

CO₂ EMISSIONS FROM NEW CARS IN EUROPE: COUNTRY RANKING

How national car tax systems helped boost sales
of lower-carbon cars across Europe in 2013



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December 2014

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Editeur responsable

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This report was prepared by Malcolm Fergusson with the support of T&E's staff.

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T&E gratefully acknowledges funding support from the European Commission. The views in this report are those of Transport & Environment and can therefore in no way be taken to reflect the official opinion of the European Commission.

Summary

This report

This report is part of the eighth annual report T&E has published on progress in reducing CO₂ emissions and improving the fuel efficiency of cars. This document focuses on average new car emissions in different Member States and highlights the effectiveness (or otherwise) of their different taxation policies in encouraging the purchase of lower carbon cars.

For all petrol and diesel vehicles, CO₂ emissions are directly related to the fuel consumption of the vehicle. Lower-carbon vehicles therefore also use less fuel and are cheaper to run. While new cars represent a small share of the car fleet, new cars sold today will affect the fuel economy of the whole vehicle stock as they age and trickle down through second-hand sales. New car sales in each Member State will therefore impact on the future fuel costs of motorists, the total expenditure on oil and the CO₂ emissions generated.

2013 progress in cutting CO₂ emissions

In 2013, the average CO₂ emissions from all new cars across the EU (as measured by the official test) was 127g/km, a 4% reduction on 2012. On average, therefore, the 2015 target has already been met two years ahead of schedule. Since the regulation was adopted in 2008, the average rate of progress has been 3.7% per year, so 2013 progress was slightly above average. However, care must be taken in monitoring progress since about half of the measured improvement in test results is not being realised on the road.¹ This is due to a steeply widening gap (now 31%) between the official test result and real world CO₂ emissions and fuel economy.

The effectiveness of national policies to encourage the purchase of lower carbon cars

The principal responsibility to reduce CO₂ in line with the Regulation falls upon the carmakers. Each carmaker has a target for the CO₂ emissions of the new cars it sells in 2015 and 2020/1. However, there is much that Member States can do to help (or hinder) progress through the policies that they adopt nationally. Substantial differences in the rate of progress of companies are mirrored by the Member States, principally because of differences in the ways cars are taxed across the EU. While some countries have made conspicuous efforts to improve the fuel economy of their new cars, others have done very little to support the aims of the cars and CO₂ legislation.

In 2013, the top six best performing countries all achieved annual emissions reductions of new cars of more than 5% (Netherlands, Greece, Slovenia, France, Finland and Bulgaria). In contrast the laggards, including Sweden and Poland, achieved less than 2.5% improvement in average CO₂ emissions from 2012. Countries with low average emissions typically have initial registration taxes (purchase taxes) and company car taxes that are steeply differentiated by CO₂. Annual circulation taxes are a modest driver of fuel efficiency even if they are

¹ <http://www.transportenvironment.org/publications/2014-mind-gap-report-manipulation-fuel-economy-test-results-carmakers>

graduated according to CO₂ emissions, and high fuel taxes alone have a limited influence on the efficiency of the cars being bought – but do impact on the overall level of car use and fuel consumption.

Tax policies and average new car 2013 CO₂ emissions in major car markets

Rank	Country	CO ₂ g/km	Registration Tax	Circulation Tax	Company Car Tax	Fuel Tax	Green car tax rating
1	Netherlands	109	✓✓		✓✓	✓✓	★★★
2	Greece	112		✓		✓	★
3	Portugal	112	✓✓	✓			★★
4	Denmark	112	✓✓	✓✓		✓	★★
5	France	117	✓✓	✓	✓✓	✓	★★★
6	Italy	121				✓✓	★
7	Spain	122		✓			★★
8	Belgium	124	✓		✓	✓	★★
9	UK	128		✓	✓✓	✓✓	★★
10	Austria	131	✓✓				★
11	Finland	132	✓	✓		✓	★
12	Sweden	133		✓		✓✓	★
13	Czech Rep	135					★
14	Germany	136		✓		✓	★
15	Poland	138					★

Key: Vehicles	✓	Tax relates to CO ₂ , but only to a limited extent
	✓✓	Tax strongly graduated according to CO ₂
Fuel	✓	Intermediate fuel tax rates
	✓✓	Highest fuel tax rates
Green car rating	★	Weak policies
	★★	Average policies
	★★★	Best policies

The poorest performing countries tend to have ineffective incentives for fuel efficiency and low-CO₂ cars in their tax systems. Among the large new car markets tax reform is most urgently needed in Germany, Poland, Czech Republic and Sweden, which are falling behind other countries.

Most countries could strengthen their taxation systems to encourage more fuel-efficient lower-carbon vehicles by increasing the graduation in the tax rate between low and high-carbon cars particularly for initial registration taxes and company car taxes, which have the greatest influence on car buyers' choices.

Vehicle taxes graduated according to CO₂ emissions have one negative consequence – they bias the market in favour of diesel cars. This is because diesel cars have typically around 15% lower tailpipe CO₂ emissions than equivalent petrol cars, so can benefit more from the fiscal incentives on offer. They also have typically lower running costs owing to their better fuel economy and the lower price of diesel in most of the EU. Diesel now accounts for over half of all new cars sold and dieselisation has many serious drawbacks notably higher air pollution emissions of nitrogen oxides. On a lifecycle basis the CO₂ emissions from diesels are also no better, and probably worse, than gasoline cars. This is particularly the case in countries with a low rate of diesel tax that encourages larger vehicles and more driving.

Countries with the lowest rates of dieselisation tend to have specific taxation surcharges on diesel cars that discourage purchase (Netherlands and Denmark). Comparison of the rates of dieselisation of passenger cars in different countries with the average new car CO₂ emissions shows it is not necessary to have a high share of diesels in order to achieve low average CO₂ emissions.

To better balance the fiscal treatment of petrol and diesel, countries that don't yet have higher vehicle taxes on diesel cars should introduce a differential tax rate between diesel and petrol cars so that gasoline cars with CO₂ emissions 15-20g/km higher than for diesels have a similar tax rate. This is to reflect the higher nitrogen oxide emissions and lifecycle CO₂ emissions of diesel cars. Such a differential rate should apply to all forms of vehicle taxes.

Low levels of diesel tax encourage higher proportions of diesel car sales and more vehicle use. Fuel should be taxed on the basis of its energy content with similar rates of excise duty applied to gasoline and diesel fuels to avoid market distortions leading to dieselisation.

Many countries subsidise car purchase through low rates of taxation on company cars, leading to more and bigger cars on the roads that are driven further. The OECD recently observed that “environmental outcomes across the OECD would be greatly improved by ending the under-taxation of company cars, particularly the distance component.”² While steeply graduated company car taxes with CO₂ emissions will encourage the purchase of lower carbon cars, the overall level of tax levied should be commensurate with that levied on salaries and discourage unsustainable vehicle use and choices.

² <http://www.oecd.org/tax/under-taxing-drivers-is-bad-for-environment-and-health.htm>

Introduction

This report summarises the progress made by EU Member States to reduce the CO₂ emissions and fuel consumption of their new cars. It highlights the effectiveness (or otherwise) of vehicle and fuel taxation policies to encourage the purchase of lower carbon cars.

The report is part of Transport and Environment's (T&E's) eighth annual progress report tracking progress in reducing car CO₂ emissions. The report examines progress in 2013 towards meeting the 2015 (130gCO₂/km) and 2021 (95gCO₂/km) targets for the average emissions of new cars sold in these years.

Three earlier reports in 2014 have assessed:

- Overall progress in 2013 towards meeting the EU-wide and manufacturer-specific targets³
- The growth in sales of electric cars and the impact of so-called 'supercredits'⁴ and
- The extent to which progress measured in official tests is being reflected in fuel efficiency improvements on the road.⁵

The principal responsibility to reduce CO₂ in line with EU regulations⁶ falls upon the carmakers, as reflected in the fact that each has a target to cut its average emissions. However, there is much that Member States can do to help (or hinder) progress through the policies that they adopt nationally. Substantial differences in the rate of progress between different car companies are mirrored by the Member States, principally because of differences in national policies towards vehicles and fuels. While some countries have made conspicuous efforts to improve the fuel economy of their new cars, others have done very little to support the aims of the cars and CO₂ legislation.

³ <http://www.transportenvironment.org/publications/how-clean-are-europe%E2%80%99s-cars-2014-%E2%80%93-part-1>

⁴ <http://www.transportenvironment.org/publications/electric-vehicles-2013-progress-report>

⁵ <http://www.transportenvironment.org/publications/2014-mind-gap-report-manipulation-fuel-economy-test-results-carmakers>

⁶ http://ec.europa.eu/clima/policies/transport/vehicles/cars/index_en.htm

Note on data

This report is based on the finalised version of the database of new car CO₂ emissions for 2013 published by the European Environment Agency in October 2014. Previous reports were based on the preliminary data published earlier in the year. The differences, in practice, are minimal.

For our analyses we restricted the calculations to points where data were present and reliable (e.g. excluding cars with zero weight from weight calculations).

Test results *versus* the 'real world'

It is also important to bear in mind that all the data in this report reflect the test results as derived and monitored under EU legislation. As the previous report highlighted, there is a large and growing gap between the levels of progress reported in this document and the actual improvements in fuel economy that will be experienced by motorists in each Member State. About half of the measured progress in tests has been delivered on the road.

Overview of progress by Member States

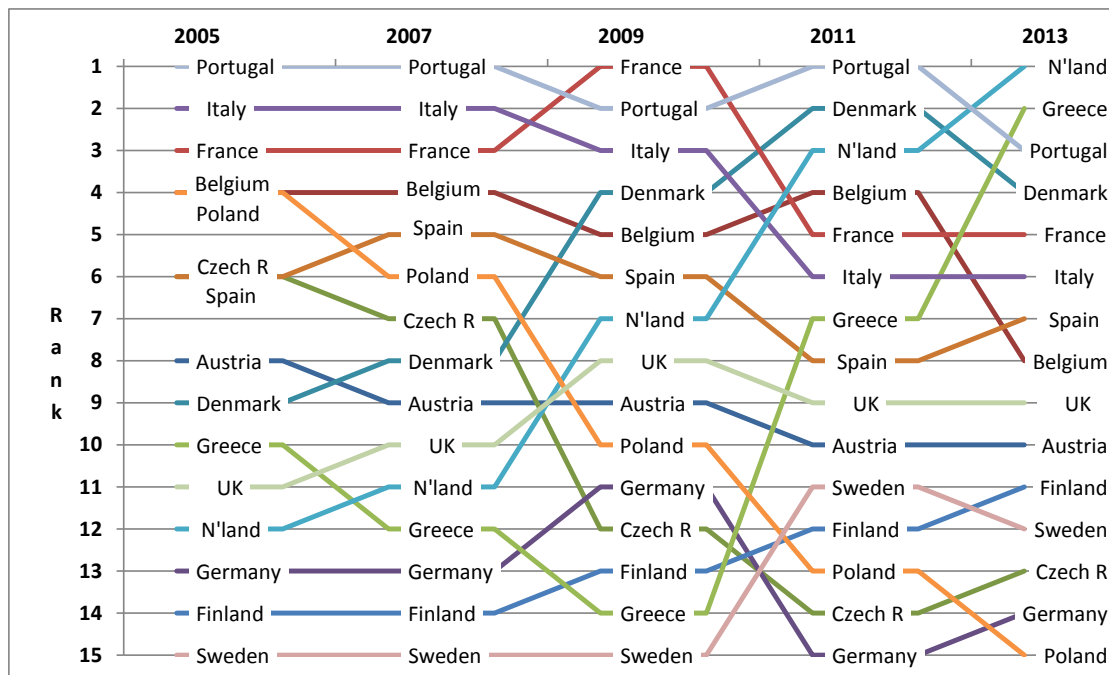
This section provides an overview of progress by EU Member States in reducing average new car CO₂ emissions in 2013. Countries do not have individual targets under the legislation, but are able to influence sales of low-CO₂ vehicles in many ways including CO₂-based registration and circulation taxes; company car taxation; labelling and car advertising regulations; and fuel taxes.

Average CO₂ emissions of new cars sold in 2013 in each EU Member State and improvements since 2012

	2013 CO ₂ Ranking	Registrations 2013	Average CO ₂ 2013	Average CO ₂ 2012		Improvement Ranking	% change	
	1	Netherlands	416,258	109.1	118.6	1	Netherlands	-8.0%
	2	Greece	58,143	111.9	121.2	2	Greece	-7.7%
	3	Portugal	105,324	112.2	117.6	3	Slovenia	-5.8%
	4	Denmark	184,261	112.7	117.0	4	France	-5.7%
	5	France	1,827,319	117.4	124.4	5	Finland	-5.3%
	6	Malta	5,791	118.7	121.5	6	Bulgaria	-5.0%
	7	Ireland	74,509	120.7	125.1	7	Romania	-4.9%
	8	Italy	1,304,668	121.2	126.2	8	Spain	-4.9%
	9	Spain	732,583	122.4	128.7	9	Portugal	-4.6%
	10	Belgium	489,870	124.0	128.0	10	Hungary	-4.5%
	11	Slovenia	50,996	125.6	133.4	11	Czech Republic	-4.4%
	12	UK	2,254,768	128.3	132.9	12	Slovakia	-4.2%
	13	Austria	318,642	131.6	135.8	13	Italy	-4.0%
	14	Finland	99,937	131.8	139.1	14	Germany	-3.9%
	15	Romania	57,100	132.1	139.0	15	Denmark	-3.7%
	16	Sweden	253,268	133.4	136.1	16	Cyprus	-3.5%
	17	Luxembourg	45,687	133.4	137.0	17	Ireland	-3.5%
	18	Hungary	55,063	134.4	140.8	18	UK	-3.5%
	19	Czech Republic	162,052	134.6	140.8	19	Latvia	-3.2%
	20	Slovakia	65,603	135.1	141.0	20	Austria	-3.1%
	21	Germany	2,930,525	136.1	141.6	21	Belgium	-3.1%
	22	Poland	287,993	138.1	141.3	22	Lithuania	-3.0%
	23	Cyprus	6,863	139.2	144.3	23	Luxembourg	-2.7%
	24	Lithuania	11,706	139.9	144.2	24	Malta	-2.3%
	25	Bulgaria	15,007	141.7	149.2	25	Poland	-2.3%
	26	Latvia	10,343	147.1	152.0	26	Estonia	-2.3%
	27	Estonia	19,591	147.2	150.6	27	Sweden	-2.0%
	EU27		11,843,870	126.8	132.2	EU27		-4.1%

The table illustrates the enormous contrasts from one country to another, and demonstrates the importance of national policies to encourage more fuel-efficient vehicles. In 2013, the top six countries all achieved greater than 5% reduction in fleet average CO₂, while the bottom five achieved only 2-3%.

From 2005 until 2011 the range of performance between the best and worst Member States converged – in both absolute and percentage terms. For the last two years, the reverse has been true and the gap has grown markedly, suggesting that the leading countries are pulling further ahead, and leaving those that are not pursuing active car CO₂ policies behind. These countries will be required to import more oil than is necessary with a more efficient car fleet. The effects will be experienced for the lifetime of the vehicle – around 15 years. The figure illustrates the relative performance of the Member States with the largest car markets over the past nine years.



The following sections provide short sketches of 2013's performance in some of the standout Member States. In some cases, additional information can be found in the fiches annexed to this report.

The front runners

The Netherlands has now overtaken Denmark in rising furthest and fastest in the rankings over the past six years. It now tops the rankings both for the lowest CO₂ of any Member State at 109 g/km, and for the most improved Member State in 2013 with an 8% reduction. It also shows the greatest overall reduction of any Member State since 2005, at nearly 36%. This is largely due to an initial registration tax that is strongly graduated according to CO₂ emissions, as well as exemptions from circulation tax for very low-CO₂ vehicles and a strong differentiation against CO₂ emissions in the taxation of 'benefit in kind' payments for company cars. The thresholds and emission categories were further revised downwards in 2012 and subsequently continue to incentivise the lowest emitters. This seems to be driving a continuing improvement.

Greece was the most improved Member State in 2012, and second-most improved (7.7%) in 2013. As a result it has now moved into second place in the league table, and has moved from near-bottom to near-top in just four years. This is partly attributable to a graduated circulation tax and to sharply higher fuel taxes, especially on petrol, but also reflects to a large extent the severe economic crisis which has resulted in a crash in demand for cars especially larger and higher emitting ones.

Portugal now drops to third place for 2013 having led the field in 2011. In Portugal relatively few cars are bought new and they are on average smaller than the average for the EU as a whole. Fuel taxes are low compared to many other Member States but still high relative to incomes, and vehicle taxes are steeply differentiated against CO₂. All these factors help explain Portugal's continued strong showing.

Still doing well

Denmark improved its position steadily in recent years to first position in both 2010 and 2012, in spite of having to accommodate some of Europe's tallest drivers. In 2007 the Danish vehicle purchase tax was restructured to be much more strongly based on fuel economy. Annual circulation taxes are also graduated according to fuel economy. This made a huge difference in fleet average CO₂ overall. Progress has slowed in 2013 and consequently Denmark has fallen back to fourth place in the ranking.

France rose to the top of the table in 2009 following the implementation of its 'bonus malus' scheme whereby generous allowances were given towards the purchase of the most fuel-efficient cars, while those with higher CO₂ emissions paid a strongly-graduated purchase tax. The system was effective but has been revised to avoid providing an excessive net subsidy for car buyers, leading to less generous incentives for the lowest carbon cars than initially. The impact of the scheme has correspondingly reduced, but France registered a further substantial annual improvement in 2013 and has now moved back up to fifth place in the table.

Falling behind

Sweden traditionally bumped along the bottom of the car CO₂ table, owing to a strong preference for heavy Saabs and Volvos among its motorists. In 2005 the annual vehicle taxation switched from being based on weight to CO₂ emissions and as a result the average for new cars fell consistently and considerably – over 31% against an EU average of 22%. In 2012 it achieved one of the best annual improvements in average CO₂ and as a result entered the top half of the table for the first time. However, in 2013, Sweden registered the lowest level of improvement of any Member State at just 2%, and has fallen back several places. This is in spite of the fact that the ever-popular Volvos continue to maintain one of the highest rates of corporate reduction in average CO₂.

The backmarkers

Poland, Hungary, the Czech Republic and most of the other newer Member States continue to inhabit the lower half of the league table, although some are now registering bigger improvements. When they first reported under the monitoring mechanism in 2004, their average CO₂ emissions were significantly below the EU average. However, they have made relatively little progress, at least partly owing to a continuing lack of incentives for fuel efficiency in their tax systems. These countries now find themselves well above the EU's average level, with Poland in particular performing conspicuously and consistently badly.

Germany continues in the bottom third of the table, by far the worst performer of the EU15. Germany does not have a significant car registration tax, while annual circulation taxes are so weakly graduated according to CO₂ emissions (a linear €2/g/km above a given threshold) as to have little or no effect on consumer choice. The benefit-in-kind for a company car, at 12% of the car price per year, constitutes a huge subsidy, and is not differentiated for CO₂ (see chart next chapter). Meanwhile, the national government promotes a labelling scheme so counterintuitive that it rates a 191g/km Porsche Cayenne the same as a 114g/km Citroen C3.⁷ The mulled passenger car vignette sends similarly confusing CO₂ signals, with big-engine high-CO₂ petrol cars paying less than small-engine low-CO₂ diesel cars. Germany is by far the largest manufacturer of passenger cars in Europe, and also the largest market for them, but is failing to deliver the market signals necessary to encourage a major reduction in CO₂ emissions.

⁷ <http://www.transportenvironment.org/press/porsche-suv-get-%E2%80%98green-rating%E2%80%99-under-new-german-labelling-scheme>

Comparison of national vehicle and fuel taxation policies

This section looks at the five primary areas of national policy where Member States can make a difference to the uptake of low-CO₂ cars – vehicle registration taxes, circulation taxes, fuel taxes, company car taxation and incentives for electric vehicles. Other policies such as the way information on vehicle fuel economy is presented are also relevant, but these are either less important or more difficult to evaluate meaningfully.

Vehicle registration taxes

Aside from VAT, which is applied to new car sales in all Member States, some states also apply an additional registration tax on first registration of a new car. In some cases this is only a small administrative charge, but in others it materially affects the price of a new car.

Historically such charges were normally graduated in relation to vehicle price, weight or power, but since the introduction of CO₂ standards for cars, a growing number of Member States have official test results for CO₂ as the sole or main parameter on which to base registration taxes. First registration taxes can therefore significantly influence new car buyers' choice of cars and this is probably the most effective policy to improve the efficiency of the car fleet over time.

A particular variant on such registration taxes is a so-called bonus-malus or feebate scheme, whereby some of the taxes levied on the highest-emitting cars is rebated to the lowest-emitting to reduce the price of the latter and thereby encourage their uptake. These notably apply in France, and Austria. In most countries, finance ministries remain resistant to the idea of giving away money, even to encourage good behaviour.

Vehicle circulation taxes

In most countries an annual fee, referred to as a circulation tax, is applied to all road vehicles. In some cases this is a purely administrative fee to ensure registration records are kept up to date; but as with registration taxes, they can also be substantial and are widely graduated according to a range of vehicle characteristics, including its CO₂ emissions in some cases.

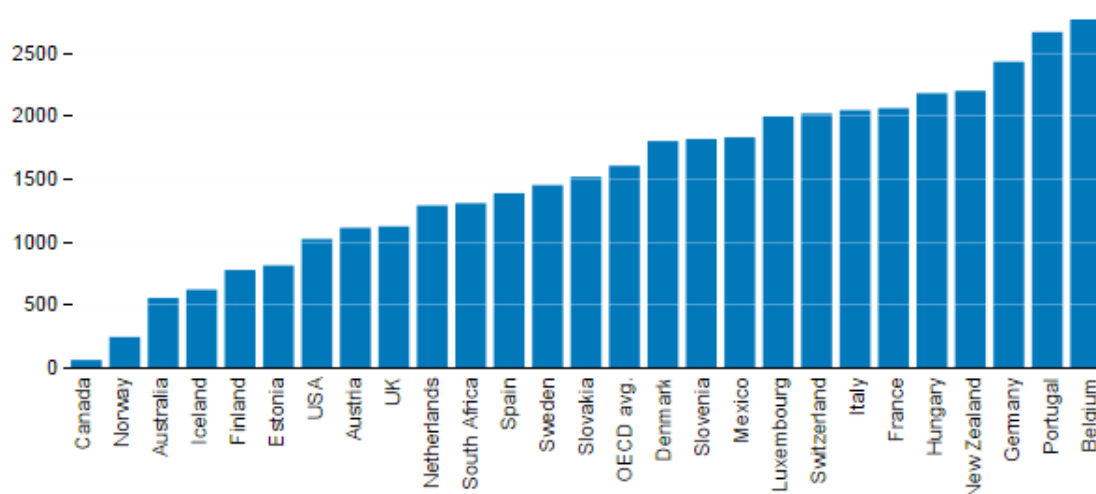
Graduated circulation taxes are generally less effective at changing the vehicle stock than registration taxes, because most people can only choose from the vehicles already on the road. They are nonetheless more common than registration taxes, and vary at least as widely in their composition. In the UK, new car buyers pay for the first three years of their 'road tax' up front when purchasing a new car, which increases the tax payable initially and is intended to magnify the price signal given to the car's initial buyer. The measure is designed to stimulate purchases of lower carbon vehicles and could be considered a weak form of purchase tax. However, as shown below, there is no evidence from the relative progress made in the UK that the policy has been effective.

Company car taxation

When individuals have private use of a company-provided car outside working hours, this is generally treated as a benefit in kind which is subject to income tax under

national taxation laws. Any free fuel provided by the employer is also often subject to personal taxation. National governments tend to tax this benefit rather cautiously, often making the provision of a car more tax-efficient than paying the employee the equivalent income in cash. In many countries these provisions have become widespread: in the United Kingdom, for example, half of all new cars purchased are registered to a company rather than a private individual. These arrangements effectively provide a subsidy for motoring, leading to more and bigger cars on the roads and encouraging them to be driven further.

The OECD recently observed that “environmental outcomes across the OECD would be greatly improved by ending the undertaxation of company cars, particularly the distance component”.⁸ The chart below (by the OECD) illustrates the average level of subsidy in euro per car.



The highest subsidies in the EU are in Italy, France, Hungary, Germany, Portugal and Belgium (€2,763). The environmental and social costs are higher still. Increased contributions to climate change, local air pollution, health ailments, congestion and road accidents from the under-taxation of company cars in OECD countries is estimated to cost €116 billion.

A few Member States have recently reformed their tax regimes to graduate company car tax to the level of CO₂ emissions. The UK was the first country to reform its company car taxation in this way and company-provided cars went from being much larger and less fuel-efficient than those bought by private individuals to having lower CO₂ emissions on average in only a few years as a result.

The table below illustrates the variety of approaches to vehicle taxes by briefly summarising the main characteristics of car registration and circulation taxes and company car taxation in the largest EU Member States. This is, however, a necessary simplification: most countries’ tax systems have far more complexities than could be reflected in this table, and company car tax can be particularly

⁸ <http://www.oecd.org/tax/under-taxing-drivers-is-bad-for-environment-and-health.htm>

complex. Data are based primarily on the *ACEA Tax Guide 2014*⁹, but while every effort has been made to interpret this fairly and accurately, a few pieces of information are missing or too complex to allow a reliable interpretation.

Summary of car registration and circulation taxes

	Registration Tax	Circulation Tax	Company cars and other key features
Netherlands	In the Netherlands, registration tax is strongly graduated according to CO ₂ emissions, with the tax rate ramping up sharply above approx 200 g/km. The diesel band thresholds are slightly lower than those for petrol. All thresholds are to be reduced for 2015 onwards.	Based primarily on vehicle weight.	Company car tax strongly graduated against CO ₂ . Large surcharge on purchase to discourage diesel cars.
Greece	Primarily based on value of car.	Based on CO ₂ for newer cars but fairly modest – ranging from €0.9/g at 101 g/km to €3.4 above 250 g/km.	Benefit in kind taxed as % of purchase price plus annual taxes.
Portugal	Primarily based on CO ₂ emissions, and strongly ramped with increasing CO ₂ . Band thresholds are lower for diesel cars.	Partly based on CO ₂ emissions.	Benefit in kind taxed as % of purchase price.
Denmark	Very high registration taxes, based in part on fuel economy.	Based on fuel economy and steeply graduated for poor fuel economy. Higher thresholds for diesels.	Benefit in kind taxed as % of purchase price plus the 'green owner's tax' amount.
France	CO ₂ -based bonus-malus system with strong positive incentives for the lowest CO ₂ emitters (<=110 g/km) and stronger incentives on malus.	Based in part on CO ₂ emissions above 190g/km.	Company car tax payable strongly graduated against CO ₂ and year of registration of the car to include air pollution levels. The tax is much higher for a diesel car since 2014.
Italy	Small flat rate charge based on horsepower.	Charge based on horsepower and Euro standard.	n/a
Spain	Based on CO ₂ emissions, but only modestly graduated.	Based on horsepower.	Benefit in kind taxed as % of purchase price.
Belgium	Based partly on CO ₂ emissions.	Based on ccs.	Employers and employees pay a 'solidarity contribution' strongly graduated against CO ₂ for private use of a car – but contribution rates are low. Employee also pays tax on benefit – again CO ₂ related.

⁹ *ACEA Tax Guide 2014*, ACEA, Brussels

UK	None	Primarily based on CO ₂ emissions, but are not strongly graduated.	Company car tax payable strongly graduated against CO ₂ .
Austria	CO ₂ -based bonus-malus system with strong negative incentives for the highest CO ₂ emitters (>250 g/km) from 2014.	Based on kW.	Normal tax deductions for business cars, and mileage allowances for business use of private cars. Benefit in kind tax based on purchase price.
Finland	High rates of tax, based partly on CO ₂ emissions.	Based on CO ₂ emissions and weight.	n/a
Sweden	None	Based on CO ₂ emissions and weight. Additional surcharge on diesel cars.	Benefit in kind taxed as % of purchase price plus private mileage.
Czech Rep	None	n/a	Benefit in kind taxed as % of purchase price.
Germany	None	Partly based on CO ₂ emissions, but linear and set at a very low rate.	Benefit in kind taxed as % of purchase price plus factor based on commuting distance.
Poland	Modest level of tax, based on ccs.	n/a	n/a

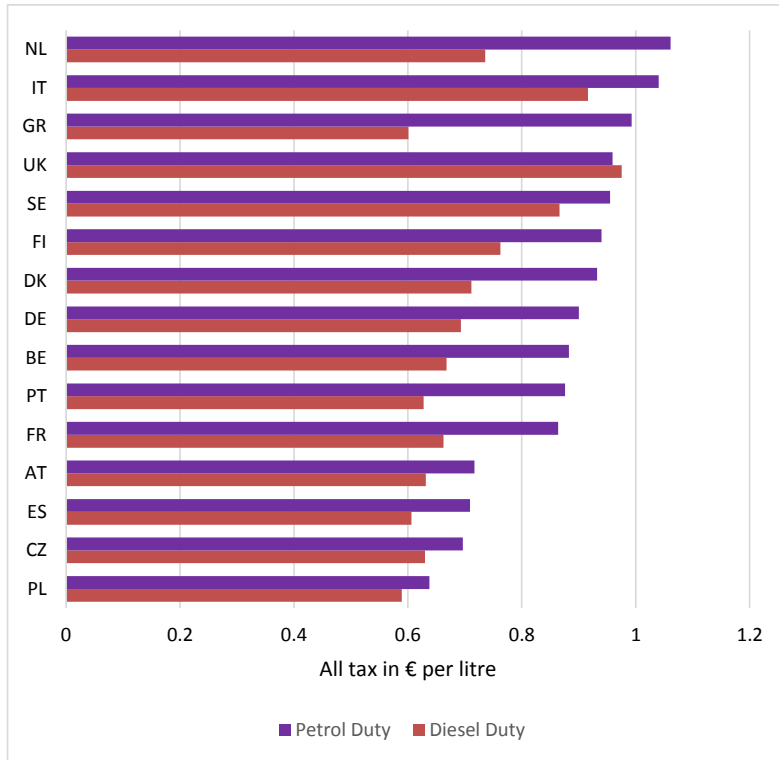
Fuel taxation

Fuel taxation accounts for around half of the pump price of fuel in every EU member state, and in many cases, much more. This in turn has a significant impact upon the price that motorists pay for each litre of fuel. There are many studies which illustrate that the price of fuel has a substantial influence upon the level of demand, and among other things, the degree to which car buyers value fuel economy (and low CO₂) in the choices of car that they make. The figure overleaf¹⁰ illustrates how the rates set vary very substantially from country to country.

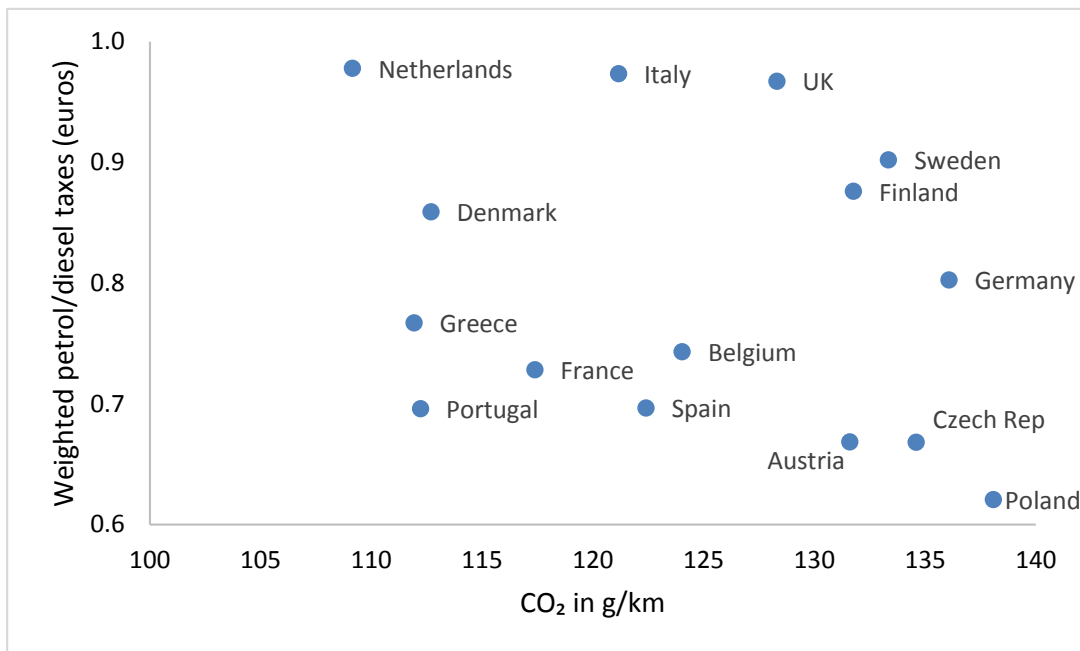
For petrol, the Netherlands and Italy stand out as charging more than €1 per litre of tax, with Greece not far behind. Behind these, a large number of the major Member States charge between 80 and a hundred eurocents per litre. At the bottom are Austria, Spain, the Czech Republic and Poland, all of whom charge 70 cents or less in tax on petrol.

Almost all countries charge significantly less for diesel than petrol – the only exception in the EU being the United Kingdom (Switzerland is the other exception in Europe). This is primarily the result of adverse tax competition, as some countries – most notoriously Luxembourg – keep diesel taxes low so that trucks that pass through the country certainly fill up there. This in turn forces nearby countries to keep their own diesel taxes below what they otherwise might be in order to limit their loss of revenue from this ‘fuel tourism’. It is not a coincidence that the three countries with the highest diesel taxes (the UK, Italy and Sweden) are all at the periphery of the EU and have only limited road connections to the mainland.

¹⁰ European Commission; prices and taxes as at 1 January 2014



While in theory levels of fuel taxation have a bearing upon the average CO₂ emissions of new cars bought in each country, the figure below illustrates no clear relationship between the level of fuel tax (weighted according to the proportion of petrol and diesel sales) and the average level of CO₂ emissions achieved. High fuel taxes therefore do not appear to drive the market for lower CO₂ and better fuel economy – vehicle taxation is far more important.



The impact of tax policies on average new car CO₂

Summarising the findings of previous sections, the table shows the relationship between positive tax policies and the ranking of each of the major Member States in the 2013 CO₂ league table.

Tax policies in major car markets

Rank	Country	Registration Tax	Circulation Tax	Company Car Tax	Fuel Tax	Green car tax rating
1	Netherlands	✓✓		✓✓	✓✓	★★★
2	Greece		✓		✓	★
3	Portugal	✓✓	✓			★★
4	Denmark	✓✓	✓✓		✓	★★
5	France	✓✓	✓	✓✓	✓	★★★
6	Italy				✓✓	★
7	Spain		✓			★★
8	Belgium	✓		✓	✓	★★
9	UK		✓	✓✓	✓✓	★★
10	Austria	✓✓				★
11	Finland	✓	✓		✓	★
12	Sweden		✓		✓✓	★
13	Czech Rep					★
14	Germany		✓		✓	★
15	Poland					★

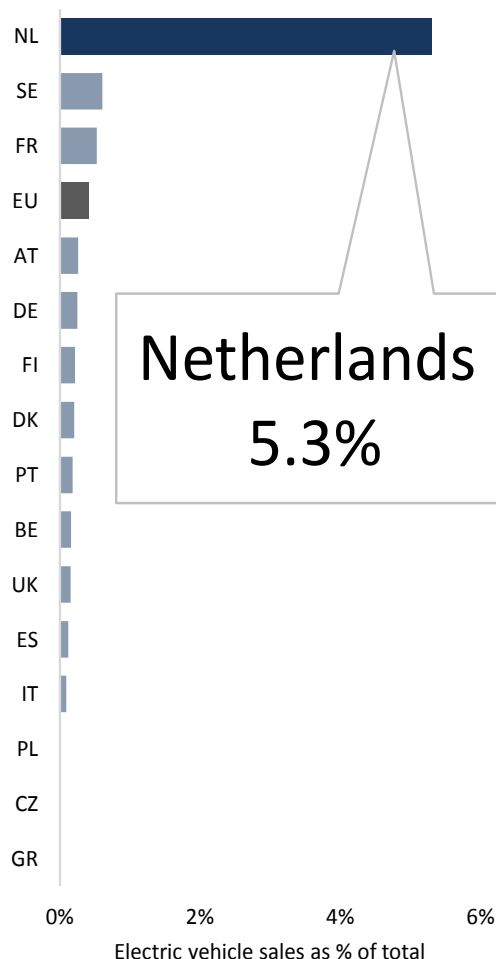
Key: Vehicles	✓	Tax relates to CO ₂ , but only to a limited extent
	✓✓	Tax strongly graduated according to CO ₂
Fuel	✓	Intermediate fuel tax rates
	✓✓	Highest fuel tax rates
Green car rating	★	Weak policies
	★★	Average policies
	★★★	Best policies

Taxation policy does not explain all the differences between Member States' new car CO₂ emissions. The impacts of economic recession are clear as are national car buyer preferences. Nevertheless, there is a fairly strong relationship between effective CO₂-based vehicle taxation policies and reductions in CO₂— if the policies are sufficiently strong and coordinated across more than one area of tax policy. The results also support the proposition that graduated registration taxes are the most effective instrument to bring down average new car CO₂. Graduated company car taxes can also be strongly influential. Circulation taxes tend to be lower and seem to be less effective in changing car buyer behaviour, while fuel taxes appear to be the least effective in influencing levels of CO₂.

Incentives for electric vehicles

T&E issued a separate report on electric vehicles (EVs) earlier in 2014,¹¹ so its findings are only briefly summarised here.

EVs remain substantially more expensive to buy than a comparable petrol or diesel car and most motorists remain ignorant of this new-to-market technology, so financial incentives to reduce or remove the price differential are being used to encourage sales.



EV sales have grown more or less exponentially over the past four years, but from a very low base. Also, only a few countries have yet put significant incentives in place, so sales of EVs vary enormously from country to country across Europe as a result. Norway and the Netherlands each achieved over 5% of total sales, compared to less than 1% elsewhere. In these two countries generous fiscal incentives drove the market in 2013. In the Netherlands some of the incentives ended on 31 December, spurring last-minute purchases in late 2013; and arguably the very high level of the incentives offered could not have been sustained for long.

Beyond these two countries, Sweden and France have offered significant levels of incentive and are in second and third places in terms of market share – but at well below 1% each, a very long way behind the Netherlands. The UK and Germany also offer significant levels of incentive, but as yet their EV market shares remain quite low in percentage terms. The German government has recently recognised that it will need to offer substantially bigger incentives if it is to reach its target of a million EVs on German roads by 2020.¹² France is also increasing its incentives.

In the majority of Member States that as yet offer no significant incentive, EV sales remain negligible.

¹¹ <http://www.transportenvironment.org/publications/electric-vehicles-2013-progress-report>

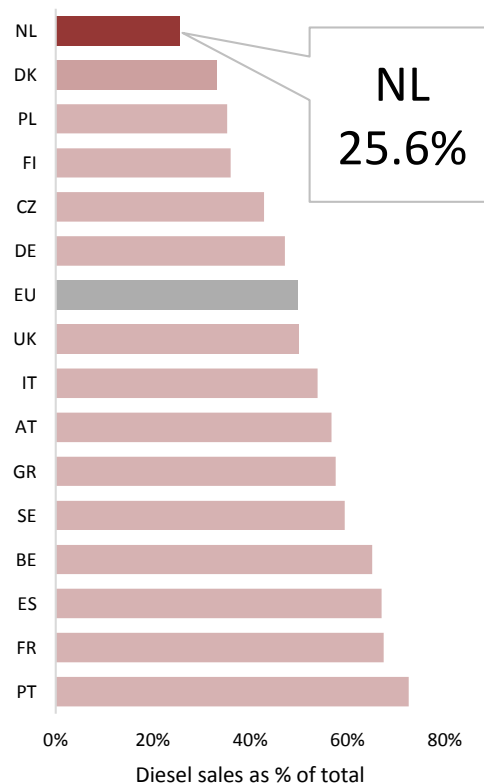
¹² <http://europe.autonews.com/article/20141202/ANE/141209958/germany-merkel-backs-incentives-to-reach-ev-goal?ccid=email-ane-daily>

Lifting the diesel subsidy

Vehicle taxes graduated according to CO₂ emissions have had one negative consequence – they have promoted an increase in the share of diesel cars that now represent about half of all new cars sold. This is because diesel cars have typically around 15% lower tailpipe CO₂ emissions than equivalent petrol cars, so can benefit more from the fiscal incentives on offer. They also have typically lower running costs owing to their better fuel economy and the lower price of diesel in most of the EU.

Europe is one of the few regions of the world with a significant number of diesel cars (the others being South Korea and India). The increasing share of diesel cars has had a number of negative effects:

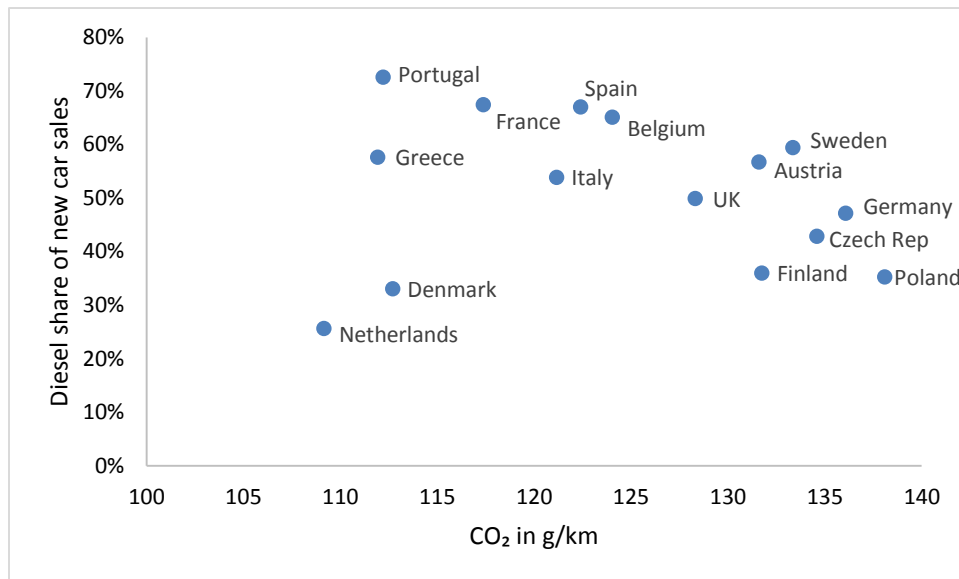
- It has significantly increased levels of air pollution, notably from particulates and nitrogen oxides. Diesels produce significantly more of these pollutants on the road than petrol cars, and unlike petrol cars, there is evidence that nitrogen oxide emissions, in particular from light duty diesels, have not been reduced over the past two decades;
- It has contributed to larger, heavier and higher performance vehicles that are inherently less efficient and are driven many more kilometres; It has unbalanced the ratio of diesel and gasoline fuel produced by EU refineries, leading to higher process emissions and to very large international trade in fuels, with huge quantities of petrol now exported to the US and Africa, while much of our diesel is imported from the US and Russia¹³
- It increases the embedded emissions in manufacturing the vehicle¹⁴
- It has raised the share of biodiesel which is, directly or indirectly, strongly linked to deforestation and hence high-carbon emissions;
-



On a lifecycle basis for carbon emissions diesel cars are no better and are probably worse than petrol ones. This is particularly the case in countries with a low rate of diesel tax that encourages more driving.

¹³ See for example <https://www.fuelseurope.eu/dataroom>

¹⁴ http://www.lowcvp.org.uk/assets/reports/RD11_124801_5%20-%20LowCVP%20-%20Life%20Cycle%20CO2%20Measure%20-%20Final%20Report.pdf



As the figure illustrates, the diesel share varies enormously from country to country, according to the extent to which national policies encourage or discourage the choice of diesel. Across the EU about half of all new cars bought are now diesels, but in the Netherlands only one new car in four is a diesel and in Denmark one in three, whereas in France and Portugal it is more than two out of every three.

The countries with the lowest rates of dieselisation tend to have specific taxation surcharges on diesel cars that discourage purchase (Netherlands and Denmark). Elsewhere vehicle taxation policy is neutral but in many countries diesels are actively incentivised such as by lower rates of fuel duty. A comparison of the rates of dieselisation of passenger cars in different countries with the average new car CO₂ emissions shows it is not necessary to have a high share of diesels in order to achieve low average CO₂ emissions. Similarly, Japan has lower average new car CO₂ emissions than the EU but virtually no diesel cars at all.

In many countries taxation rates and other policies are skewing the market in favour of diesel over gasoline vehicles. T&E supports graduated CO₂ rates (lower taxes for lower CO₂ vehicles) for registration and circulation taxes but believes different scales should apply to gasoline and diesel cars. A system in which a similar tax rate applies for a diesel car and for a gasoline car with CO₂ emissions 15-20 g/km higher would rebalance the market with significant benefits for air quality. This level of differential would effectively nullify the tailpipe CO₂ benefit of diesel cars and is considered reasonable since on a well to wheel or lifecycle basis diesel has no benefit.