

# **Reducing CO<sub>2</sub> Emissions from New Cars: A Study of Major Car Manufacturers' Progress in 2007**

**August 2008**

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## Note on data source

The data source used for this report is the EU car CO<sub>2</sub> monitoring mechanism database. It was obtained by T&E following submission of a request under laws granting access to official documents.

The source is an updated version of the one used for our 2007 report of the same name.

It should be noted that the geographical coverage of the figures is not the entire EU27, but rather the EU18: **the 'old' EU15 plus Hungary, Lithuania and Slovenia.**

The other nine Member States had not yet submitted their data by the time T&E requested access to the EU database. Together these nine 'missing' countries represent 6% of total sales in the EU27<sup>1</sup>.

T&E has followed the convention of the official EU monitoring reports in revising figures downward by 0.7% to reflect changes to the EU test cycle.

## Acknowledgements

T&E would like to thank the Institute for European Environmental Policy (IEEP), London, UK who performed the underlying data analysis for this year's study and the Esmée Fairbairn Foundation for funding the research.

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<sup>1</sup> The T&E report published in 2007 (based on data for 2006) also covered the Czech Republic, Cyprus, Estonia, and Slovakia (96% coverage of EU27 new sales).

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## Introduction

This report is the third T&E has published on the progress Europe's major car manufacturers have made in reducing CO<sub>2</sub> emissions and fuel consumption of new cars. The first report was published in October 2006, followed by a second in November 2007<sup>2</sup>.

This latest report comes at a critical time. Europeans are paying record prices for petrol and diesel, post-Kyoto climate targets are under discussion, and there are increased concerns about Europe's dependence on imported oil and gas.

In December 2007 the European Commission published a legal proposal to regulate the fuel efficiency of new cars. The legal proposal has to be approved by the European Parliament and Member State governments before becoming law, a process that is expected to end early in 2009.

It is regrettable that neither carmakers nor the European Commission have so far published company-specific fleet-average CO<sub>2</sub> figures for new cars. Indeed the European Commission specifically agreed not to publish company-specific data when it signed a voluntary commitment with the car industry on cutting CO<sub>2</sub> in the late 1990s.

T&E continues to believe that this information should be put into the public domain. New car fuel efficiency is an issue of importance to all Europeans, and particularly to drivers, shareholders and policymakers.

**Fuel efficiency and CO<sub>2</sub> emissions** are used interchangeably in this report because the two are directly linked. One litre of petrol consumption leads to about 2.34 kg of CO<sub>2</sub>, one litre of diesel consumption to approx. 2.62 kg of CO<sub>2</sub>. Reducing CO<sub>2</sub> emissions is therefore not only beneficial in the context of mitigating climate change, but it also helps to reduce Europe's oil import burden and drivers' fuel bills at the pump.

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<sup>2</sup> 2006 report: [www.transportenvironment.org/Publications/prep\\_hand\\_out/lid:442](http://www.transportenvironment.org/Publications/prep_hand_out/lid:442)  
2007 report: [www.transportenvironment.org/Publications/prep\\_hand\\_out/lid:481](http://www.transportenvironment.org/Publications/prep_hand_out/lid:481)

## Background: EU climate & energy policy and the role of transport

The European Union is committed under the Kyoto Protocol to reduce greenhouse gas emissions by 8 per cent by 2008-2012 compared to the 1990 level. In March 2007 EU leaders committed to a 20-30% reduction in greenhouse gas emissions overall by 2020. In January 2008 the European Commission issued a package of proposals to legally implement these targets. The 'climate and energy package' is now working its way through the Council of Ministers and the European Parliament.

Transport is the worst performing sector under Kyoto and seriously jeopardises the achievement of the targets. Transport CO<sub>2</sub> emissions in the EU grew by 35% between 1990 and 2006. Other sectors reduced their emissions by 3% on average over the same period. The share of transport in CO<sub>2</sub> emissions was 21% in 1990, but by 2006 this had grown to 28%<sup>3</sup>. The European Environment Agency estimates that cars are responsible for 14% of CO<sub>2</sub> emissions<sup>4</sup>.

Transport is also critical in the debate on Europe's energy dependence. Europe currently imports approximately €1 billion of oil every day. Cars are the single biggest consumer in the EU, using around 4.4 million barrels a day, and responsible for 40 per cent of imports.

Oil imports for cars now amount to €140 billion a year, more than the value to the economy the entire European car industry creates each year. According to figures from Eurostat, the 'value added' of the European automotive industry, including vans and trucks as well as suppliers, was €132 billion in 2005<sup>5</sup>.

In this context, the European Commission published on 19 December 2007 a proposal to reduce CO<sub>2</sub> emissions from cars.

## CO<sub>2</sub> and cars: a history of postponement and weakening

The EU target to reduce average new car emissions to 120 g/km was first proposed by Germany at a meeting of European environment ministers in October 1994. It was presented as the ambition to lower fuel consumption of new petrol cars to 5 litres per 100 km and new diesel cars to 4.5 litres per 100 km. The target was formally announced in a European Commission communication in 1995 and represents a 35% reduction over 1995 levels.

Originally the target date was set for 2005. Until now, the target has been postponed or weakened three times.

The first postponement occurred in 1996 when the Environment Council introduced the term 'by 2005, or 2010 at the latest'.

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<sup>3</sup> Source: *Annual European Community Greenhouse gas inventory 1990-2006 and inventory report 2008*, European Environment Agency, June 2008, [http://reports.eea.europa.eu/technical\\_report\\_2008\\_6/en](http://reports.eea.europa.eu/technical_report_2008_6/en)

<sup>4</sup> [tinyurl.com/5hrwod](http://tinyurl.com/5hrwod)

<sup>5</sup> See T&E oil briefing [www.transportenvironment.org/Publications/prep\\_hand\\_out/lid:505](http://www.transportenvironment.org/Publications/prep_hand_out/lid:505)

The second postponement took place in 1998 when the European Automobile Manufacturers Association (ACEA) committed to the EU to reduce the average CO<sub>2</sub> emissions from new cars sold in the EU to 140 g/km by 2008. The Commission agreed to postpone the deadline for delivery of the '120' target to 2012.

The third weakening was in December 2007 when the European Commission proposed<sup>6</sup> to move the target for 2012 from 120 to 130 g/km. The Commission said that the missing 10 g/km should be taken up by non-car-related measures such as the use of biofuels.

## Brief explanation of the European Commission proposal

The Commission proposal strives to reduce the average CO<sub>2</sub> emissions from new cars to 130 g/km by 2012 (approx. 5.6 litres per 100 km for petrol cars and 5.0 litres for diesel cars). This is 19% below the average in 2006, which stood at 160 g/km.

Carmakers are responsible for delivering the reductions. But it should be remembered that the target is an average for all cars sold, not a fixed limit that no car may exceed. In fact, manufacturers can average the CO<sub>2</sub> emissions from all cars they produce.

It was also proposed that individual manufacturers' targets should be differentiated on the basis of the weight of the cars they produce in the target year, 2012. If their cars are heavier than average, they are allowed an easier CO<sub>2</sub> target. If by 2012 their cars are lighter than average they get a tougher target.

Manufacturers can also file for joint-compliance with other manufacturers, in order to average emissions over a larger pool of vehicles. This flexibility mechanism is called 'pooling'.

According to the proposal, enforcement would take place through a system of fines. For every g/km a manufacturer exceeds its company target, it has to pay a fine per vehicle sold that raises in steps from €20 in 2012 to €95 in 2015.

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<sup>6</sup> Proposal for a regulation of the European Parliament and of the Council, Setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO<sub>2</sub> emissions from light-duty vehicles, COM(2007)856, Brussels, 19 December 2007, [http://ec.europa.eu/environment/air/transport/co2/co2\\_home.htm](http://ec.europa.eu/environment/air/transport/co2/co2_home.htm)

## Carmaker progress in 2007

T&E commissioned the Institute for European Environmental Policy (IEEP) in London to analyse sales and CO<sub>2</sub> information in the European Commission database that forms the basis of the official EU monitoring mechanism on cars and CO<sub>2</sub><sup>7</sup>. T&E was granted access to the database following a request under EU laws granting access to official documents<sup>8</sup>.

This database includes figures for all cars sold in Europe in 2007 including weight and CO<sub>2</sub> emissions. On the basis of this data we were able to produce the rankings published in this report. It is important to note that all the data is sales-weighted i.e. based on the actual number of cars sold by each manufacturer in each country. This is relevant because the Commission's proposal is also based on sales-weighted figures.

It should be noted that the geographical coverage of the figures is not the entire EU27, but rather the EU18: **the 'old' EU15 plus Hungary, Lithuania and Slovenia**. The other nine Member States had not yet submitted their data by the time T&E requested access to the EU database. Together these nine 'missing' countries represent 6% of total sales in the EU27<sup>9</sup>.

Only the volume car manufacturing groups (those that sold over 200,000 vehicles in Europe in 2007) were included in the study. These were the same 14 manufacturers reported in the 2007 study (on 2006 data).

In this report we present three rankings:

1. The progress made by the 14 manufacturers in cutting their fleet average CO<sub>2</sub> emissions in 2007;
2. The improvements the 14 manufacturers still have to make in order to hit their individual targets as proposed by the European Commission in December 2007;
3. The average 2007 CO<sub>2</sub> emissions of new cars sold in the 18 EU Member States for which we have data.

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<sup>7</sup> [http://ec.europa.eu/environment/co2/co2\\_monitoring.htm](http://ec.europa.eu/environment/co2/co2_monitoring.htm)

<sup>8</sup> [http://ec.europa.eu/transparency/access\\_documents/index\\_en.htm](http://ec.europa.eu/transparency/access_documents/index_en.htm)

<sup>9</sup> Note: the T&E report published in 2007 (based on data for 2006) also covered the Czech Republic, Cyprus, Estonia, and Slovakia (96% coverage of EU27 new sales).



## I. Progress in 2007, by carmaker

The first table shows the improvement (or lack of it) in the fleet-average CO<sub>2</sub> emissions of each given carmaker group in 2007 compared with the previous year.

Manufacturer group	Ranking 2006	Sales 2007 (1,000)	Average CO <sub>2</sub> emissions (g/km)		
			2006	2007	%
1 BMW	4	765	184	170	-7.3
2 Hyundai	7	341	167	160	-3.9
3 Daimler	14	796	188	181*	-3.5*
4 Toyota	1	818	153	149	-2.4
5 Fiat	9	1,157	144	141	-2.0
6 Volkswagen	12	2,776	166	163	-1.8
7 Mazda	5	213	173	171	-1.4
8 PSA Peugeot Citroën	3	1,903	142	141	-0.9
9 Suzuki	13	240	164	162	-0.8
10 General Motors	10	1,611	157	156	-0.6
11 Nissan	6	279	168	167	-0.5
12 Renault	8	1,192	147	146	-0.5
13 Ford	9	1,565	162	162	-0.2
14 Honda	2	262	154	156	+1.1
German groups			173	168	-3.2
French groups			144	143	-0.7
Japanese groups			161	157	-2.3
ACEA			160	157	-1.6
JAMA			161	159	-1.4
KAMA			164	161	-2.0
average			160	158	-1.7

\* The Daimler figure includes the effects of the 2007 de-merger with Chrysler. Had DaimlerChrysler not demerged, the 2007 company CO<sub>2</sub> figure would have been 185 g/km (a 1.5% improvement compared with 2006 instead of 3.5%).

### Notes

- Note that data apply to the EU18: 'old' EU15 plus Hungary, Lithuania and Slovenia (94% of the EU27 market). Last year's report on 2006 data referred to this EU18 plus Czech Republic, Cyprus, Estonia, and Slovakia (96% of the EU27 market);
- 'German groups' include Volkswagen, Daimler and BMW.
- 'French groups' include PSA and Renault
- 'Japanese groups' include Toyota, Honda, Mazda, Nissan and Suzuki;
- The European Automobile Manufacturers Association (ACEA) is the industry association of European manufacturers. [www.acea.be/index.php/about\\_us/members/](http://www.acea.be/index.php/about_us/members/)
- The Japan Automobile Manufacturers Association (JAMA) is the industry association of Japanese manufacturers. [www.jama.org/about/members.htm](http://www.jama.org/about/members.htm)
- The Korea Automobile Manufacturers Association (KAMA) is the industry association of Korean manufacturers. [www.kama.or.kr/eng/MC/K\\_eng\\_mc1.jsp](http://www.kama.or.kr/eng/MC/K_eng_mc1.jsp)

The following conclusions can be drawn from the table:

- BMW is the carmaker that made by far the greatest year-on-year CO<sub>2</sub> and fuel efficiency improvement in 2007. This is likely to be due to its programme 'Efficient Dynamics', a range of fuel-saving measures gradually introduced across the full range of BMW's models. This progress shows that significant year-on-year CO<sub>2</sub> cuts are achievable even by carmakers in the premium segment of the market;
- Daimler, the other premium German car maker in the ranking, achieved a 3.5% improvement. However more than half of this figure can be attributed to the demerger of DaimlerChrysler in 2007. See next section.
- Both French car makers disappointed with less than 1% progress. Ford and General Motors performed similarly;
- Overall progress for all carmakers was just 1.7 per cent. European, Japanese and Korean carmakers (represented by ACEA, JAMA, and KAMA respectively) performed more or less similarly. The 1.7% is slightly better than last year's all-time low score of 0.7 per cent improvement, but still by far not enough to hit climate targets. See next section.

The lack of progress was, again, explained to a large extent by the lack of progress in cutting weight. In 2007, cars again became 10 kg heavier, from 1,372 to 1,382 kg<sup>10</sup>. Heavier cars use more fuel.

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<sup>10</sup> Note that the European Commission's Impact Assessment is calculated using an average weight in 2006 of 1,289 kg. The difference is due to definition. The Impact Assessment works with 'empty weight', the figures in the CO<sub>2</sub> Monitoring Mechanism, used in this report, work with a so-called weight of the vehicle 'in running order' i.e. including driver and fuel.

## 2. Distance to proposed regulatory target, by carmaker

As already described, the Commission's proposal strives to achieve a 130 g/km average figure by 2012. But the targets are differentiated by manufacturer, based on the average weight of the vehicles they will produce in 2012.

The table below shows a ranking on the basis of the percentage reduction in CO<sub>2</sub> each carmaker has to make in order to hit its target. **The stated targets assume the average weight of each company's cars will not change between 2007 and 2012.**

Manufacturer	target for 2012*	Year 2007		Year 2006		
		average CO <sub>2</sub> (g/km)	Distance to target	average CO <sub>2</sub> (g/km)	Distance to target	Rank 2006
1 PSA Peugeot-Citroën	127	141	10%	142	12%	1
2 Renault	127	146	13%	147	15%	2
3 Fiat	122	141	14%	144	16%	3
4 Toyota	127	149	15%	153	17%	5
5 Honda**	131	156	16%	154	16%	4
6 Hyundai	132	160	17%	167	21%	9
7 General Motors	129	156	17%	157	19%	6
8 Ford	132	162	18%	162	20%	7
9 Volkswagen	133	163	19%	166	20%	8
10 BMW	137	170	19%	184	26%	12
11 Nissan**	130	167	22%	168	24%	10
12 Mazda	129	171	24%	173	26%	11
13 Daimler	137	181	24%	188	27%	14
14 Suzuki	122	162	25%	166	26%	13
Average	130	158	17%	160	19%	

\* Assuming the average weight of the company fleet will not change between 2007 and 2012

\*\* There are significant gaps in the recorded data of the *weight* of cars sold by Honda (39% missing) and Nissan (25% missing). Therefore the company CO<sub>2</sub> target and the gap to close are less reliable than those of other carmakers, for whom missing weight data is in the range of 1-2%.

- PSA Peugeot-Citroën is the best-placed carmaker. Fiat, despite rivalling PSA in terms of absolute emissions, is number three in the list because it receives a tougher target for making vehicles that are on average 115 kg lighter than PSA's.
- No carmaker has to cut CO<sub>2</sub> emissions by more than 25% to hit their target by 2012.
- It is striking that three of the bottom four carmakers are Japanese: Suzuki, Mazda and Nissan. All three did not close the gap sufficiently in 2007 and will have to speed up their efforts. The same goes for Daimler, although the company is no longer in last place.
- BMW's good progress in 2007 implies that the company has now caught up with Volkswagen group in the race to meet CO<sub>2</sub> reduction targets (both now need a 19% cut). Last year the companies were 6 percentage points apart (26% vs. 20%).
- The 3.5% improvement of Daimler is a special case. In 2007 the company sold off its high-emitting Chrysler arm, responsible for some 10% of the

company's sales in the EU. On the one hand, this explains more than half of the 3.5% CO<sub>2</sub> reduction. On the other hand, the fact that Chrysler's cars were also heavier than Daimler's means that Daimler's CO<sub>2</sub> target has also become 1 to 2 g/km tougher.

- Furthermore, in 2006 DaimlerChrysler actually increased fleet-average CO<sub>2</sub> emissions by 2.8%.
- These factors together imply that the fuel efficiency of Daimler models has not improved over the last two years, which explains their low position.

### 3. Average CO<sub>2</sub> emissions and progress by Member State

The third table shows average CO<sub>2</sub> figures of new cars sold in the 18 Member States for which data was available as well as the percentage improvement made over the last year.

	New registrations in 2007 (1,000)	Average CO <sub>2</sub> 2007	Average CO <sub>2</sub> 2006	Improvement 2006-2007	Rank 2006
1 Portugal	204	143	144	-0.5%	1
2 Italy	2,493	146	148	-1.8%	2
3 France	2,050	148	149	-0.3%	3
4 Belgium	525	152	153	-0.7%	4
5 Spain	1356	152	155	-1.5%	7
6 Hungary	167	154	154	0.3%	5
7 Slovenia	68	155	154	0.5%	6
8 Denmark	160	159	161	-1.7%	8
9 Ireland	186	160	165	-2.9%	11
10 Austria	298	162	163	-0.5%	10
11 UK	2,352	164	167	-1.8%	14
12 Netherlands	494	164	165	-1.1%	13
13 Greece	260	164	165	-0.8%	12
14 Luxembourg	51	165	167	-1.4%	15
15 Germany	3,105	168	171	-1.7%	16
16 Lithuania	21	175	162	8.0%	9
17 Finland	123	176	178	-1.1%	17
18 Sweden	300	180	187	-3.8%	18
Average	14,213	158	160	-1.7%	

- This table shows that Portugal is, as in 2006, the country where the most efficient cars are sold on average. But in terms of progress made, Portugal, as well as France and Belgium (numbers 3 and 4 on the list) performed poorly, with a less than 1 per cent improvement.
- Sweden remains in last position with average CO<sub>2</sub> emissions of new cars of 180 g/km. This poor figure can largely be explained by the popularity in Sweden of the country's home brands: Volvo (part of Ford) and Saab (part of GM). The average CO<sub>2</sub> emissions of these marques in Europe, at 188 g/km and 189 g/km respectively reflects a range almost entirely made up of high consuming models. But despite this, the country did manage to close the gap with the rest of the field significantly, by improving its fleet average CO<sub>2</sub> emissions by almost 4 per cent, from 187 to 180 g/km.
- Ireland made significant progress, with an almost 3 per cent improvement.
- In most big markets - Germany, UK, Spain, and Italy - emissions went down between 1 and 2 per cent. France is the exception with only 0.3% improvement.

- Fleet average CO<sub>2</sub> emissions actually went up in the three 'new' EU Member states for which this report has figures: Hungary, Slovenia and particularly Lithuania – although that last country only represents a very small market for new car sales.

## Regulation – key issues

Regulating the fuel consumption and CO<sub>2</sub> emissions of new cars is the single most effective policy measure the EU can take to simultaneously tackle climate change, reduce dependence on oil, and spur investment in low-carbon car technologies in Europe and elsewhere.

### **120g by 2012**

Carmakers have been lobbying hard in favour of a 'phase-in' of targets over several years. In effect this would mean that the target would initially only apply to the cleanest segment of the fleet.

A comparison can be made to a smoking ban that only applied to non-smokers in its first years of introduction.

The deadline for reaching 120g has already been postponed twice, first to 2010, then to 2012. It is a matter of political credibility not to postpone the deadline any further. Recent research shows that if all cars on the market were equivalent to today's 'state of the art', CO<sub>2</sub> emissions would already be 20-25% lower than today even without car engine downsizing, or a move to hybrid technology.

### **Long term targets are needed**

The Commission's proposal does not contain any hint of a target after 2012. Long-term targets for 2020 and 2025 are necessary to give the industry a long-term perspective for the development of more fuel efficient cars. 80g CO<sub>2</sub> /km is needed by 2020 and 60g by 2025 in order to be consistent with scenarios to reduce CO<sub>2</sub> emissions by 30% by 2020 and 60-80% by 2050.

### **'Eco-innovations'**

Industry lobbyists are arguing for so-called 'eco-innovations' such as solar-powered sunroofs and improved air conditioning systems to be counted towards the targets. But these devices are not currently counted in the test process used to calculate new car fuel efficiency – so also amount to a weakening when compared to previous targets based on the so-called 'test-cycle'. T&E believes that such improvements should come on top of, not instead of improvements to engine technology, aerodynamic modifications and weight reduction.

### **If differentiated CO<sub>2</sub> targets are introduced, they should not be based on weight**

The European Commission proposed to make CO<sub>2</sub> standards for carmakers dependent on the weight of the cars they produce.

We believe that Europe should have one fleet average standard for all cars sold in a given year, without distinction between classes of car.

If however some differentiation on utility parameter should be allowed then the parameter should be a car's 'footprint' (track width multiplied by wheelbase), not its weight.

T&E has strongly argued that weight based CO<sub>2</sub> standards punish weight reduction, one of the most important methods of improving efficiency and reducing CO<sub>2</sub><sup>11</sup>. They make the regulation less effective, more costly, or both.

Therefore we have presented an alternative proposal that does not base the manufacturer target on the weight of the cars produced but on their 'footprint'<sup>12</sup>. The 'footprint' is a car's track width times the wheelbase, and is a good proxy for the interior space it offers.

In the US, weight-based standards have been a failure. They have led to an average vehicle weight increase of 28% since 1987. This was due to a massive shift in the market towards heavier vehicles. Therefore, the most recent US fuel efficiency standards for light trucks, and also the latest US proposals in this area for cars<sup>13</sup>, base the standards on the vehicle's footprint instead of its weight.

### **Penalties of €150/g/km/car are needed**

A robust compliance regime is essential for the functioning of legislation on CO<sub>2</sub> and cars. Penalties should be high enough to ensure that carmakers really comply with the targets instead of just paying the penalty. Sales of low emitting cars could offset those of high emitters but any excess CO<sub>2</sub> over the target for the average car should be charged at €150 per g/km, per vehicle sold.

Penalty levels of €20-95 as proposed by the Commission are unlikely to be sufficient. The Commission's Impact Assessment states '*achieving a deterrent effect across the board would require basing premium levels on the upper range of the marginal abatement costs (150 €/gram)*' (p29). Such penalties are cost neutral to the consumer. At today's fuel prices a car that emits 1 g/km CO<sub>2</sub> more burns about 100 litres extra fuel over its lifetime, leading to approximately €150 extra fuel costs to the consumer.

### **Sales of flexfuel cars should not count towards an energy-efficiency target**

Flexfuel cars (cars which can run on high blends of biofuel) should not be rewarded for a policy designed to promote technical fuel efficiency. Biofuels are also a scarce resource, their environmental impacts are very uncertain, and they are not a substitute for energy efficiency measures. Given the crucial role of vehicle efficiency in achieving climate and oil dependence objectives such an 'escape' would be unacceptable.

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<sup>11</sup> See T&E's background briefing on weight-based car CO<sub>2</sub> standards  
[www.transportenvironment.org/Publications/prep\\_hand\\_out/lid:500](http://www.transportenvironment.org/Publications/prep_hand_out/lid:500)

<sup>12</sup> See the study T&E commissioned from IEEP, TNO and CE Delft, full report available at  
[www.transportenvironment.org/Publications/prep\\_hand\\_out/lid:511](http://www.transportenvironment.org/Publications/prep_hand_out/lid:511), executive summary at  
[www.transportenvironment.org/Publications/prep\\_hand\\_out/lid:512](http://www.transportenvironment.org/Publications/prep_hand_out/lid:512)

<sup>13</sup> See <http://tinyurl.com/dgntg>