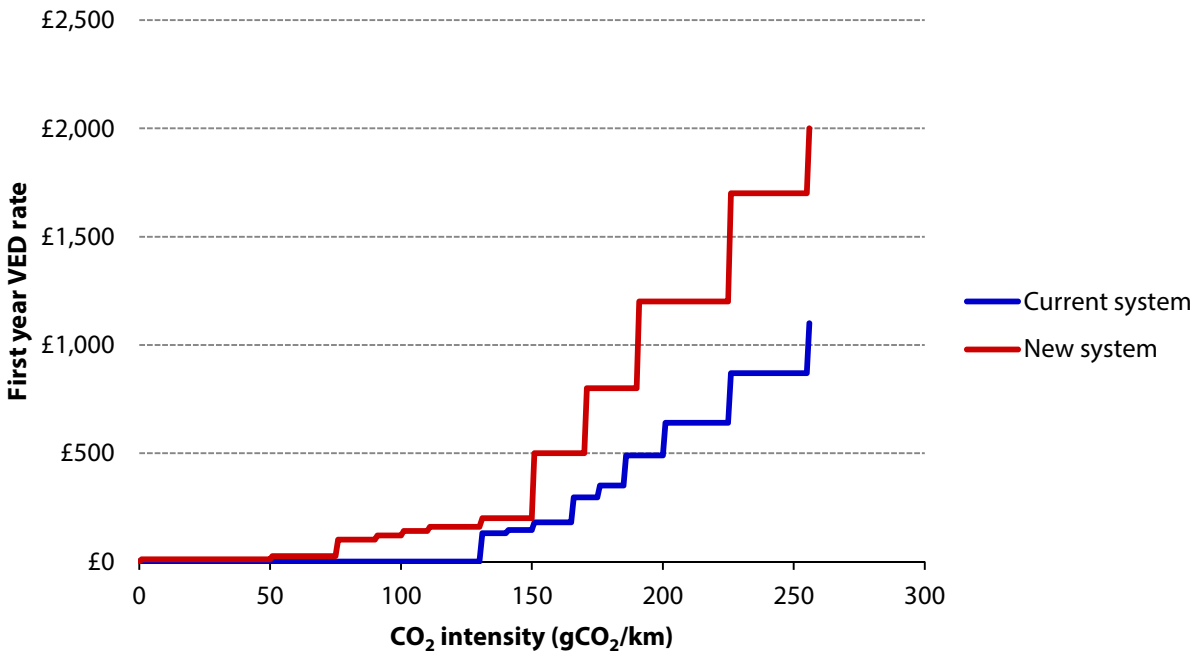


Source: SMMT (2016) *New Car CO_2*
Notes: *Hybrid electric, includes plug-in hybrid electric vehicles

3. Reforms to Vehicle Excise Duty

Since 2001, VED rates have been differentiated according to CO_2 intensity (gCO_2/km). In 2015, the Government announced a reform to VED starting in 2017, including new rates below 100 gCO_2/km and higher first-year rates for higher emitting vehicles (Figure A5.7).

Figure A5.7. First year VED rates under the current system and new system due to start in 2017



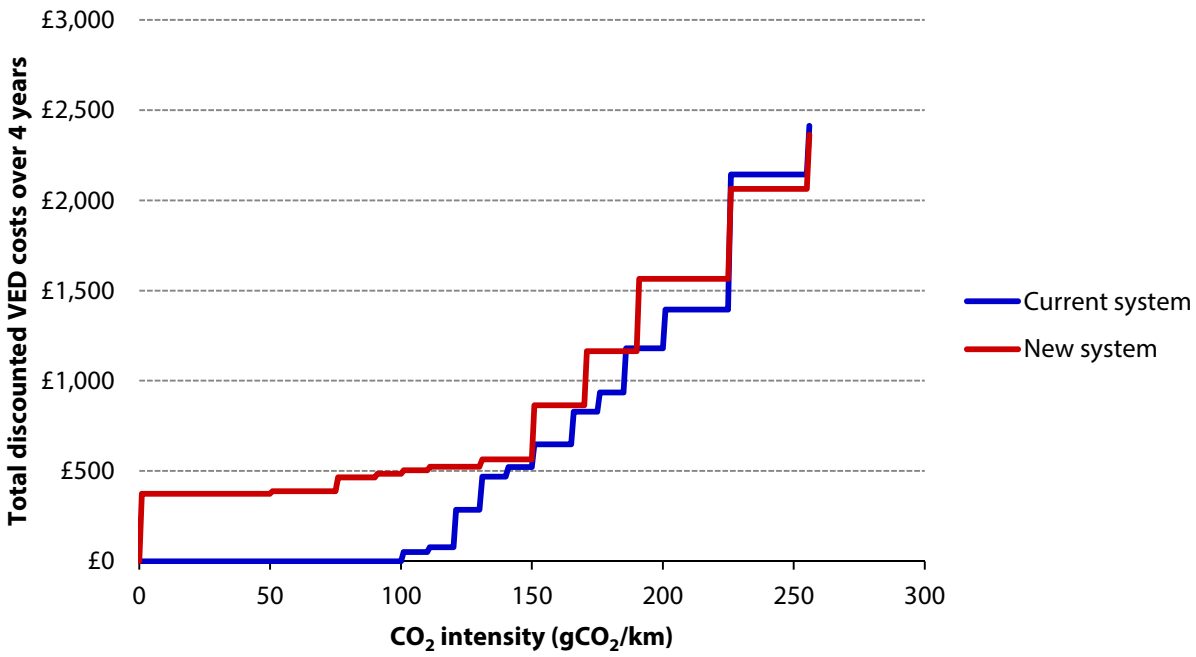
Source: HMRC

CO_2 banding has been effectively removed for subsequent year rates under the new system, with a standard rate of £140 for all but zero-emission vehicles. If new car buyers consider total VED costs over a number of years, this could mean lower incentives for low emission vehicles compared to the previous system.

Figures A5.8 and A5.9 show the total discounted VED costs under the current and new systems over 4 years and 14 years (the average lifetime of a car). The slope of the cost curve illustrated by these figures is one measure of whether VED costs incentivise purchase of low-emission vehicles:

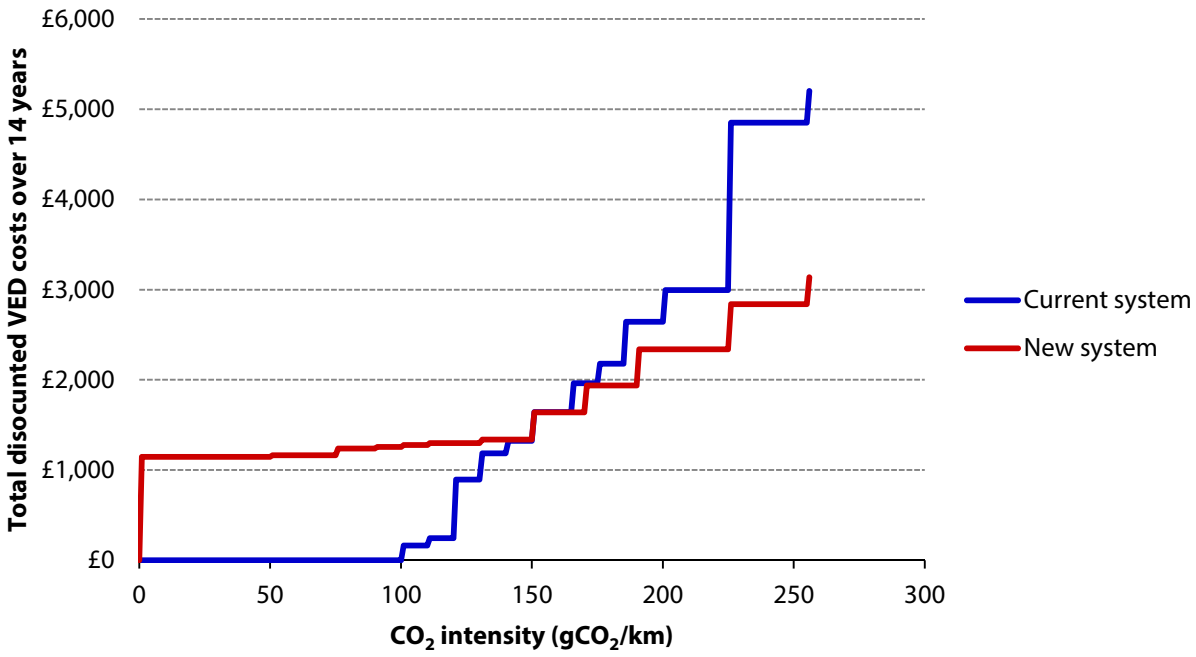
- When 4 years of VED costs are considered, the slope of the curve above 150 gCO_2/km for the new system is broadly similar to that of the current system, suggesting incentives are broadly similar in this CO_2 intensity bracket. However, when 14 years of costs are considered, the steeper slope suggests the current system offers a greater incentive for lower emission vehicles.
- For both 4 and 14 years, the slope for the new system is much less steep between 100 and 150 gCO_2/km than that for the current system. This suggests the new system provides a lower incentive to buy a lower-emitting vehicle in this CO_2 intensity bracket.
- Below 100 gCO_2/km, the slopes are both nearly flat but the slope for new system is slightly steeper, suggesting it offers a slightly higher incentive to buy a lower-emitting vehicle.

Figure A5.8. Total discounted VED costs over 4 years under the current and new systems



Source: HMRC, CCC analysis
Notes: Costs discounted assuming a private discount rate of 7.5%.

Figure A5.9. Total discounted VED costs over 14 year lifetime under the current and new systems



Source: HMRC, CCC analysis
Notes: Costs discounted assuming a private discount rate of 7.5%.

This analysis suggests that that, in some cases, a new vehicle buyer who considers costs over several years of operation could have a lower incentive to buy a lower emitting vehicle. In particular, a buyer choosing between two vehicles, one with a CO_2 intensity of around 150 gCO_2/km and the other with a CO_2 intensity of around 100 gCO_2/km or lower, will have a much lower incentive under the new system. Fleet buyers, who make up around 60% of new car sales, are a key group who are more likely to consider the total upfront cost and operating costs of a vehicle over a period of several years. This suggests that this reform is a missed opportunity to provide new vehicle buyers with a greater incentive to buy a low emission vehicle.

4. Electric vehicles: Global electric vehicle outlook

Full list of references for the material set out in Box 5.5 of the main report:

IEA (2016) *Global EV outlook 2016.*

Norwegian Government (2016) *National Transport Plan 2018-2029*. For a summary in English see: http://www.ntp.dep.no/English/_attachment/1361769/binary/1109453?_ts=154c39bc008

Dutch News (2016) *Only electric cars should be sold in Netherlands from 2025*. Available at: http://www.dutchnews.nl/news/archives/2016/03/only-electric-cars-to-be-sold-in-netherlands-from-2025/

The Economic Times (2016) *India aims to become 100% e-vehicle nation by 2030* - Piyush Goyal. Available at: http://economictimes.indiatimes.com/industry/auto/news/industry/india-aims-to-become-100-e-vehicle-nation-by-2030-piyush-goyal/articleshow/51551706.cms?from=mdr

E3G (2016) *China's 13th five year plan challenges Europe's low carbon competitiveness.* Available at: https://www.e3g.org/docs/E3G_Report_on_Chinas_13th_5_Year_Plan.pdf

McKinsey (year of publication unknown) *Bigger, better broader: A perspective on China's auto market to 2020*. Available at: http://www.sharpspixley.com/uploads/McKinseyPerspectiveonChinasautomarketin2020.pdf

Fortune (2015) *Audi: 1 in 4 of of Cars Sold in U.S. Will Be Electric*: http://fortune.com/2015/11/18/audi-u-s-electric-cars/

NextGreenCar (2015) *Ford plans £3bn investment in EV technology.* Available at: http://www.nextgreencar.com/news/7400/ford-plans-3bn-investment-in-ev-technology/

NextGreenCar (2015) *Huge plug-in investment confirmed to protect VW's future*. Available at: http://www.nextgreencar.com/news/7362/huge-plugin-investment-confirmed-to-protect-vws-future/

Autocar (2016) *VW plans radical new electric vehicle for 2019*. Available at: http://www.autocar.co.uk/car-news/new-cars/vw-plans-radical-new-electric-vehicle-2019

NextGreenCar (2015) *Pole position for Porsche in VW's EV development*. Available at: http://www.nextgreencar.com/news/7484/pole-position-for-porsche-in-vws-ev-development/

NextGreenCar (2016) *Is there any stopping Tesla after its Model 3 launch?* Available at: http://www.nextgreencar.com/news/7590/is-there-any-stopping-tesla-after-its-model-3-launch/

BMW (2016) *BMW Group driving the transformation of individual mobility with its Strategy.* Available at: https://global.handelsblatt.com/edition/318/ressort/companies-markets/article/the-future-is-electric-says-bmw#.Vmk8aPzzjvg.twitter

NextGreenCar (2016) *Toyota lays out plans for zero emission future*. Available at: http://www.nextgreencar.com/news/7301/toyota-lays-out-plans-for-zero-emission-future/

Auto Express (2015) *All-new Nissan Leaf to get 300-mile range*. Available at: http://www.autoexpress.co.uk/nissan/leaf/92857/exclusive-all-new-nissan-leaf-to-get-300-mile-range

NextGreenCar (2015) *Chevrolet launches long-range Bolt EV*. Available at: http://www.nextgreencar.com/news/7433/chevrolet-launches-longrange-bolt-ev/

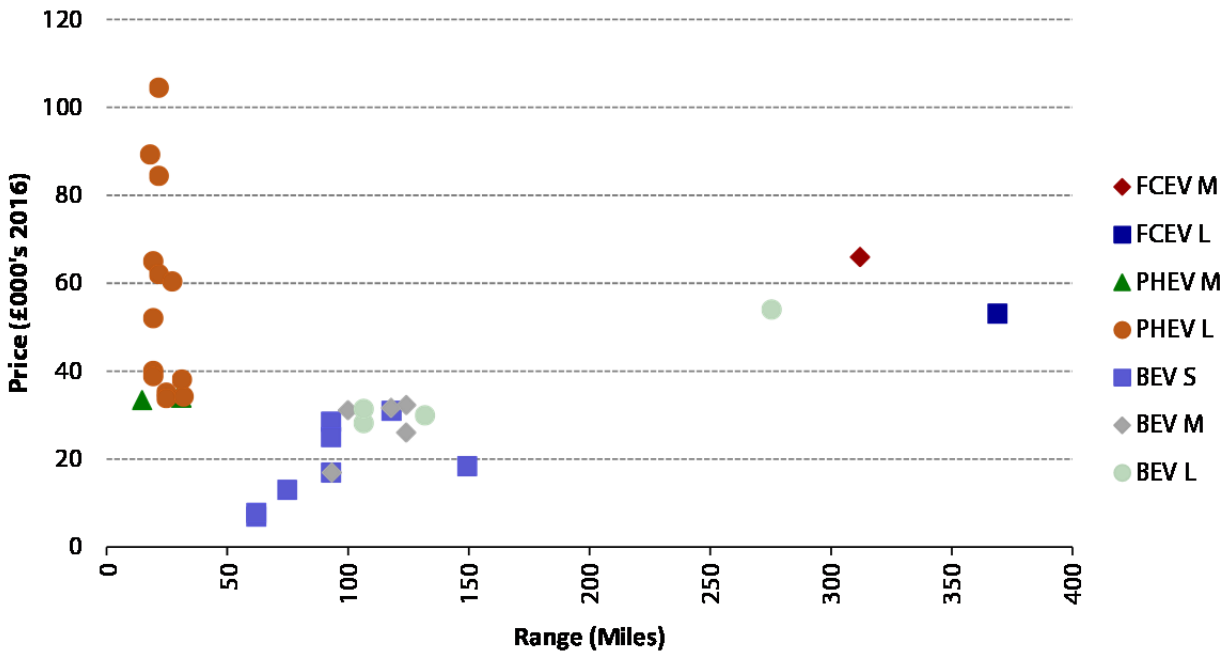
BNEF (2016) *Here's How Electric Cars Will Cause the Next Oil Crisis*. Available at: http://www.bloomberg.com/features/2016-ev-oil-crisis/

Goldman Sachs (2015) *The Low Carbon Economy*. Available at: http://www.goldmansachs.com/our-thinking/pages/new-energy-landscape-folder/report-the-low-carbon-economy/report.pdf

5. Electric vehicles: Range of models available in 2015/16

Figure A5.10 illustrates the relationship between price and measured range for electric vehicles on the market in 2015/16. There are 36 models of electric car available, up from 25 in 2015. Hydrogen fuel cell cars also became commercially available in the UK for the first time in 2015, albeit in small numbers.

Figure A5.10. Range and price of EVs available in 2015/16



Source: NextGreenCar.com
Notes: Key -PHEV = Plug-in Hybrid Electric Vehicle; BEV = Battery Electric Vehicle; FCEV = Fuel Cell Electric Vehicle; S = Small; M = Medium; L = Large.

6. Demand-side measures: Eco-driving and speed limiting

Vehicle emissions can be reduced by promoting more efficient driving styles, known as eco-driving, and by reducing driving speeds. There has been limited progress in rolling out measures to promote eco-driving (Box A5.3) whilst publication of 2015 data on drivers exceeding the speed limit has been delayed (Box A5.4).

Box A5.3. Eco-driving

Eco-driving can help drivers to maximise fuel efficiency, through a range of techniques such as smooth acceleration, appropriate use of gears and speed, anticipating traffic conditions, using engine braking and turning off the engine when stationary. Technological measures have been found to be an effective way to encourage more efficient driving and are being rolled out across all new vehicles whilst driver training schemes are being used by businesses to improve the efficiency of their drivers:

- Progress has been made in demonstrating the impact of vehicle technologies such as Gear Shift Indicators (GSIs) and Fuel Consumption Meters (FCMs) to encourage eco-driving. In 2015, the EU made FCMs a mandatory feature in all new cars and vans from 2019, FCMs can achieve efficiency gains of 2-3% and reduce CO_2 emissions by 0.3-1.1%.
- The Energy Saving Trust launched a subsidised eco-driving training scheme in England, part-funded by the DfT, which ran until March 2016. It provided a subsidy of £25 per driver trained, with a maximum participation of 8,500 drivers.

Source: European Parliament (2015) *Reduction of pollutant emissions from road vehicles*; Energy Saving Trust (2016) http://www.energysavingtrust.org.uk/businesses/subsidised-ecodriving-training; http://www.energysavingtrust.org.uk/businesses/information-training-providers

Box A5.4. Enforcing the speed limit

Lower air resistance when travelling at 70 mph vs. 80 mph can reduce car emissions by 10-20%. Levels of speeding have fallen slightly since 2008, but remain relatively high. The publication of 2015 speeding statistics has been delayed. Last year we reported on the 2014 statistics, which showed that speeding fell slightly on both motorways and dual carriageways:

- Cars exceeding the speed limit on the motorway decreased by 1% to 46% in 2014.
- For dual carriageways, the percentage of cars exceeding speed limits fell by 2% to 37% in 2014.

Source: DfT (2016) *Free-flow vehicle speed statistics*

7. Assessment of current and planned policies

In Chapter 5 - Transport of the main report, we set out our assessment of the impact of Government policies intended to reduce emissions in the Transport sector, differentiating between those policies which are expected to deliver (classified as "lower risk") and those at risk of failing to deliver, either due to design and delivery problems, or because they are currently unfunded (classified as "at risk").

Table A5.1 sets out the rationale for classifying lower risk policies as such; Table A5.2 sets out the rationale for at-risk policies; Table A5.3 sets out areas where policy is missing.

Table A5.1. Lower risk policies

Policy	Why the policy is 'lower risk'
Biofuels policy to 2020	There is evidence that current UK biofuels policy is delivering genuine GHG savings, even after taking account of ILUC emissions. There is scope to increase supply of waste-derived and advanced biofuels broadly in line with the Government's planned uptake in 2020.
Local Sustainable Transport Fund (LSTF)	The LSTF has now ended and schemes are largely complete. Small emissions savings from residual impacts of schemes funded by the policy are included in the Government's projections.
Rail electrification	Whilst there are some delays to the electrification programme, there is no evidence that these will significantly impact the overall scale of emission reduction to 2030.

Source: CCC analysis

Table A5.2. At risk policies

Policy	Why the policy is 'at risk'
Car fuel efficiency policies	Whilst new vehicle standards are in place to 2020, there is uncertainty over the extent to which emissions savings will be delivered in the real world. Reforms to Vehicle Excise Duty do not provide a significant additional incentive to purchase a lower emitting vehicle.
Van fuel efficiency policies	Whilst new vehicle standards are in place to 2020, there is uncertainty over the extent to which emissions savings will be delivered in the real world.
HGV fuel efficiency policies	There is evidence that the fuel efficiency of HGVs has remained flat in recent years. There is a lack of new vehicle CO_2 standards for HGVs. These are likely to be needed to drive the level of improvement required.

Source: CCC analysis

Table A5.3. Missing policies	
Policy	Detail
New vehicle CO_2 standards beyond 2020	New vehicle CO_2 standards for cars and vans are only in place to 2020 and there are no standards for HGVs. New vehicle CO_2 targets for 2025 and 2030 will be crucial to improve the efficiency of conventional vehicles and to bring forward mass market ultra-low emission vehicles.
Electric vehicle support beyond 2020	Our scenario for 60% of new car and van sales to be EVs by 2030 will require roll-out of a national network of rapid charge points and continued incentives beyond 2020. A package of incentives could include measures such as favourable Vehicle Excise Duty and provision of free access to low emissions zones or parking spaces, but does not necessarily have to include an upfront grant in the longer term as EV capital cost premiums fall. There is currently no support for EVs committed beyond 2020.
Passenger demand side reduction	New funding has been put in place to promote walking, cycling and use of public transport to 2020. Many Local Authorities are also providing support to promote modal shift from car travel to these modes. There is no Government assessment of the impact of these measures on emissions and they are not included in Government emissions projections. It is therefore difficult to say whether they are sufficient to deliver the level of demand reduction in our scenarios.
HGV demand side reduction	The Government's current position is that improvements to freight operations should be industry-led. Schemes such as the Logistics Carbon Reduction Scheme (LCRS) are delivering emissions reductions but membership is limited so the impact on fleet emissions is small.
Source: CCC analysis	

8. Surface transport indicators

Table A5.4. The Committee's surface transport indicators

Road transport		Budget 2 (2017)	Budget 3 (2022)	Budget 4 (2027)	2014 outturn
Headline indicators					
Emissions (% change on 2007)	Road	-19%	-29%	-43%	-13%
	Cars	-18%	-29%	-45%	-13%
	Vans	-3%	-9%	-28%	-2%
	HGVs	-29%	-42%	-47%	-18%
gCO_2/km (carbon intensity of a vehicle kilometre)	Cars	145	117	88	162
	Vans	203	166	119	224
	HGVs	559	449	400	657
Vehicle kilometres (billion)	Cars	430	457	472	409
	Vans	82	92	101	75
	HGVs	27	27	28	27

Table A5.5. The Committee's surface transport indicators					
Road transport		Budget 2 (2017)	Budget 3 (2022)	Budget 4 (2027)	2015 outturn
Supporting indicators - Vehicle technology					
New vehicle CO_2	Car	111	95 (by 2020)	57	121
	Van	164	130	89	179
New electric vehicles registered each year		35,000	525,000	1,470,000	28,342
Stock of electric vehicles in fleet		75,000	1,340,000	6,645,000	47,983
Review of financial mechanisms for addressing up-front costs to EVs		2017			
Roll-out of strategic rapid charging network			2020		
Strategy for development of residential off-street charging points		2015			Broadly met.
Action plan for engaging local authorities in providing measures to support EV uptake		2015			Broadly met.
Full evaluation of GHG implications of methane trucks		2015			Incomplete

Table A5.6. The Committee's surface transport indicators				
Road transport	Budget 2 (2017)	Budget 3 (2022)	Budget 4 (2027)	2015 outturn
Supporting indicators - Biofuels				
Penetration of biofuels (by energy)	5.9%	8.4%	9.9%	2.5%
Develop trajectory for RTFO to meet EU 2020 target following EU agreement	2015/16			Delayed.
Supporting indicators - Demand side measures				
Evaluate effectiveness of LSTF and commit to further funding if appropriate	2016			Further funding committed but evaluation ongoing
Nationwide roll -out of Smarter Choices if appropriate		Complete		
Review effectiveness of voluntary industry approach to reduce emissions in freight sector	2016			Government is carrying out a Freight Carbon Review.

9. Aviation and shipping monitoring indicators

Table A5.7. The Committee's aviation monitoring indicators

Aviation	Domestic		International*		Total		CCC 2050 planning assumption	2050 forecast range**
	2005	2014	2005	2014	2005	2014	vs. 2005	
Headline indicators								
CO_2 emissions (million tonnes)	2.6	-40%	34.9	-6%	37.5	-9%	~0%	+3% to +37%
Passenger demand (million)	50.2	-22%	178.0	12%	228.2	4%	~+60%	+76% to +119%
Supporting indicators								
Proportion of passengers travelling for business	46%	-5pp	22%	-3pp	27%	-5pp	n/a	
Load factor	n/a				79%	+5pp	n/a	
Wider monitoring								
Non-CO_2 climate science, international/EU policy (e.g. ICAO, EU ETS, SESAR programme), UK policy, technology developments (e.g. biofuels, airframe/engines)								

* International emissions are not currently formally covered by carbon budgets, but are included in the 2050 target

** Airports Commission (2015) Strategic Fit: Forecasts

*** 2005 total passenger demand has been revised downwards in CAA statistics but domestic/international split is only available on old basis. We scale domestic and international demand downwards in proportion to revision to total passenger demand.

**** Only covers UK registered airlines and includes their worldwide activity

Table A5.8. The Committee's shipping monitoring indicators						
Shipping	Domestic		International*		Total	
	2013	2014	2013	2014	2013	2014
Headline indicators						
CO_2 emissions (million tonnes)	2.3	4%	8.3	-9%	10.6	-6%
Tonne-km (billion)	28.0	-8%	1,184	0%	1,212	-1%
Supporting indicators						
Cargo carried (million tonnes)***	56.1	3%	266.5	-1%	322.6	0%
Ship movements (thousands)	n/a				138.3	2%
Average ship size (thousand deadweight tonnes per ship)	n/a				10.0	-2%
Wider monitoring						
Non-CO_2 climate science, international/EU policy (e.g. IMO), industry/market factors (e.g. vessel speeds, relative prices of bunker fuels in UK/non-UK ports), alternative fuels (e.g. biofuels/LNG), technology developments.						

* International emissions are not currently formally covered by carbon budgets, but are included in the 2050 target

** Total emissions measured on the basis of bunker fuel sales

*** Reflects imports/arriving ship movements. International t-km based on CCC analysis of DfT Port Freight Statistics