

How vehicle taxes can accelerate electric car sales

February 2019

Summary

As a result of the transition from the old NEDC car emissions test to the new WLTP procedure - which will increase vehicles' official CO2 emissions - many EU governments are considering changes to their car taxes. Carmakers have demanded that governments shift to WLTP based tax systems and increase the tax bands by 20% or more to account for the more representative (i.e. higher) WLTP test results. France, Spain, Denmark and Austria have already given in to this pressure and agreed to incorporate the WLTP corrections into their tax systems. However, the European Commission has confirmed [T&E allegations](#) that carmakers are manipulating and inflating the WLTP tests. The new comparison of carmaker average CO2 emissions tested in 2018 under the old NEDC test with figures in early 2019 under the new WLTP test shows the emissions gap jumping between 1% and 81% for different carmakers. While some of this deviation is due to differences in sales, the data does suggest WLTP figures are unstable and it is impossible to set a single robust and representative correction factor at this stage. To avoid distorting the tax systems and further manipulation, governments must **continue basing taxes on NEDC equivalent values until the end of 2021**. Italy and Sweden have rightly done so - and countries such as Germany, the UK and others who are still in the midst of the reform, should follow suit and base their taxes on NEDC equivalent values until pure WLTP values are used from 2022.

Current systems of car taxation have driven a transport system dominated by privately owned, large engined cars contributing to pollution, climate change, congestion and lost urban space. T&E [analysis](#), supported by Commission's own modelling, shows that all new cars have to be zero emission - largely electric - from early 2030s to be in line with the Paris climate goals, and their numbers, as well as kilometres driven, have to reduce to cut energy demand and make cities clean and liveable.

To respond to these challenges a wholesale reform of vehicle taxation systems is urgently needed. By 2025 carmakers will have to sell 15-20% zero and low emission cars to achieve the CO2 regulations, so governments should put in place measures to help the industry get there. But handing out purchase grants to electric cars is not a sustainable solution: based on the expected sales it would cost governments such as France or Germany up to EUR 3bln a year from 2025 onwards. Tax reform must be done in a way that is socially equitable, economically smart and facilitates the shift to shared and zero emission solutions.

The market and tax conditions across EU member states are very diverse and different systems have developed over decades to take account of national specificities. This briefing does not aim to present a one-size-fits-all solution, but instead highlights some of the best practices and ideas that governments can adopt to effectively steer the market in favour of zero emission cars and reduced car ownership. Notably:

- ✚ Continue basing vehicle CO2 tax systems on NEDC equivalent values until end of 2021
- ✚ While **company car taxes** are rightly criticised for driving private car ownership and subsidising the car industry, they can also be a powerful tool to shift the new car sales to zero

emission models. Governments should reduce the company car subsidy and deploy the systems to accelerate the market uptake of zero emission cars. This was effectively done with lower benefit-in-kind (BiK) rates in the Netherlands and the UK, with tax rates steeply graduated with CO2 emissions for other cars, leading to all company cars achieving zero emissions by 2030 at the latest.

- ✚ Vehicle **registration and circulation taxes**: evidence shows taxes steeply graduated by CO2 emissions, such as **bonus-malus systems**, are very effective at lowering fleet average emissions and tackling rising transport CO2 emissions. They are also a more sustainable way of incentivising electric car sales than purchase grants, whereby malus paid on polluting models “subsidises” bonuses given to the cleaner ones. Zero emission cars should be getting the maximum subsidy upon car registration (or positive tax in the case of circulation taxes), while low emission cars such as plug-in hybrids should get a smaller subsidy in line with their CO2 emissions. The malus component should be properly graduated and start after 50g/km (EU threshold for low emission vehicles) and take into account the expected reduction in emissions as carmakers roll out new models to meet the 2021 95g/km target. The penalties paid on CO2 emitting cars should be regularly updated and take into account the gap between lab results and real-world performance of these models.
- ✚ **Road use and parking charges**, if robustly designed, can help reduce the number of cars and km travelled, while novel alternatives like **mobility budgets** could help reduce private car dependency.

Ultimately, all fossil fuels should be taxed on the basis of the energy content and CO2 per litre - this would lead to **increases in diesel and fossil gas tax rates**, as well as higher tax receipts to compensate the lower fuel tax revenues and lower oil prices, resulting from higher penetration of low and zero emission vehicles in the future.

1. Introduction

As a result of the transition from the old NEDC car emissions test to the WLTP many EU governments are considering changes to their car taxes. In parallel there are profound changes underway in the vehicle technology and the way we move. In the next decade there is expected to be a marked shift to electromobility and sharp reductions in car ownership with increased sharing of vehicles. Together with the introduction of progressively autonomous cars in the next decade, mobility will change more than in the last century.

Current frameworks of vehicle and fuel taxation are both entirely unprepared for the revolutions underway in mobility and are driving unsustainable system in which personally owned cars with engines dominate, that have imposing shocking costs on society. Inappropriate taxation frameworks in many countries are contributing to the existing problems. For example:

- ✚ Low diesel excise duties were an important driver of the rise in diesel car sales that is unique to Europe and which in combination with the Dieselgate scandal has been a major contributor to the continuing air pollution crisis in most major cities.
- ✚ Generous company car tax systems have driven car ownership and car commuting contributing to peak-hour congestion that costs the EU economy more than 1% of GDP. Meanwhile cars parked on average for 23 hours a day occupy valuable space in our increasingly cramped cities.
- ✚ In Germany, (and most other car manufacturing countries) the reluctance to implement car registration taxes and a weak graduation of vehicle taxes with CO2 emissions has resulted in high

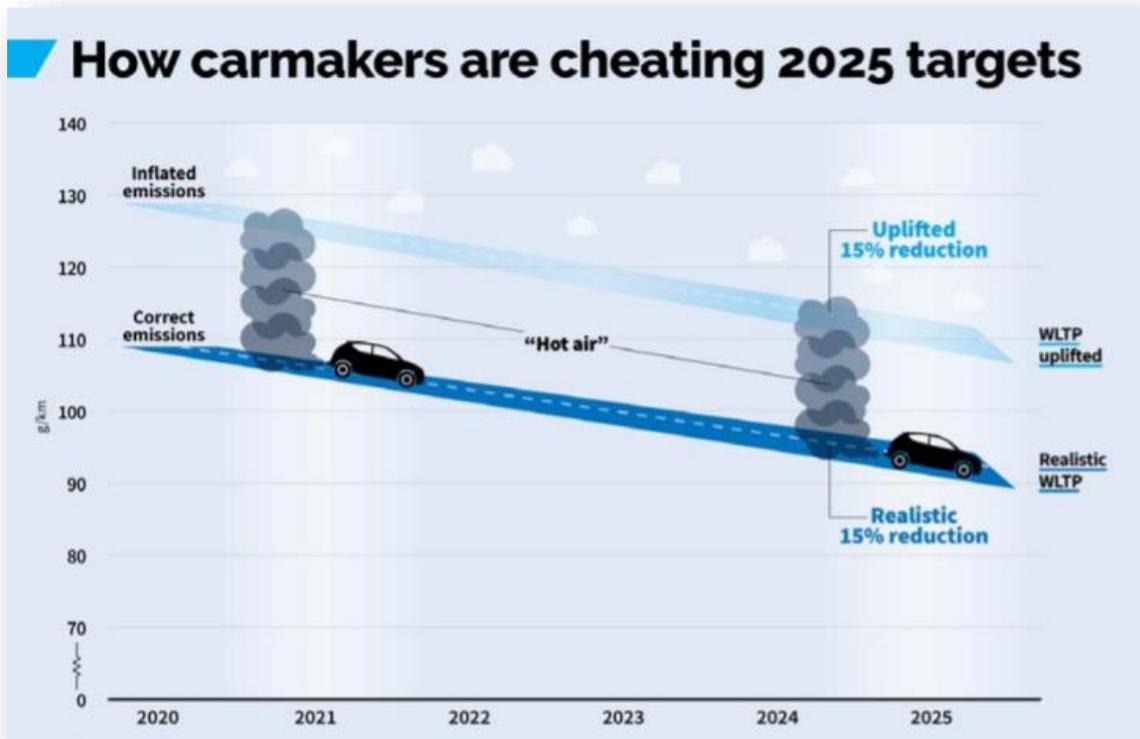
CO2 emissions from new cars in Europe and a surge of SUVs. As a result improvements in efficiency are not keeping pace with increases in car ownership and use leading to rising transport CO2 emissions.

If we are to tackle the legacy of our current system of mobility and accelerate the transition to zero emission and more sustainable system, vehicle taxation must be reformed in order that they can effectively contribute to delivering our climate objectives. This briefing describes how vehicle and fuel taxation systems need to respond to changes in technology and mobility in order to maintain, and where appropriate raise revenues, from vehicle and fuel taxes and encourage more sustainable choices. It does not propose a one-size-fits-all solution as local situations differ between countries and there is little prospect of harmonised vehicle and fuel taxes across Europe. Instead the briefing identifies a number of key opportunities that should steer the evolution of taxation systems to maximise their effectiveness in delivering more sustainable mobility.

The paper is partially based upon an independent review of car taxation undertaken for Transport and Environment by Green Budget Germany but the views expressed solely those of T&E. It highlights the urgent need for radical reform of vehicle and fuel taxes to help reduce the huge societal costs of our unsustainable mobility.

2. The NEDC-WLTP transition and car taxation

The new WLTP test has applied to all new cars sold from 1 September 2018 (and vans one year later). It is an improvement over the NEDC, the obsolete test it replaces, which means that same car models will see their type approval CO2 emissions used for national vehicle taxes increase. Previously [researchers](#) estimated that the gap between WLTP and real world emissions will still be about 23% in 2020, while the gap between the new WLTP and the old NEDC test should be around 10-15%. However, recent analyses by [T&E](#) and the European Commission [Joint Research Centre](#) have highlighted that the first WLTP test results available were being deliberately inflated to on average a gap of 36% with NEDC. Carmakers do this to deliberately elevate the 2021 CO2 baseline on which their 2025 and 2030 CO2 will be based: elevating the starting point in 2021 would result in less stringent CO2 reduction targets set as shown in the image below.



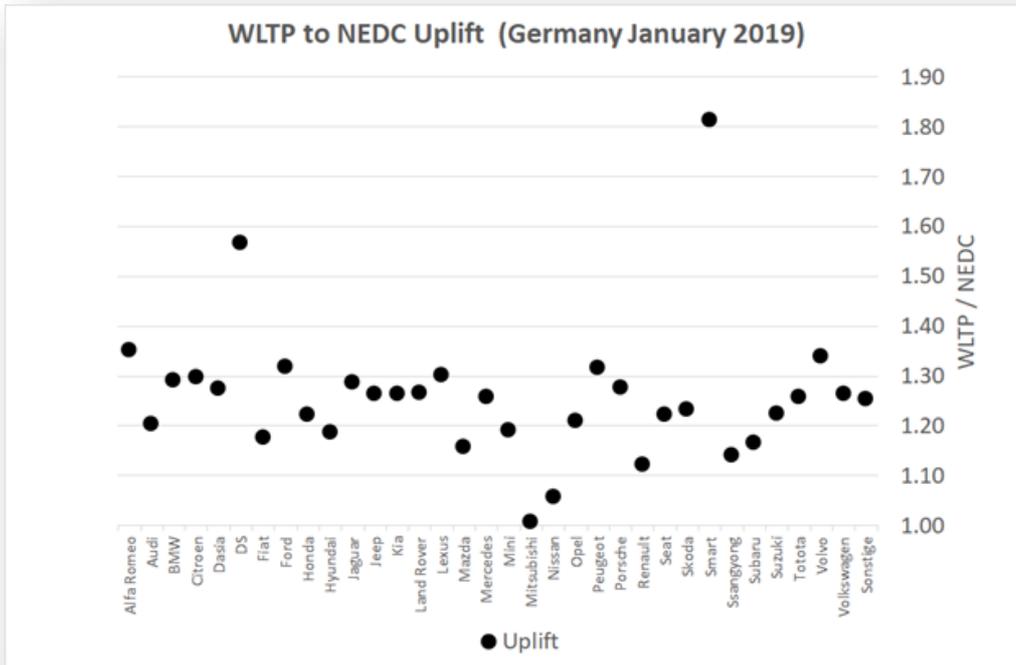
To help manage the transition to WLTP the European Commission has also developed a tool (CO2MPAS) that converts WLTP test results (as carmakers are required to test cars based on the new procedure) into an NEDC equivalent value to be used for the compliance with the current 2021 CO2 targets. The CO2MPAS tool is designed to “maintain regulatory stringency” throughout the process of introducing the new test: this means an NEDC equivalent value calculated using the CO2MPAS tool should be comparable to an NEDC test value. CO2MPAS is used for carmakers compliance with the 2021 car CO2 targets so is suited as well for national taxation which is often (in)directly tied to the EU CO2 standards. Both WLTP and NEDC equivalent values will continue to be available on all new cars sold until end 2021.

The switch over from the NEDC to the WLTP creates a number of issues for tax authorities, as national NEDC-based tax bands will result in higher tax paid by WLTP-approved vehicles. Because there is a huge uncertainty as to the accurate impact of WLTP on vehicle emissions, a single correction factor is hard to estimate. To date there is no comprehensive and independent study to compare NEDC and WLTP official test results. Carmakers have been asking for tax bands for WLTP vehicles to be uplifted by at least 20%. However, until there is a clear, and officially verified, picture of carmakers WLTP testing strategies, this could result in tax rates being effectively lowered. Adapting vehicle taxes to the artificially elevated WLTP values will result in consumers opting for less fuel efficient vehicles in the real world. Crucially, it will also result in treasuries and finance ministries seeing a considerable reduction in their tax receipts as higher emitting vehicles are allowed reductions.

T&E has recently obtained the official data from Germany¹ comparing the fleet average emissions measured using NEDC in January 2018 and the fleet average emissions in January 2019 using WLTP. This is a large dataset of over 250,000 models, but the measured uplift also reflects real differences in the sales mix between the years and some improvements in real CO2 emissions as a result of model upgrades - it cannot therefore be considered a robust basis for deriving an uplift factor. The values for some carmakers or models may also have been distorted by test manipulation, while the NEDC values are likely to include a mix of both

¹ Fahrzeugzulassungen (FZ) Neuzulassungen von Kraftfahrzeugen und Kraftfahrzeuganhängern - Monatsergebnisse Januar 2018 & Januar 2019 (available in pdf upon request)

NEDC test results and NEDC equivalent values using CO2MPAS. The results show an average uplift of 26%, with a wide range from 1% for Mitsubishi to 81% for Smart.



The data shows several noteworthy features:

- ✚ For most brands the uplift is in the range of 15% to 35%
- ✚ The uplift for DS and Smart are particularly high. For DS this is due to the introduction of the new DS7 SUV; for Smart because less electric models were sold in 2019 compared to the previous year.
- ✚ The uplift for Nissan, Renault and Mitsubishi is particularly low. This is due to strong electric and plug-in hybrid sales in 2019.
- ✚ Ford and Opel have similar NEDC average emissions (127 g/km), but the equivalent WLTP values vary widely (Ford 164 g/km and Opel 154 g/km).

This new dataset confirms that it is not possible to derive a robust and representative single conversion factor at the present time as such a single factor could create significant market distortions.

Many member states have already amended their CO₂-based vehicle taxes to adapt it to the WLTP switch, as briefly summarised in Table 1 below. Unfortunately some countries including France (bonus-malus), Spain, Austria and Denmark, have already corrected their vehicle taxation for the elevated WLTP emissions, often by more than 20%. Others - including Sweden and Italy - have resisted the car industry pressure and left their vehicle tax systems based on NEDC until 2021, which is the best option given the uncertainty. The discussion is ongoing in Germany, the UK and Portugal with NEDC (or NEDC equivalent in Portugal) continuing to apply until the decision is taken. To avoid distorting the tax systems and encouraging further manipulation, these governments must continue basing taxes on NEDC equivalent values until the end of 2021.

Member state	NEDC-WLTP conversion	Date of application
Germany	CO2 tax bands still based on NEDC	Reform in progress
France	CO2 tax (bonus-malus) updated for WLTP	End 2019
Italy	CO2 tax (bonus-malus) based on NEDC	2019
Spain	CO2 taxes on NEDC but correction for WLTP used (1.2 on average)	1 Sept 2018
Portugal	CO2 taxes based on CO2MPAS NEDC (temporarily)	2019
Sweden	Annual vehicle tax bands remain NEDC-based (WLTP value used)	1 January 2020
Netherlands	CO2 taxes based on NEDC	Until 1 January 2020
Belgium	NEDC equivalent values used for taxes	Until end 2020
Austria	CO2 taxes based on WLTP	1 January 2020
Denmark	CO2 tax bands NEDC-based with 1.21 correction used for WLTP	Mid 2018
UK	NEDC but reform under way	Reform in progress

Table 1: Progress on NEDC –WLTP transition across a number of EU member states

From 2022, only WLTP test will apply, so there will be no need for carmakers to continue to use the CO2MPAS tool and compute NEDC equivalent values. Neither will carmakers double test cars using the WLTP and NEDC procedures, nor attempt to inflate the WLTP values (since the 2025/30 CO2 targets will already be set). Importantly, some of the current loopholes carmakers use (e.g. declaring a higher WLTP value than is measured or using different vehicle settings on NEDC and WLTP) have recently been outlawed by the new [WLTP regulation](#), which will affect new models from March 2019 onwards.

It will ultimately be necessary to adapt national taxation systems to the new WLTP test by 2022. However, by this time a considerable amount of new WLTP data should be available together with NEDC equivalent values to enable a robust conversion factor to be applied. For the present time continuing to tax cars using NEDC equivalent values is a practical solution.

3. National vehicle taxes: driving EV market

3.1. Company cars

The use of a company car for private purposes is a taxable benefit in kind (BIK) calculated as a percentage of the car's list price. The real financial benefit of company cars is usually much higher than the BIK, which in reality only takes into account part of the vehicle cost but completely ignores the distance travelled by the employee. In effect many, including OECD, see it as a tax break for the employee and an indirect subsidy for carmakers, at taxpayers' costs. In Belgium for instance, company car taxation accounts for approximately [EUR 2 billion of revenue foregone](#) annually. The subsidy is regressive, benefiting people with higher incomes and encouraging the purchase and use of larger, higher CO2 and more expensive cars. Figure 2 compares the level of subsidization among European countries.

The long-term priority for reform of company car taxation is to reduce its overall value to the employee and subsidy to the car industry as part of a wider tax shift that would see labour taxes lowered and company car subsidies reduced, along with higher taxes on polluting cars.

But the company car market is a huge driver of the car market in Europe today and the taxes governing that market can shape the vehicle fleet by being strongly linked to CO2 emissions in a similar way to registration and circulation taxes. In Germany, 65% of all new passenger cars in 2016 were registered by companies, while in Belgium these remain over half for years now. Company cars therefore shape a country's composition of new cars and through the second-hand market have a long-lasting effect on the overall fleet.

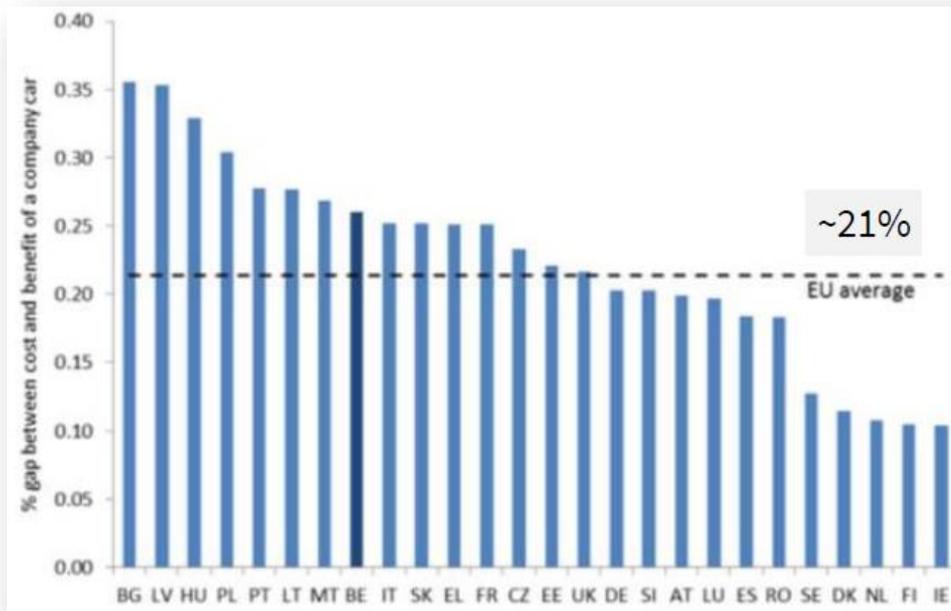


Figure 2: Subsidy for private use of company cars: calculated as the percentage gap between the company cost of providing a car and the individual's taxable benefit of using a car.

In the short-term, company car taxation can be used to accelerate the uptake of zero and low emission cars, such as battery electric and plug-in hybrid vehicles, offering an easy option for governments to stimulate this market. The Dutch and UK schemes are good examples of how to structure company car taxation with tax rates incentivising zero emission purchases, and higher rates for diesel compared to gasoline cars (in the UK). Notably, in the Netherlands BIK on zero emission cars is only 4% against 22% on conventional cars; this is one of the main explanations for a [surge](#) in premium BEV sales in the country last year. On the other hand in Germany and Austria the different between BIK rates for EVs and conventional cars is negligible (less than 1%), and does not sent a strong enough signal to customers given the higher list price of EVs.

As a minimum, governments across Europe should follow example of the Netherlands and the UK and reform their company car taxation systems to steer the market more aggressively towards zero emission cars, aiming at 100% EV sales by 2030. This will have a huge impact on the overall car fleet and accelerate the entry of ZLEVs into the mainstream and second-hand markets. This should be done by offering very low tax rates on zero emission vehicles, slightly higher ones on low emission cars (PHEV) and considerably

higher ones (>20% list price) on all other vehicles to take into account the environmental and social cost of their subsidised use.

Crucially, employers should be obliged to offer a range of zero and low emission models to their employees as company cars, which is often not the case today. They should also benefit from VAT exemptions for the use of ZLEV models by their employees. Good practice is also not to over incentivise PHEV models to ensure they are largely bought by responsible drivers that will charge the vehicle regularly. As part of company taxation schemes, governments could also consider ensuring the vehicle operates for a high proportion of the time using its battery or for a higher tax rate to be applied; or to grade company car taxes (including benefit-in-kind schemes) based on PHEV range.

3.2. Registration taxes: bonus-malus best practice

To increase the sales of zero and low emission vehicles (ZLEVs), some countries in Europe have introduced [purchase grants](#) to encourage their purchase. Examples include: Germany, Ireland, Luxembourg, Sweden, Slovenia, the UK and Romania. Grants have boosted sales in some of these countries. Whilst purchase grants for ZLEVs have been introduced with the best intentions, it is not a sustainable approach to growing the plug-in car market. For example, the new EU CO2 standards would require around 15% of new car sales to be ZLEV in 2025, which is around 500k cars in Germany and 325k in France based on today's sales. If these countries offer a EUR 3,000-5,000 grant for each purchase, it will cost finance ministries between EUR 975m and 2,5bn annually starting with 2025. Raising the grants to EUR 6,000 will make the cost tip over the EUR 3bn mark!

As sales grow, the cost of the grant thus rapidly becomes unsustainable leading to its withdrawal and causing the market to stall. This has already been seen in the renewables market across Europe with changes to feed-in-tariffs. For PHEV, The UK has recently announced it will discontinue plug-in hybrid grants due to the growing market and high costs. From an equity perspective it is also highly questionable whether Governments should be using tax receipts to assist affluent citizens to buy any car - even one with zero tailpipe emissions. Furthermore, industry inevitably become dependent on such subsidies and costs so profits will be inflated.

Instead, smartly designed registration taxes are by far the most effective way to drive the market to low emission models; and many countries have established a CO2 linked system rewarding sales of low and zero emission vehicles. They make for a more sustainable support whereby the reduced (or zero) registration taxes of cleaner cars are "subsidised" by the higher taxes on more polluting models, or the bonus-malus approach.

The figure below illustrates that the countries with registration taxes strongly linked to CO2 emissions tend to have the lowest new car CO2 emissions including Norway, the Netherlands, Portugal and Denmark (that uses fuel consumption not CO2). Notably the 11 countries with no registration taxes, or those not linked to

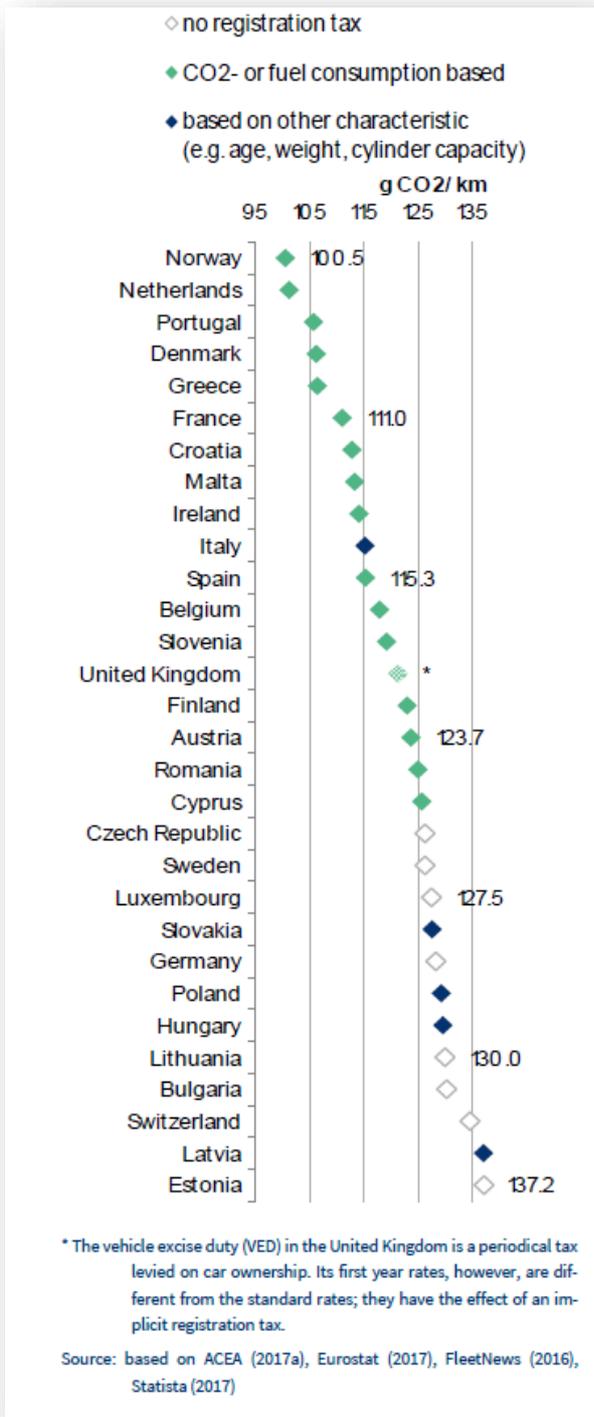


Figure 3: Registration taxes and average CO2 emissions in 2015 showing that countries with CO2 based taxation (green) have lower CO2 emissions in their fleet.

CO2 emissions, have the highest new car CO2 emissions. The gradient of the tax to CO2 emissions is important. In countries like the UK the total and incremental cost of buying a high CO2 model is too small to have a meaningful effect on the purchasing decision. In contrast, the systems in the Netherlands and France rise more steeply.

At what level of CO2 emissions taxes sharply increase is also important. For example, recent changes in France would from 2020 exempt all vehicles below 117g/km (WLTP) from registration tax, which includes many efficient diesel and petrol cars coming on the market today. On top of that, the new amendments to the French bonus-malus have lower the penalties for more polluting cars and raised the top max penalty up by 6g/km (to 190g/km). So while the zero tax on ZLEVs is welcome, the French malus component is not steep enough to steer the car market.

Best practice is that there should only be no registration taxes (or negative taxes as in the case of a bonus-malus scheme) for zero emission vehicles (0g/km) and above this level taxes need to rise. There is no justification for providing a bonus for any model with emissions above 50g/km (considered as a threshold for zero and low emissions vehicles in EU legislation). It's crucial that the tax paid on PHEVs is intermediate between a zero emission vehicle and a conventional model, in line with the CO2 emissions. It should also be graded between different PHEVs to incentivise those with longer range (>50km) and lower CO2 (15-20g/km). This is important given the recent reports from the UK that PHEVs are [often driven only on their engine](#) and never or rarely charged (a similar experience to [the Netherlands](#)). The UK has a high share of PHEVs and over-incentivising their purchase appears to encourage the market for drivers that do not recharge the vehicle regularly.

It is particularly important to adequately graduate taxes for CO2 emissions between [80 and 180g/km](#) (based upon the NEDC measurements) as this represents the overwhelming majority of new car purchases and will strongly influence average CO2 emissions. Penalising higher emitting cars - e.g. vehicles emitting more than 120g/km - with very high registration taxes may be considered socially equitable but is unlikely to have any significant environmental benefit or

contribute to significant tax receipts as sales are now very low. It is also important to regularly update tax bands as new car emissions decline in line with stricter car CO2 regulations.

3.3. Circulation taxes

CO2 linked circulation taxes increase the attractiveness of low CO2 second hand models lowering fleet average emissions. CO2 linked circulation taxes are widespread in Europe and in countries where new car registrations are very low and second hand vehicles dominate can help to encourage the choice of more fuel efficient models. In addition, the resale value (and therefore leasing cost) of new cars is directly impacted by the fuel economy (and CO2 emissions) having an indirect effect on the new car market.

The best practice principles that apply to registration taxes also apply to circulation taxes. The taxes, usually paid annually are lower and the CO2 emissions of the cars, some of which will be older will also tend to be higher). It is therefore important to graduate taxes for CO2 emissions over a slightly wider range [80 and 220g/km](#) (based upon the NEDC measurements) and to periodically update the tax bands as the vehicle fleet becomes more efficient.

Given the continuing air pollution crisis in cities, circulation taxes should also include an air quality component. At present pollutant emissions are largely ignored in vehicle or fuel taxes. However, as exposed by the Dieseltgate scandal and independent testing on Euro 6 diesel cars, [many](#) new diesel cars still have higher NOx emissions than those of gasoline models. Therefore, the simplest way to embed this into the taxation systems would be to include an increment for cars that takes account of the higher NOx or particle emissions. This could be done for example by uplifting the diesel CO2 emissions by a factor to take account of the higher air pollution emissions.

Even if some of the newest (Euro 6d-temp) diesel cars now have similar NOx emissions to gasoline models, the regulations that come into force in 2021 for all new cars will still permit higher emissions from new diesel cars than new gasoline models. For this reason continuing to apply an air quality tax increment is justifiable for new diesel cars as part of registration taxes. Alternatively, remote sensing or EU Real-world Emissions (RDE) test data can be used to target and tax individual models.

4. Incentivising efficient mobility through tax

4.1. Road and congestion charging

One of the features of the current system of vehicle taxation is that it is the asset (car) rather than its use (km) that is largely taxed. Although registration taxes are very important to drive the market towards more efficient cars, taxing only the vehicle and not its use (based on km driven and CO2 emissions) encourages personal ownership of cars, and with this selecting models that meet the most extreme uses. As a result, people buy much larger and higher emitting vehicles than are needed for most trips. It also encourages inappropriate car use for very short trips acting against comodality. However, road pricing should not come instead of fuel taxes or registration taxes, as is often demanded by the car industry. Without steeply differentiated charges road pricing systems would not have a steering effect on the type of vehicle purchased. Introducing such differentiation can be complex and could also raise important social questions.

In urban areas congestion charging, such as in [London](#), Stockholm and Gothenburg, combined with low emission zones, are an excellent way to manage traffic and influence vehicle choice. Flexible congestion charging schemes can price private cars, ride sharing, car sharing and public transport differently. San Francisco will shortly introduce a local tax on Uber and Lyft and higher taxes for ride-sharing during peak

periods (when user charges are also higher) can avoid ride-sharing worsening congestion. Revenues raised in this way can be earmarked to support public transport or shared trips for the poorest members of society.

Adequate parking policy should complement road and congestion charging. In some cities, parking spaces have sprawled to an extent that they're actually putting a strain on the housing market. A solution to this mobility and urban planning issue would be to limit available parking spaces in city centers, thus increasing the price of parking. Parking rates can be calculated depending on the emission class of the vehicle, like in the case of Madrid or Oslo, where for instance a petrol-fueled car will pay EUR 5.75 during rush hour, whereas a diesel has to pay EUR 6.29.

On top, cities can roll out smart parking solutions to optimise parking management and minimise search traffic. For instance, search time decreased by 43% in [San Francisco](#) after the introduction of smart parking technologies that enable motorists to locate the nearest parking solution. As a result, GHG emissions dropped by 30% in the area.

4.2. Mobility budgets

As mentioned earlier in this briefing, a reduction in the taxable benefit provided by company cars is a key component of policy to encourage a shift away from car ownership to sharing of vehicles. Belgium, which has one of the most generous company car schemes in Europe is also introducing a new law to allow employees to instead take a mobility budget. As of 2018, employees have the choice to exchange a company car against cash. The value of the mobility budget will be similar (6/7th) of the company car but divided over 5 year. To compensate for the loss of a free fuel card the mobility budget is then increased by 20%. The mobility budget can then be used for any form of travel such as public transport, membership of car-clubs, ridesharing etc. There are criticisms of the approach as it is only accessible to people who previously owned a company car and continues to be overly generous and therefore encourages travel - however as an approach to gradually reform the company car system and reduce car ownership and encourage sharing vehicles mobility budgets could have merits if they are well designed.

5. Incentivising efficient mobility through tax

5.1. Fuel taxes

Fuel taxes are a powerful tool to drive more sustainable mobility both in terms of reducing vehicle kilometers and encouraging lower carbon and less polluting fuels. But in most countries have often been used to do the opposite such as supporting the market for diesel cars and vans or [fossil gas](#) that offers few environmental benefits.

Fuel taxes vary widely between countries with the EU Energy Tax Directive stipulating minimum rates. However, for some fuels (e.g. LPG, Kerosene, fossil gas) member states are allowed to set lower taxes than the minimum ones distorting the market (in aviation fuel e.g.). Diesel is still taxed at a lower rate than gasoline in most countries (see Figure 4), although it has a 15% higher energy and carbon content. A well-designed fuel energy taxation should be based on the principle of equivalence, i.e. fuels should be taxed according to their energy and/or carbon content that would result in diesel being taxed at a higher rate than gasoline. At present only the UK and Switzerland tax gasoline and diesel at the same rate and is one of the main drivers for the rise in the share of diesel cars. Several European countries have started reducing the fuel tax gap including Belgium and France but much more progress is needed EU wide.

The same principle should be applied to taxation of advanced biofuels made from wastes and residues which meet the EU sustainability criteria, with lower tax rates for biofuels with lower GHG intensity. Any

preferential treatment to crop based biofuels, or biofuels not meeting the sustainability criteria, should end in line with the [state aid guidelines](#) decision to stop support for crop based biofuels.



Fuel tourism, in which centrally located countries like Luxembourg attract additional revenues from encouraging trucks to refuel in their country is an important block on more progressive policies but with unanimity between EU countries required to agree changes to taxation a more progressive EU-wide policy remains a distant prospect. However, there is a trend towards a decoupling of commercial diesel and car diesel use. Many countries apply rebates that mean the effective price paid for truckers is close to the EU minimum. Whilst this holding back efficiency and the development of alternatives in the trucking sector is has allowed governments to increase diesel taxes for private cars, which is welcome.

The taxation of electricity has not yet been adapted for transportation and national tax rates for electricity vary even more widely than for transport fuels. In most countries, electricity is taxed at much lower rates than conventional fuels. But in the long term, the electrification of transport will necessitate a shift to new road financing models like intelligent road pricing.

In the longer run it might be necessary to radically increase fuel taxes, effectively setting a minimum sales price. This is because successful climate policy in the field of transport will lead to a radical decline in oil demand, and ultimately cheap oil.

Figure 4: Diesel and petrol tax rates, in Euro/1000 Liter vs diesel share in new car, showing higher diesel shares (left) with lower diesel taxes (right)

5.2. Fossil (natural) gas

In Europe, fossil gas in transport is taxed at a disproportionately low level, most notably in Italy where the CNG (compressed natural gas) price at the pump is less than half that of diesel equivalent. If the tax rate applied to gas was based upon the energy content (€/GJ fuel) and set on a par with diesel, the price of CNG would double. In Belgium and 6 other EU countries remarkably apply [no tax at all](#). This low tax rate makes CNG and LNG vehicles commercially viable - without the incentive it is highly unlikely they would have any appreciable market share. Excluding excise duties, LNG trucks are 0.02€/km more expensive to operate due to higher purchase price and maintenance.

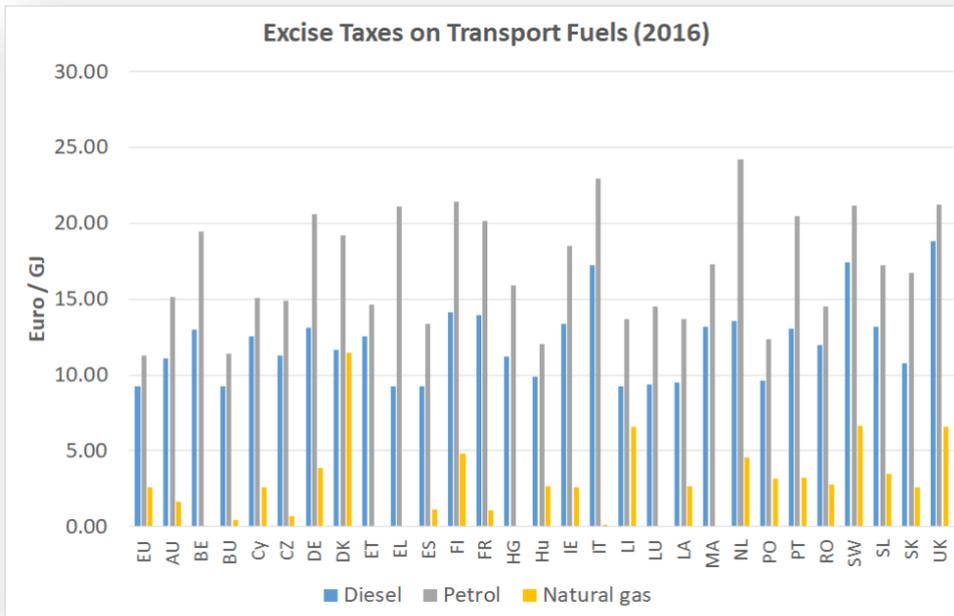
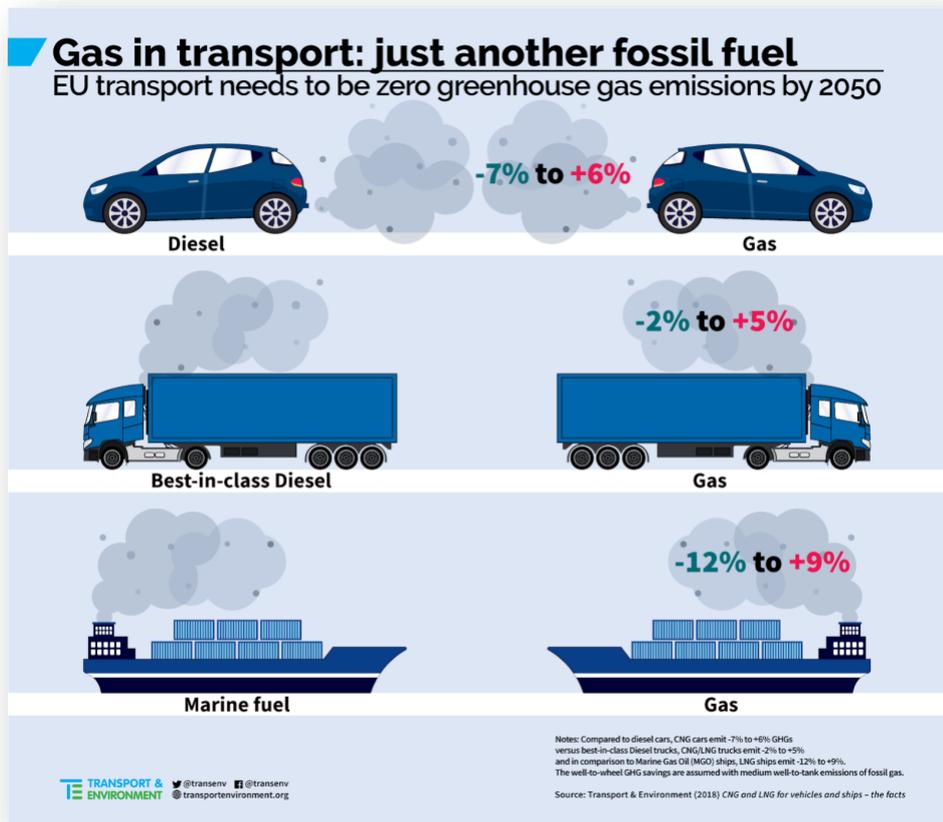


Figure 5: Excise taxes on transport fuels

The gas industry claims gas vehicles are cleaner than diesel, and lower carbon than petrol cars. But a major recent [study](#) has highlighted fossil gas vehicles are broadly equivalent to modern diesels in terms of CO₂ emissions. Whilst air pollution emissions were lower in the past, new diesel technology has diminished this difference between gas and diesel. Petrol and gas cars have similar local pollutant emission profiles, and are under the same EURO air pollution standard category with same limits. Fossil gas is a fuel where taxes should justifiably rise.



A number of countries also apply subsidies and tax breaks for gas vehicles boosting sales, most notably in Italy, Germany, Spain and France. Such subsidies should be limited to genuinely zero emission vehicles, which make a significant difference in air quality and GHG compared to incumbent technologies.

Further information

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