

Transport & Environment

Published: October 2022

Authors: Griffin Carpenter and Arnau Oliver Antich

Reviewers: Full list on page 3

Editeur responsable: William Todts, Executive Director

© 2022 European Federation for Transport and Environment AISBL

To cite this report

Transport & Environment (2022), *The good tax guide: A comparison of car taxation in Europe*.

Further information

Griffin Carpenter

Company Cars Analyst

Transport & Environment

griffin.carpenter@transportenvironment.org

Mobile: +32(0)488 567 283

www.transportenvironment.org | @transenv | fb: Transport & Environment

Acknowledgements

The findings and views put forward in this publication are the sole responsibility of the authors listed above.

Reviewers by country

Country	Name(s)	Organisation
Austria	Michael Schwendinger	Mobility with a Future
Belgium	Jolan Rijmenams, Marie Desrousseaux	Bond Better Environment
	Laurent Franckx	Federal Planning Bureau
Bulgaria	Atanas Georgiev	Sofia University
Croatia	Tomislav Čop	Hrvoje Požar Energy Institute
Cyprus	Sofronis Clerides	University of Cyprus
Czechia	Josef Pokorny	Czech Car Importers Association
Denmark	Søren Jakobsen	Danish E-Mobility
	Jeppe Juul	Council for Green Transformation
Estonia	Magnus Piirits	Foresight Centre
Finland	Jarkko Harju, Satu Kuitunen	Tampere University
France	Louis-Pierre Geffray	Institute for Sustainable Development & International Relations
	Quentin Perrier	High Council for Climate
Germany	Matthias Runkel	Green Budget Germany
	Benjamin Fischer, Carl-Friedrich Elmer	Agora Verkehrswende
Greece	George Xydis	Aarhus University
Hungary	Ferenc Meszaros, Gabriel Ayobami Ogunkunbi	Budapest University of Technology & Economics
Iceland	Sigurður Friðleifsson	Icelandic Energy Institute
	Jón Ásgeir Haukdal Þorvaldsson	Icelandic National Energy Authority
Italy	Francesco Naso, Clio Ceccotti	Motus-E
Ireland	Vera O'Riordan	University College Cork
Latvia	Aivars Rubenis	Ivory Group
Lithuania	Renata Dagiliūtė	Vytautas Magnus University
Malta	Maria Attard	University of Malta
Netherlands	Arno Schroten, Peter Scholten	CE Delft
Norway	Shiyu Yan	Aarhus University
Poland	Piotr Chrzanowski	WiseEuropa
Portugal	Susana Silva	University of Porto
Romania	Mihnea Catuti	Energy Policy Group
Slovakia	Róbert Rehák	University of Bratislava
Slovenia	Boštjan Okorn	Slovene Consumers Association
Spain	Marta Villar Ezcurra	Universidad CEU San Pablo
Sweden	Frances Sprei	Chalmers University of Technology
Switzerland	Gracia Brückmann	University of Bern
UK	Sophie O'Connell	Green Alliance
-	Sandra Wappelhorst	International Council on Clean Transportation

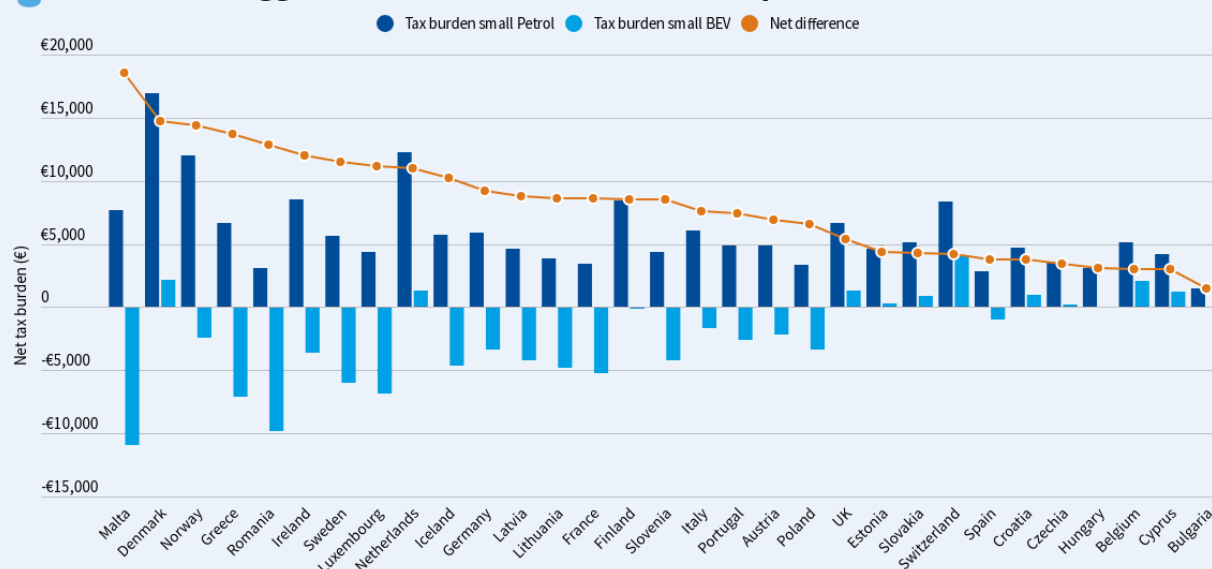
Summary

This report is the first time that systems of car taxation are directly compared across European countries. The comparisons cover 31 countries, seven forms of taxation, and two registration types (private and corporate). The results detail the different tax methods used and the resulting tax burden for typical car ownership and usage.

By calculating the different taxes that are levied on the same car in each country, a total tax burden can be compared across countries. The range in tax burden is substantial. For a small petrol car, the tax burden over ten years of private ownership ranges from €1,500 in Bulgaria to €17,000 in Denmark. For a compact petrol SUV, the range is from €2,800 to €51,400.

Importantly for the zero-emission transition, our report calculates the tax burden between vehicle types (small car and compact SUV) and powertrains (petrol, plug-in hybrid, battery electric vehicle - BEV) and the tax differential between them.

Leaders and laggards for the tax incentivisation of private zero-emission vehicles



Source: T&E calculations of the tax burden over ten years of private ownership

Our results reveal that the tax differential between a BEV and petrol **private car** varies greatly across countries. The highest tax differentials are in Malta, Denmark, and Norway while the lowest are in Bulgaria, Cyprus, and Belgium. The tax comparisons offer explanations for these findings:

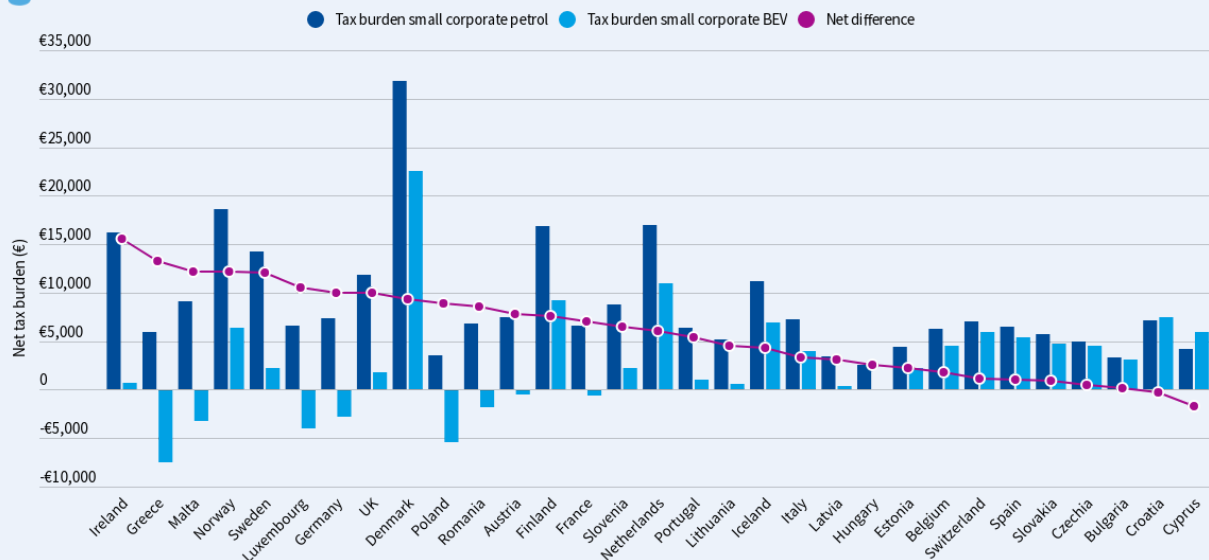
- Nearly all countries with a high differential have zero-emission purchase grants (the largest in Malta and Romania), whereas these grants are absent in countries with a low differential.
- Over ten years of ownership, fuel taxation is the largest share of tax burden in most countries. In 2022, 20 countries cut fuel excise duties, thus lowering the tax differential.
- Some forms of taxation are absent. Nine countries do not have an acquisition tax (despite its influence on new purchases) and four countries do not have an ownership tax.

- Some taxes are misspecified. Ten countries – particularly countries without recent tax reforms – do not have a car tax (i.e. acquisition or ownership) based on CO₂ emissions.

Across Europe, BEV tax differentials are broadly correlated with BEV uptake. There is no correlation, however, between BEV tax differentials and per capita GDP or income, with higher differentials (and BEV uptake) in Malta and Romania than richer countries like Belgium and Spain.

The calculation of tax burden is also relevant for **corporate cars**, which constitute the majority (58%) of new registrations in Europe and add income and corporate tax benefits to the analysis.

Leaders and laggards for the tax incentivisation of corporate zero-emission vehicles



Source: T&E calculations of the tax burden for a small BEV and petrol salary car over four years of ownership

Like private cars, the tax differential between a BEV and petrol salary car varies greatly across countries. The highest differentials are in Ireland, Greece, and Malta while the lowest differentials are in Cyprus, Croatia, and Bulgaria. The tax calculations offer key explanations for these findings:

- Purchase grants for zero-emission corporate cars are present in fewer countries (15), and are often lower than for private cars, but are still a significant contributor to the tax differential.
- In most countries, benefit-in-kind taxation is the largest share of tax burden for salary cars. It is strongly differentiated by CO₂ emissions in the UK and Ireland but undifferentiated in six other countries (Croatia, Czechia, Lithuania, Romania, Slovakia, Switzerland).
- Corporate cars are eligible for large tax benefits in the form of depreciation write-offs and VAT deduction. Seven countries differentiate depreciation write-offs by CO₂ emissions, with the largest differentiation in Belgium, and four countries differentiate VAT deduction.

Given the emissions challenge faced in road transport, the learnings from these tax comparisons are critical and timely. Transport is the only sector in Europe where emissions continue to rise. This report offers good practices to employ, bad practices to avoid, and guidance to follow.

Table of contents

1. Introduction	8
1.1. The transport emissions challenge: scale and direction	8
1.2. Countries are progressing at different rates	10
1.3. Taxation is a powerful tool, underused in transport	10
1.4. Research objective and scope	12
2. Comparing car taxation across countries	15
2.1. Comparing countries by the vehicle attributes used as a tax base	15
2.1.1. Comparing vehicle attributes used for car acquisition taxation	15
2.1.2. Comparing vehicle attributes used for car purchase grants	17
2.1.3. Comparing vehicle attributes used for ownership taxation	19
2.1.4. Comparing vehicle attributes used for benefit-in-kind taxation	21
2.1.5. Comparing vehicle attributes used for VAT deduction	23
2.1.6. Comparing vehicle attributes used for depreciation write-off	25
2.1.7. Comparing vehicle attributes used for energy taxation	27
2.1.8. Summary across seven forms of car taxation	29
2.2. Comparing countries that tax the same vehicle attribute	30
2.2.1. Comparing car acquisition taxation by common taxable base	30
2.2.2. Comparing purchase grant policies	33
2.2.3. Comparing car ownership taxation by common taxable base	36
2.2.4. Comparing benefit-in-kind taxation by common taxable base	38
2.2.5. Comparing VAT deduction policies	40
2.2.6. Comparing depreciation write-off policies	42
2.2.7. Comparing taxation by energy source	44
2.3. Comparing countries by the resulting tax burden on typical car models	46
2.3.1. Comparing car acquisition taxation for typical car models	48
2.3.2. Comparing purchase grants for typical car models	49
2.3.3. Comparing car ownership taxation for typical car models	51
2.3.4. Comparing benefit-in-kind tax on a salary car for typical car models	52
2.3.5. Comparing VAT deduction on a corporate car for typical car models	54
2.3.6. Comparing depreciation write-off on a corporate car for typical car models	55
2.3.7. Comparing energy taxation for typical car models	57
2.3.8. Comparing the total tax burden for typical car models	58
2.4. Net tax differentials between BEV, PHEV, and petrol cars	69
2.4.1. Net tax differentials for private cars	69
2.4.2. Net tax differentials for salary cars	74
3. Discussion	78
3.1. Trends in taxable attributes and tax burden by tax forms	78
3.2. Trends in total tax burden by country	80
3.3. Net tax differentials and the transition to a zero-emission fleet	83

4. Developing principles for car taxation	90
4.1. Principles for environmental taxation	90
4.2. The good tax guide principles	90
4.3. Good, bad, and interesting practices	94
5. Conclusions	101
Appendix: Country summaries	104
Car taxation in Austria	105
Car taxation in Belgium	107
Car taxation in Bulgaria	109
Car taxation in Croatia	111
Car taxation in Cyprus	113
Car taxation in Czechia	115
Car taxation in Denmark	117
Car taxation in Estonia	119
Car taxation in Finland	121
Car taxation in France	123
Car taxation in Germany	125
Car taxation in Greece	127
Car taxation in Hungary	129
Car taxation in Iceland	131
Car taxation in Ireland	133
Car taxation in Italy	135
Car taxation in Latvia	137
Car taxation in Lithuania	139
Car taxation in Luxembourg	141
Car taxation in Malta	143
Car taxation in Netherlands	145
Car taxation in Norway	147
Car taxation in Poland	149
Car taxation in Portugal	151
Car taxation in Romania	153
Car taxation in Slovakia	155
Car taxation in Slovenia	157
Car taxation in Spain	159
Car taxation in Sweden	161
Car taxation in Switzerland	163
Car taxation in United Kingdom	165
Bibliography	167

Acronyms

BEV	Battery electric vehicle
BiK	Benefit-in-kind
EU	European Union
GDP	Gross domestic product
GHG	Greenhouse gases
HEV	Hybrid electric vehicle (without plug)
ICE	Internal combustion engine
OEM	Original equipment manufacturer
PHEV	Plug-in hybrid electric vehicle
VAT	Value added tax
WLTP	Worldwide Harmonised Light Vehicle Test Procedure

Two-letter country codes

AT	Austria	FR	France	MT	Malta
BE	Belgium	GR	Greece	NL	Netherlands
BG	Bulgaria	HR	Croatia	NO	Norway
CH	Switzerland	HU	Hungary	PL	Poland
CY	Cyprus	IS	Iceland	PT	Portugal
CZ	Czechia	IE	Ireland	RO	Romania
DE	Germany	IT	Italy	SE	Sweden
DK	Denmark	LV	Latvia	SI	Slovenia
EE	Estonia	LT	Lithuania	SK	Slovakia
ES	Spain	LU	Luxembourg	UK	United Kingdom
FI	Finland				

1. Introduction

In Europe, transportation has proven to be a particularly stubborn sector for emission reductions. While greenhouse gas emissions are declining in every other sector of the economy, transportation emissions continue to grow and car transport constitutes the bulk of these emissions. Reversing course will require governments to utilise the full policy toolbox available to them, including one of the most powerful tools available: taxation.

A view across Europe reveals anecdotal examples of countries with strong environmental incentives through car taxation, often with correspondingly strong progress towards achieving a zero-emission fleet. Tax practice is varied, with different tax bases presenting a challenge for direct comparison. Due in part to this challenge, no numerical inventory of car taxation exists that allows for comparative analysis. This report aims to fill this research gap by moving from description to analysis. Perhaps the lack of comprehensive review lies behind the diversity in current practice as policymakers are simply unaware of best practices already in use.

The rest of **Section 1** sets out the transport emissions challenge and the scope of this report. A detailed account of car taxation in 31 countries is provided in **Section 2**, including numerical comparisons. These results are analysed in **Section 3**, linking tax practices to specific outcomes. From this evidence, principles for good taxation are developed in **Section 4** and applied to systems of car taxation across Europe to find examples of good, bad, and interesting practice. **Section 5** offers conclusions with a view to the long-term future for car transportation and taxation. To provide detailed information at the country level, two-page tax summaries for each of the 31 countries covered are provided in an **Appendix**.

This report and the accompanying spreadsheets of tax calculations were a substantial research undertaking. This work would not have been possible without the valuable input from an extensive team of collaborators who reviewed the information on national taxation - which often undergo frequent reform - to ensure the accuracy of this report. Our hope is that these outputs will prove useful to researchers, stakeholders, and governments.

1.1. The transport emissions challenge: scale and direction

As Europe struggles to contain the impacts of climate change, the emissions of greenhouse gases (GHG) must decline to zero. In many sectors there are signs of progress. Since 1990, GHG emissions from power generation, industry, buildings, agriculture, and waste have been on a steady decline – nearly in line with a trajectory to reach net zero GHG emissions by 2050. Transport, where emissions increased by 22% between 1990 and 2019, stands alone as an exception (Figure 1). The sharp reduction in transport emissions in 2020 due to Covid-19 is the only - temporary - break from the trend.

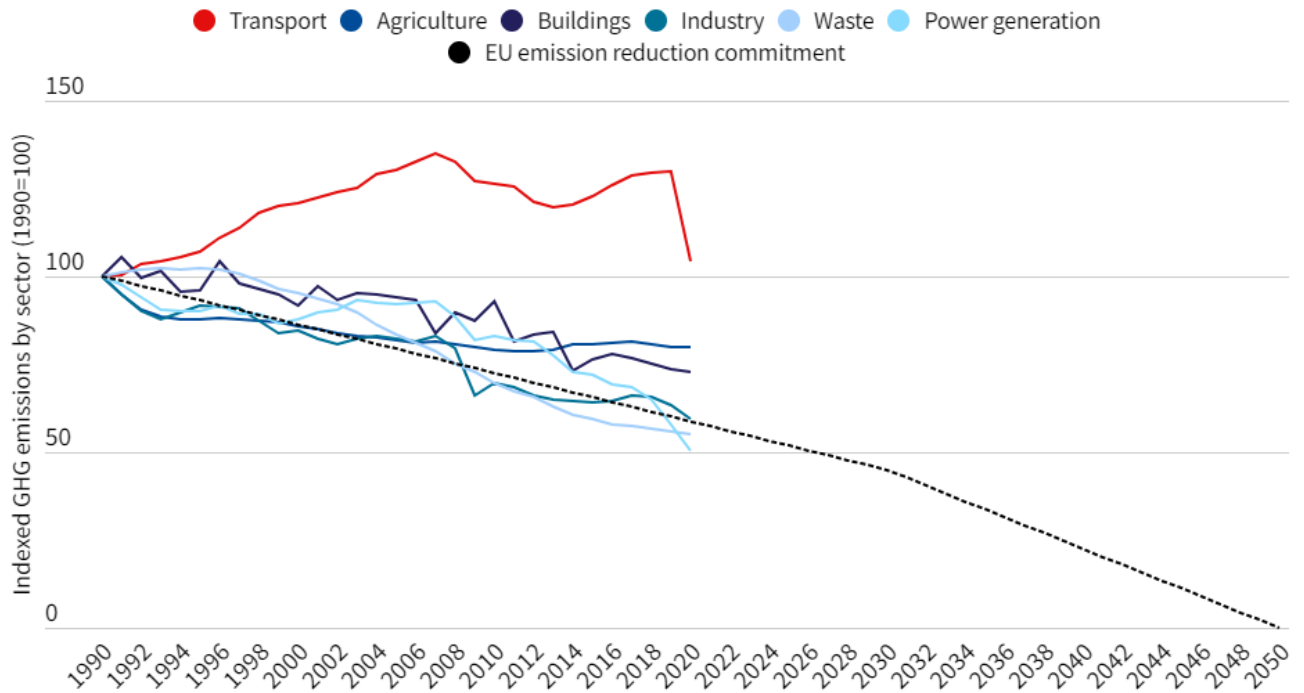


Figure 1: Trends in European GHG emissions by sector

Source: T&E calculations based on UNFCCC 2022 data release. Scope covers EU27+UK+CH+NO+IS
 Notes: EU emission reduction commitment according to the European Climate Law. Commitment covers all sectors.

Not only are transport emissions moving in the wrong direction, they are also the largest source of emissions (26%¹). Within the transport sector, passenger cars constitute just under half of the emissions (44% of the sector, 11% of the total) with the remaining emissions coming from planes, ships, trucks, vans, trains, and motorcycles (Figure 2).

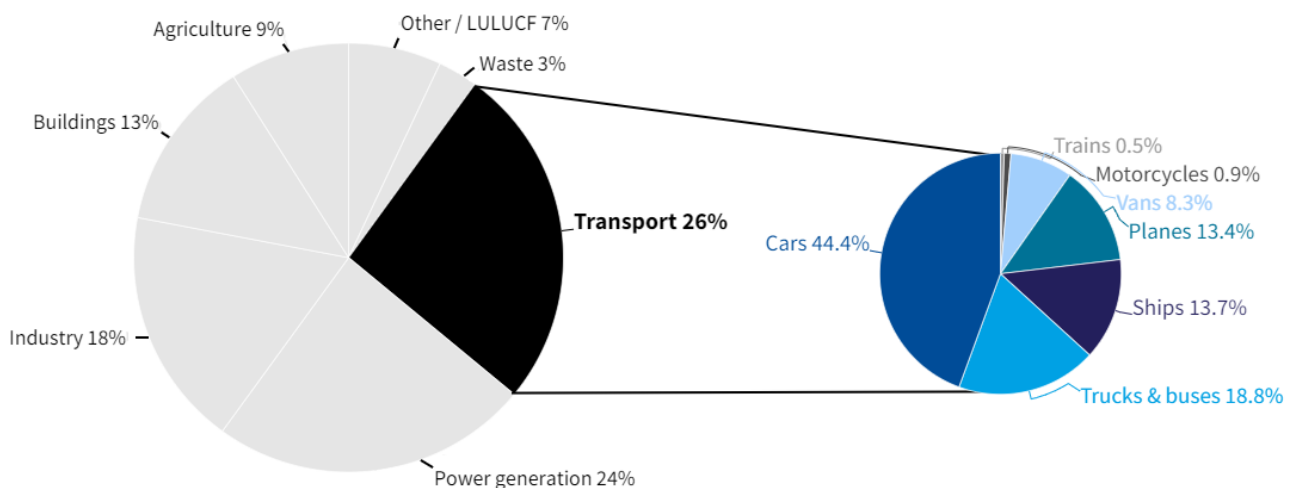


Figure 2: Transport share of total GHG emissions and car share of transport emissions

Source: T&E calculations based on UNFCCC 2022 data release. Scope covers EU27+UK+CH+NO+IS

¹ Calculated based on the UNFCCC 2022 data release including international aviation and shipping.

Passenger cars thus present a pressing challenge for climate action in Europe – a large source of emissions that continues to increase in emissions while other sectors are achieving reductions.

1.2. Countries are progressing at different rates

Despite the position of the transport sector as emission laggard, there are signs that some European countries are rising to the challenge. Battery electric vehicles (BEVs), which have emerged as the most cost competitive zero-emission technology, are commanding an ever greater share of new car registrations. In Norway, the electrification front-runner in Europe and beyond, BEVs constitute 80% of new registrations in the first half of 2022 (Figure 3).

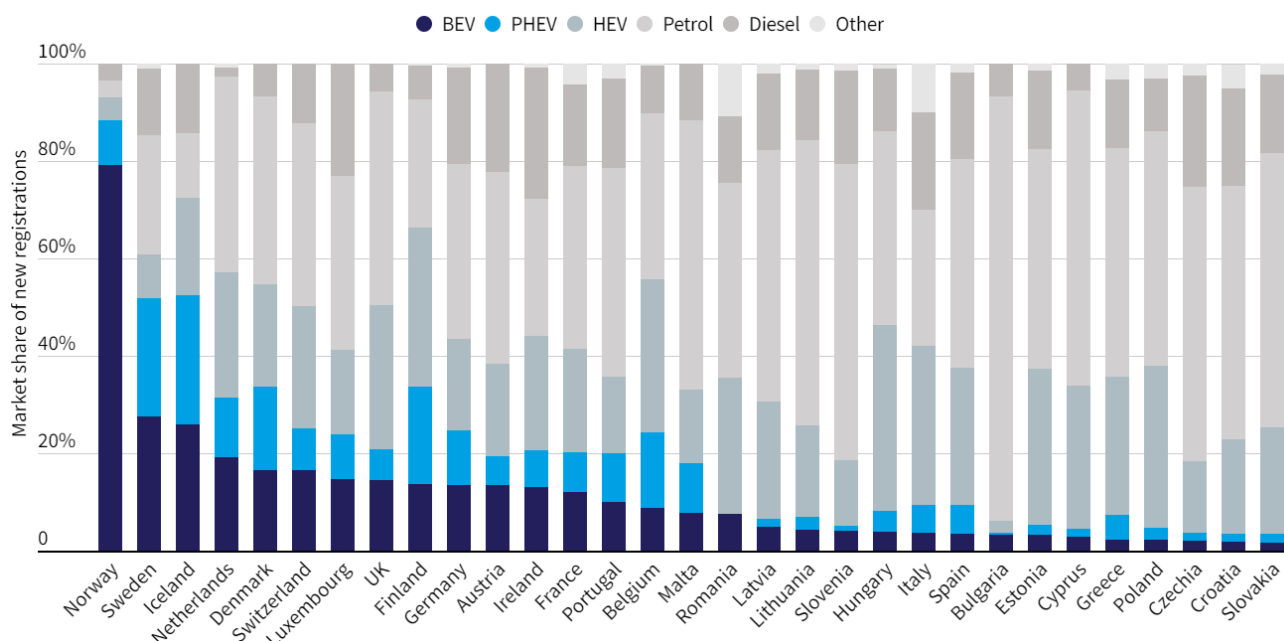


Figure 3: Drivetrain composition of new registrations

Source: T&E calculations based ACEA (July 2022) Alternative Fuel Vehicle Registrations Data, Malta National Statistics Office (October 2022) Motor Vehicles: Q2/2022.

But there is great diversity across Europe. While several other European countries - generally northern countries - are on an accelerated path towards a zero-emission fleet, other countries are still lagging behind - some with BEV shares of less than 1%.

1.3. Taxation is a powerful tool, underused in transport

If car transport is to become a sector that plays its part in reducing emissions, rather than increasing them, all tools for change must be explored, including taxation. For this report, taxation is defined as the imposition of compulsory financial charge on individuals or entities by governments. Green taxation is a form of taxation where the tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment.[1]

In European policy, taxation has proven itself to be a powerful and versatile tool. There are countless examples of green taxation across multiple sectors as documented in several reports.[2] Car taxation is no exception, with several examples of the steering effect of taxation. Purchase grants for zero-emission cars clearly shift their popularity and even have strong ripple effects in the second-hand market, as evidenced in Germany.[3] In the Netherlands, like many other European countries, the benefit-in-kind taxation on salary cars depends on the CO₂ emission intensity of the vehicle. Zero-emission cars were heavily incentivized in 2018 and 2019 but this incentivisation has been reduced in each successive tax year leading to a late surge in registrations of BEVs to beat the tax change (Figure 4).[4] A similar effect, but in reverse, took place in the UK following the reduction in benefit-in-kind for zero-emission cars in April 2020.[5] These individual policies are explored in more detail in subsequent chapters, but the responsiveness of individuals and companies to financial incentivisation is clear.

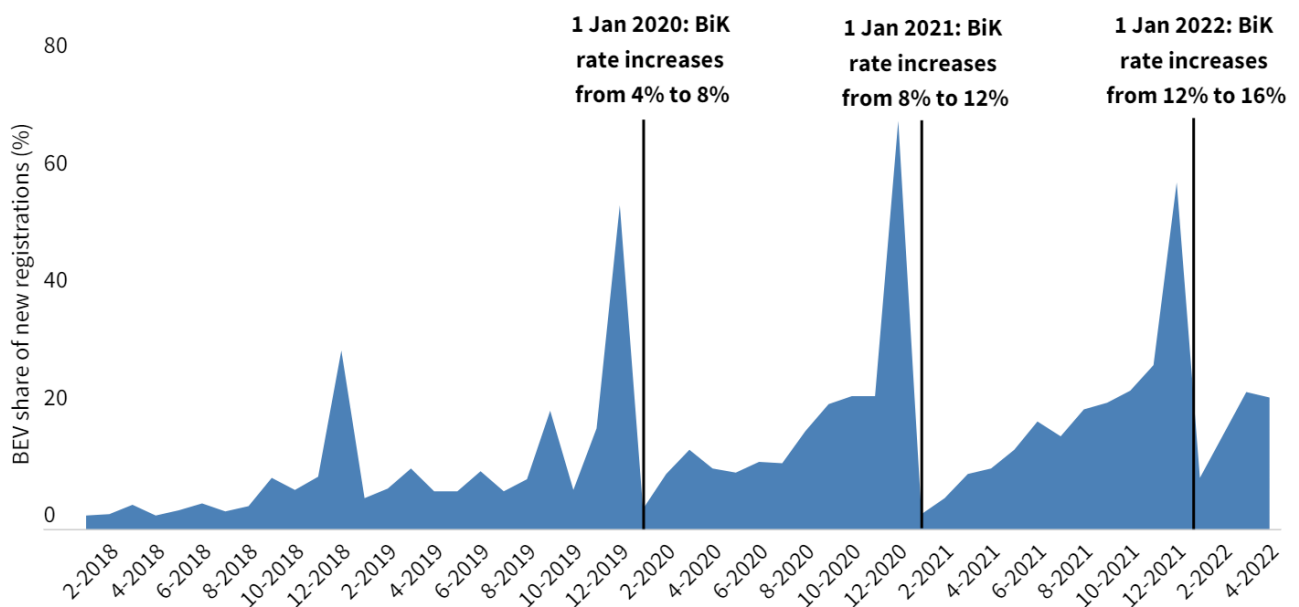


Figure 4: Dutch BEV sales spike in December to avoid higher taxes in the following tax calendar

Source: Revnext analysis of RDW data

And yet, despite the power of green taxation to both steer behaviour and raise government revenues, its use has stagnated while the need for emissions reductions becomes evermore pressing. In total, green taxation represents just over 2% of GDP and just over 5% of total government revenue from taxes and social contributions. This share has remained flat for three decades. The situation for transport taxation is even worse, with revenues from transport falling as a share of GDP and as a share of government revenues.[6] Transport taxation is both a powerful tool and an underused one.

Interaction between taxation and European CO₂ standards

For car transport, the main policy tool at the EU level is the CO₂ standards. These standards specify a limit on the average CO₂ emission intensity of new sales from a carmaker (formally referred to as an original equipment manufacturer or OEM). The CO₂ standards have spurred electrification in the European market, most noticeably in 2020 and 2021 as OEMs were required to meet a 95g CO₂/km standard. As part

of the EU's increased climate ambitions, these CO₂ standards have a proposed 0g CO₂/km standard in 2035. In other words, a phase-out on the sale of new combustion vehicles. Many non-EU countries have similar policies, including a 2025 phase-out in Norway, and a 2030 phase-out in the UK and Iceland. (Several EU member states also have advanced phase-out dates for their national market.)[7]

With CO₂ standards steering the car market and a EU proposal for a zero-emission standard in 2035, it might appear that the role of taxation is diminished as the emissions problem is effectively solved. And yet taxation continues to play a role for several reasons:

- Car taxation **can improve public finances** by raising revenue.
- Car taxation can be a fair way of **conducting public finance** by raising revenue from the right sources (i.e. following the user pays and polluter pays principles, see Section 4).
- There are many externalities associated with car ownership and usage beyond CO₂ emissions. Car taxation can be used to **address these additional externalities**.
- Taxation can serve as a complement, rather than an alternative, to **regulations** by creating the conditions through which the CO₂ standard can be fulfilled.
- National governments may wish to **attract zero-emission cars** to their country (e.g. air quality, noise pollution, lower operating costs, electricity grid balancing) while the CO₂ standards are EU-wide.
- National governments may wish to **electrify their new sales** faster than the EU-wide CO₂ standards.
- National governments may wish to use **taxation as a tool to steer the production** of domestic OEMs.
- The **CO₂ standards are implemented in a stepwise manner**, leaving periods of little action in the interim periods between requirements (e.g. the next standard is applied in 2025 and the next challenging standard is applied in 2030).[8, 9] In this sense, fiscal policy can deliver 'overachievement' with respect to the CO₂ standards.[10]
- There is the ability to **amend taxation on a regular basis**.

1.4. Research objective and scope

There are some tax guides that compile information on car taxation across much of Europe. The most comprehensive accounts are the annual ACEA Tax Guide [11] and the annual PWC Global Automotive Tax Guide [12]. From these tax guides it is clear that there are broad similarities between European countries in the sense that there are broadly seven forms of car taxation, there are wide differences between the level of tax between countries as well as the attributes that are taxed.

While the existing tax guides are very valuable sources of information on car taxation, they are descriptive in nature and each country description is contained in separate, independent chapters. A research gap

thus remains in constructing a *comparative approach* between countries, a *numerical approach* in its analysis, and an *evaluative approach* to guide best practice.²

This tax guide analyses European car taxation using a comparative, numerical, and evaluative approach. The latter is made in the context of the necessary transition to a zero-emission fleet with a smaller emphasis on other environmental, social, economic, and public finance considerations.

This tax guide limits the scope over five dimensions:

- **Vehicle age:** new cars.
- **Vehicle type:** passenger cars.
- **Registration type:** private & corporate registrations.
- **Geography:** EU-27, UK, Switzerland, Norway, Iceland. For countries with regional taxation, the taxation for the capital region is applied.
- **Time:** Taxation as of 1 September 2022.

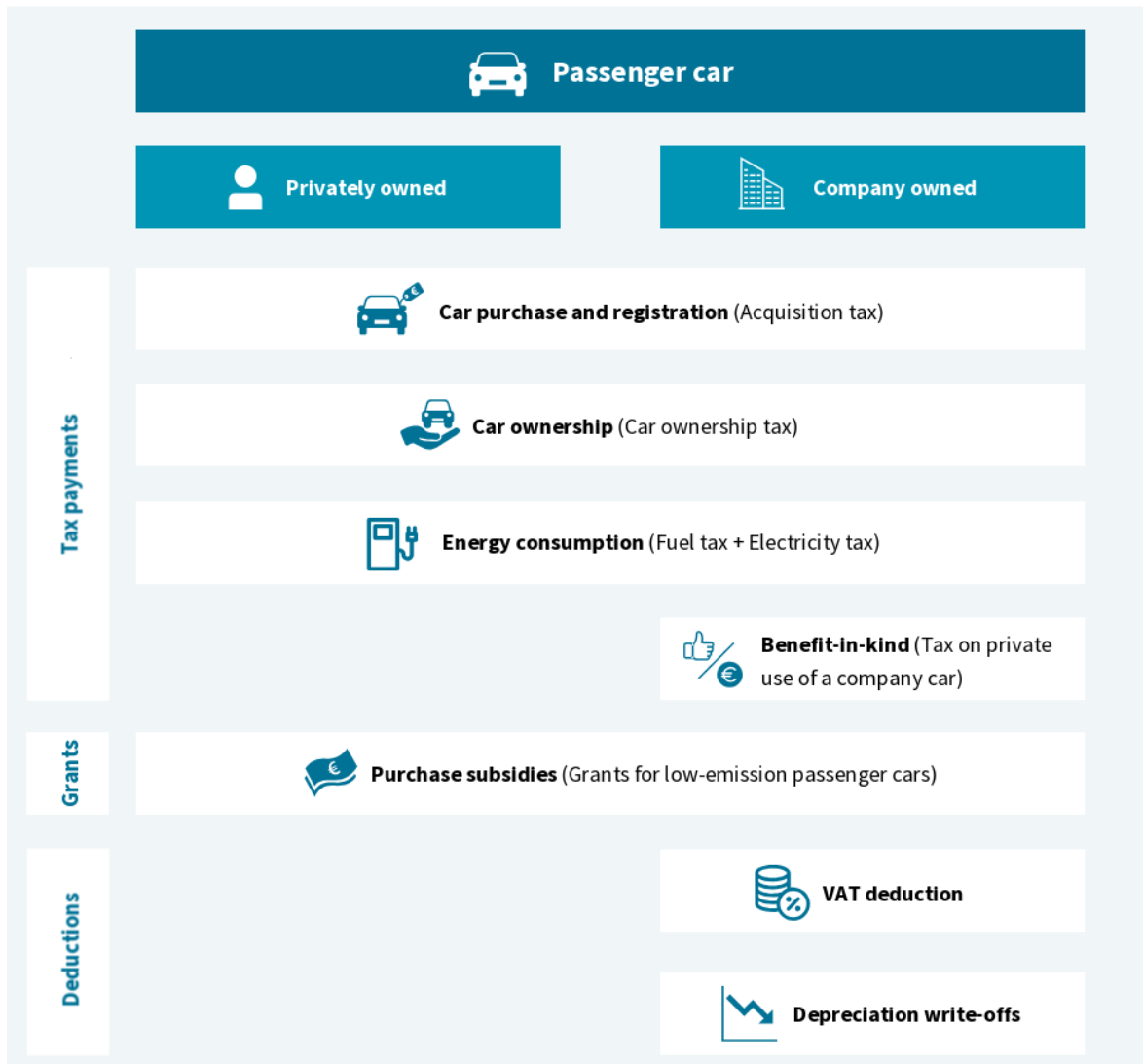
This scope may be revisited in the future, for example updating the taxes (time), adding used cars (registration type), and/or adding vans (vehicle type). The numerical comparisons further limit the scope as only a finite number of cars could be compared between countries where multiple attributes are used (described later).

Applying the definition of car taxation as compulsory financial charge intended to raise revenues and/or influence behavioural change, there are seven forms of tax and benefit that are included in the scope of this report:

- **Car acquisition taxation:** a one-off tax paid with the purchase of a new vehicle.
- **Car purchase grants:** the reverse of car acquisition taxation where grants are paid by the government to companies or individuals to subsidise the purchase of a vehicle.
- **Car ownership taxation:** this form of taxation, also known as road taxation, is typically paid annually by the ownership of the vehicle.
- **Benefit-in-kind taxation on salary cars:** this covers the benefit of receiving a car as a salary perk and therefore the additional income tax that is paid on this benefit.
- **VAT deduction on corporate cars:** this covers the tax benefit of registering a car in the corporate channel and therefore allowing the possibility to recover the VAT as an input cost.
- **Depreciation write-offs on corporate cars:** this covers the tax benefit of registering a car in the corporate channel as a capital expense and therefore lowering corporate taxation.
- **Excise duties on energy use:** this includes energy taxation levied on liquid fuels (e.g. petrol, diesel) as well as electricity.

² A January 2022 report accomplishes this task for Asian countries: ICCT (2022). Overview of Asian and Asia-Pacific passenger vehicle taxation policies and their potential to drive low-emission car purchase. Retrieved from: <https://theicct.org/publication/asia-vehicle-taxation-jan22/>

Summary figure of the main passenger car taxes used in the scope of the report



There are also several forms of taxation that are not included in the scope of this report:

- **Insurance:** while mandatory, insurance is a separate service provided by private parties.
- **Local taxes including parking and tolls:** are for a service, rather than the car, and are localised.
- **Car registration fees:** is not intended to raise revenue or incentivise behaviour.
- **Employer social insurance contributions on salary cars:** while within scope, was too difficult to find standardised information across countries (unlike benefit-in-kind taxation).
- **Value added tax:** not a car-specific tax as it is applied across the wider economy. Car-specific VAT exemptions are included within the scope.
- **Some carbon taxes on energy:** not a car-specific tax as it is applied across the wider economy.
- **Commuter allowances:** there is a lack of uniformity between countries. Tax deductions that offset their impact, for example in benefit-in-kind taxation, were also excluded.

2. Comparing car taxation across countries

The wide diversity in how car taxation is applied across Europe presents a major challenge for comparison. For some car taxes, particularly acquisition, ownership, and benefit-in-kind taxes, different vehicle attributes are used as a basis for taxation. There is also variation in how the tax is applied, either as a specified financial amount or as a percentage of car value. Even what is considered car value (e.g. non-recoverable taxes, operating costs) can vary between countries. As an example, if one country levies a car acquisition tax of €10 per gram of CO₂/km and another country levies an acquisition tax of 0.1% of car value for each KW of engine power, there is no possibility to make a direct comparison. It cannot be determined outright which tax is higher or lower, it depends on the engine power, CO₂ emission intensity, and value of the vehicle in question.

To help overcome this comparison challenge, this section proceeds with three types of comparisons. The first type of comparison (Section 2.1.) uses tables to catalogue the vehicle attributes (e.g. CO₂ emission intensity, engine power, fuel type) used by each European country as a taxable base for the seven forms of taxation covered in this report. The second type of comparison (Section 2.2.) uses graphs to directly compare the tax schedules in different countries that use a similar tax base on a similar method. The third type of comparison (Section 2.3.) uses typical car models to calculate the tax burden in different countries to allow for direct comparison even with very different tax systems. Using these tax burdens by typical vehicle, a net tax differential is calculated between between zero, low, and high emission cars.

2.1. Comparing countries by the vehicle attributes used as a tax base

Car taxation in Europe takes a highly varied form with examples of at least twelve different vehicle attributes serving as a tax base. However some vehicle attributes are much more commonly taxed than others, particularly for certain forms of taxation (e.g. fuel type for fuel excise duty, car value for depreciation). The following tables catalogue the vehicle attributes used in the tax calculation for all 31 countries. There is one table for each of the seven forms of taxation covered in this report.

A vehicle attribute can be used to varying degrees. Simply cataloguing the presence of a vehicle attribute in the tax calculation does not comment on the significance of its use (which is analysed in sections 2.2, 2.3 and section 3).

2.1.1. Comparing vehicle attributes used for car acquisition taxation

In total, 22 of the 31 countries levy an acquisition tax on the purchase of new vehicles (Table 1). CO₂ emission intensity is the most common attribute, featuring in the acquisition tax of 20 countries (of which in 3 countries the acquisition tax is not based on CO₂ emissions, but there is a discount for low- or zero-emission cars) – over three-quarters of cases – followed by a long tail of other vehicle attributes including engine power (5), engine capacity (3), Euro standard (2), air pollutants (2), weight (2), age of vehicle (2), and length (1). Car value is commonly used, featuring in the acquisition tax of 10 countries, but is often used in conjunction with another vehicle attribute where the acquisition tax is applied as a percentage of car value (i.e. an ad valorem tax). Similarly, fuel type features in the acquisition tax of five countries, but is used for different tax schedules of another main attribute.

Table 1: Taxable base, by country, for car acquisition taxation

Country	CO2 emissions	Car price threshold	Engine power	Engine capacity	Euro standard	Air pollutants	Weight	Length	Fuel type	Flat level	Distance	Age of car	Business use	Applied to car price	Buyer attributes
Austria	X													X	
Belgium	X*		X									X			
Bulgaria															
Croatia	X								X					X	
Cyprus	X														
Czechia															
Denmark	X		X											X	
Estonia															
Finland	X													X	
France	X		X				X					X			
Germany															
Greece	X													X	
Hungary	X*			X	X				X						
Iceland	X													X	
Ireland	X					X								X	
Italy			X												
Latvia															
Lithuania	X								X						
Luxembourg															
Malta	X							X						X	
Netherlands	X								X						
Norway	X					X	X								
Poland				X					X					X	
Portugal	X			X					X						
Romania															
Slovakia	X*		X									X			
Slovenia	X				X										
Spain	X													X	
Sweden															
Switzerland															
UK	X														
Total	20	0	5	3	2	2	2	1	6	0	0	3	0	10	0

Source: T&E compilation of national sources as of 1 September 2022. *The tax is not based on CO2 emissions, but there is a discount for low- or zero-emission passenger cars.

2.1.2. Comparing vehicle attributes used for car purchase grants

Purchase grants for low- and zero-emission cars are common in European countries, featuring in 23 of the 31 countries (Table 2).³ This figure includes Iceland and Norway where zero-emission cars do not receive a purchase grant but benefit in a similar manner through a VAT exemption. There is no clear trend among the eight countries that do not have purchase grants, with examples of higher and lower income countries and countries with higher and lower levels of BEV and PHEV uptake.

In most cases – 16 out of 23 – countries apply a threshold on car price as part of their purchase grant. Cars above this threshold are excluded from purchase grants. These price thresholds are generally applied in a simple manner. Ireland is the only country that uses more than two price thresholds to adjust the size of the subsidy based on car price and no country uses a continuous function to vary the size of the subsidy with respect to car price. There are, however, many countries (10) that have different levels of grants for low- and zero-emission cars (including the use of a continuous function in Sweden) and many countries (13) that have different levels of grants for private cars and corporate cars (see section 2.2.2).

CO₂ emission intensity, business use, and car value are by far the most common vehicle attributes used in the determination of car purchase grants. Buyer attributes are less commonly used and include business size (Spain), household size (France and Italy), family size (Greece and Poland), disability (Greece), and the age of the individual (Greece).

Despite the fact that these purchase grants are often termed ‘EV subsidies’, no country specifies a particular fuel type in its system. In all cases, it is the CO₂ emission intensity, rather than the fuel type itself, that determines eligibility. EVs are simply the most common powertrain that meets this eligibility criterion.

³ Some countries have purchase grants for used cars but these are not included in the report scope (Section 1.4.).

Table 2: Taxable base, by country, for new car purchase grants

Country	CO2 emissions	Car price threshold	Engine power	Engine capacity	Euro standard	Air pollutants	Weight	Length	Fuel type	Flat level	Distance	Age of car	Business use	Applied to car price	Buyer attributes
Austria	X	X											X		
Belgium															
Bulgaria															
Croatia	X*	X*													
Cyprus															
Czechia	X												X		
Denmark															
Estonia	X*												X*		
Finland	X	X											X		
France	X	X											X		X
Germany	X	X													
Greece	X	X													X
Hungary															
Iceland	X**	X**												X**	
Ireland	X	X													
Italy	X	X											X		X
Latvia	X	X											X		
Lithuania	X												X		
Luxembourg	X														
Malta	X														
Netherlands	X*	X*											X*		
Norway	X**													X**	
Poland	X	X											X		X
Portugal	X	X											X		
Romania	X														
Slovakia															
Slovenia	X	X											X		
Spain	X	X											X		X
Sweden	X	X													
Switzerland															
UK															
Total	23	16	0	0	0	0	0	0	0	0	0	0	13	2	5

Source: T&E compilation of national sources as of 1 September 2022. *Funding is exhausted **VAT exemption

2.1.3. Comparing vehicle attributes used for ownership taxation

Car ownership taxation is levied in 27 of the 31 countries (Table 3), making it a more common form of taxation than either acquisition taxation or purchase grants. Like acquisition taxation, CO₂ emission intensity is the most common vehicle attribute as a basis for taxation, but the number of examples is smaller. CO₂ emission intensity features in the ownership tax of 23 countries (of which in 8 countries the ownership tax is not based on CO₂ emissions, but there is a discount for low- or zero-emission cars), followed by engine power in seven countries, engine capacity in five countries, age of the vehicle in five countries, and weight (3), Euro standard (1), flat level (1), and business use (1) featuring in a small number of countries.

Unlike acquisition taxation, there are no examples of countries applying their ownership taxation to the car value. This is likely explained by the fact that ownership taxation can carry on for years and sometimes decades after the original purchase. Fuel type features in the acquisition tax of nine countries, but in nearly all cases (with the exception of the UK) is used to adjust the tax schedules of another main attribute. France is the only country that has a different ownership tax for corporate registrations and private registrations (with the latter exempt from any ownership taxation).

Table 3: Taxable base, by country, for car ownership taxation

Country	CO ₂ emissions	Car price threshold	Engine power	Engine capacity	Euro standard	Air pollutants	Weight	Length	Fuel type	Flat level	Distance	Age of car	Business use	Applied to car price	Buyer attributes
Austria	X		X												
Belgium	X*		X**												
Bulgaria	X*		X		X							X			
Croatia			X									X			
Cyprus	X											X			
Czechia															
Denmark	X								X						
Estonia															
Finland	X						X		X						
France	X								X				X		
Germany	X			X					X						
Greece	X														
Hungary	X*		X		X										
Iceland	X														
Ireland	X														
Italy	X*		X		X										
Latvia	X														
Lithuania															
Luxembourg	X								X						
Malta	X														
Netherlands							X		X						
Norway										X					
Poland															
Portugal	X			X					X			X			
Romania	X*			X											
Slovakia	X*			X								X			
Slovenia	X*			X											
Spain	X*		X**												
Sweden	X								X						
Switzerland	X						X								
UK									X						
Total	23	0	7	5	2	0	3	0	9	1	0	5	1	0	0

Source: T&E compilation of national sources as of 1 September 2022. *The tax is not based on CO₂ emissions, but there is a discount for low- or zero-emission passenger cars. **Measured in fiscal power, rather than KW.

2.1.4. Comparing vehicle attributes used for benefit-in-kind taxation

All 31 countries have some form of benefit-in-kind taxation for the private use of a company car (Table 4). The most basic system, present in seven countries, is a tax rate (e.g. 12% annually) applied to the value of the car. In other systems, the tax rate applied to the value of the car scales with some vehicle attribute, including CO₂ emission intensity (20) - of which in 4 countries the BiK tax is not based on CO₂ emissions, but there is a discount for low- or zero-emission passenger cars, age of the car (4), engine power (3), Euro standard (2), or engine capacity (1).

While 27 of 31 countries levy benefit-in-kind taxation as a percentage of car value as a means to approximate the size of the benefit conferred, in Estonia, Hungary, Latvia, and Poland there is no consideration of car value in the benefit-in-kind calculation.

Four countries incorporate the distance driven into their benefit-in-kind taxation. These examples are distinct from the logbook method, where several countries allow the ability for salary car drivers to record their actual private usage of the corporate car to adjust the tax calculation. In three of the four countries, longer driving distances result in increased benefit-in-kind taxation, whereas in Ireland longer driving distances result in reduced benefit-in-kind taxation.

Other variations on benefit-in-kind taxation include whether the car value is determined by actual expenditure or list price (which is often used even for second-hand vehicles), whether fuel cost (when it is covered by the employer) is included, and whether depreciation is applied to reduce car value over time.

Table 4: Taxable base, by country, for benefit-in-kind taxation on a salary car

Country	CO ₂ emissions	Car price threshold	Engine power	Engine capacity	Euro standard	Air pollutants	Weight	Length	Fuel type	Flat level	Distance	Age of car	Business use	Applied to car price	Buyer attributes
Austria	X													X	
Belgium	X								X			X		X	
Bulgaria										X***	X***			X	
Croatia										X***	X***			X	
Cyprus		X										X		X	
Czechia										X				X	
Denmark	X*	X												X	
Estonia			X									X			
Finland	X	X							X		X			X	
France	X													X	
Germany	X	X									****			X	
Greece	X	X												X	
Hungary	X**		X		X										
Iceland	X													X	
Ireland	X**										X			X	
Italy	X													X	
Latvia	X**			X											
Lithuania										X				X	
Luxembourg	X								X					X	
Malta		X												X	
Netherlands	X	X												X	
Norway	X	X										X		X	
Poland	X**		X												
Portugal		X							X					X	
Romania										X				X	
Slovakia										X				X	
Slovenia	X	X												X	
Spain	X				X				X					X	
Sweden	X*	X												X	
Switzerland										X				X	
UK	X													X	
Total	20	11	3	1	2	0	0	0	5	7	4	4	0	27	0

Source: National sources as of 1 September 2022. *Incorporating another tax; ** BiK not based on CO₂ emissions, discount for low- or zero-emission passenger cars; ***Optional; **** A tax that is not included for comparability.

2.1.5. Comparing vehicle attributes used for VAT deduction

Of the 31 countries, 21 allow for VAT deduction on the purchase of corporate cars (Table 11). In the ten countries that do not allow for VAT deduction, a distinction is drawn between cars and vans, with VAT deduction only eligible for corporate vans (beyond the scope of this report). Furthermore, all countries (31) allow for VAT deduction for transport business (e.g. leasing companies, taxi services, rent-a-car, driving schools).

In terms of vehicle attributes, car value features in all cases (21), as VAT is applied to car value. Business use features in most countries (17), however there are multiple, often complex, variations on this form (Section 2.2.5.).

Four countries use CO₂ emission intensity or fuel type in their VAT deduction policies. This is a much smaller number than acquisition taxation (Section 2.1.1.), purchase grants (Section 2.1.2.), ownership taxation (section 2.1.3.), benefit-in-kind taxation (Section 2.1.4.), and depreciation write-off policy (Section 2.1.6.). In these four countries, zero-emission cars are eligible for the full VAT deduction (i.e. 100%) with reduced rates for emitting cars, sometimes applied through multiple bands of CO₂ emission intensity.

Four countries set a maximum threshold on car value as a way to limit the tax benefits for luxury vehicles. There is substantial overlap between the countries that incorporate CO₂ emission intensity and a maximum threshold on car value as three of the four countries that use one feature also use the other. Besides CO₂ emission intensity, no other vehicle attributes are used to incentivise environmental (or other) objectives.

Table 5: Taxable base, by country, for VAT deduction on a corporate car

Country	CO ₂ emissions	Car price threshold	Engine power	Engine capacity	Euro standard	Air pollutants	Weight	Length	Fuel type	Flat level	Distance	Age of car	Business use	Applied to car price	Buyer attributes
Austria	X	X												X	
Belgium													X	X	
Bulgaria															
Croatia														X	
Cyprus															
Czechia													X	X	
Denmark															
Estonia													X	X	
Finland													X	X	
France															
Germany													X	X	
Greece															
Hungary															
Iceland	*												X	X	
Ireland	X												X	X	
Italy													X	X	
Latvia		X											X	X	
Lithuania															
Luxembourg													X	X	
Malta															
Netherlands													X	X	
Norway	*														
Poland													X	X	
Portugal		X							X					X	
Romania													X	X	
Slovakia													X	X	
Slovenia	X	X												X	
Spain													X	X	
Sweden															
Switzerland													X	X	
UK													X	X	
Total	3	4	0	0	0	0	0	0	1	0	0	0	17	21	0

Source: T&E compilation of national sources as of 1 September 2022. *VAT exemption for ZEVs

2.1.6. Comparing vehicle attributes used for depreciation write-off

All 31 countries allow for depreciation write-off on corporate cars (Table 6). Like VAT deduction policy, depreciation write-off is a corporate tax benefit applied to car value. However, unlike VAT deduction policy, the determination of depreciation write-offs for privately used corporate cars is typically flexible and based on claims by businesses through their corporate taxation rather than determined on vehicle purchase (with the exception of Italy where there are predetermined rates of depreciation write-off). There are also more examples of countries applying limits to car value and incorporating CO₂ emission intensity in depreciation taxation than in VAT deduction policy.

Seven countries use CO₂ emission intensity in their depreciation write-off policies. This is a much smaller number than acquisition taxation (section 2.1.1.), purchase grants (section 2.1.2.), ownership taxation (section 2.1.3.), and benefit-in-kind taxation (section 2.1.4.), but more than VAT deduction policy (section 2.1.5.). Four countries incorporate CO₂ emission intensity through the amount of allowable depreciation write-off. Zero-emission cars are eligible for the full write-off (i.e. 100%) with reduced rates for emitting cars, sometimes applied through multiple bands. Four countries⁴ incorporate CO₂ emission intensity through accelerated depreciation (or 'superdepreciation') for zero-emission cars.

Eight countries incorporate car value into their depreciation write-off policy by setting a maximum threshold as a way to limit the tax benefits for luxury vehicles. These luxury vehicles are still eligible for depreciation write-off, but only up to a specified amount. This approach differs from how most countries apply purchase grants where luxury vehicles above a certain price threshold are completely ineligible for a purchase grant. The determination of car value varies between countries, with some countries using actual expenditure, some countries using car list price, and some countries incorporating operational costs.

There is significant overlap between the countries that incorporate CO₂ emission intensity and a maximum threshold on car value as five of the eight countries that use one feature also use the other. Besides CO₂ emission intensity, no other vehicle attributes are used to incentivise environmental (or other) objectives.

Details of depreciation policy in terms of the length of time and the method varies substantially between countries (detailed in section 2.2. and the country summaries).

⁴ Ireland incorporates both forms of zero-emission incentivisation, thus reducing the total to seven countries.

Table 6: Taxable base, by country, for depreciation write-off on a corporate car

Country	CO ₂ emissions	Car price threshold	Engine power	Engine capacity	Euro standard	Air pollutants	Weight	Length	Fuel type	Flat level	Distance	Age of car	Business use	Applied to car price	Buyer attributes
Austria		X											X	X	
Belgium	X												X	X	
Bulgaria													X	X	
Croatia													X	X	
Cyprus													X	X	
Czechia														X	
Denmark													X	X	
Estonia														X	
Finland													X	X	
France	X	X												X	
Germany														X	
Greece	X													X	
Hungary														X	
Iceland														X	
Ireland	X	X											X	X	
Italy													X	X	
Latvia		X												X	
Lithuania														X	
Luxembourg														X	
Malta													X	X	
Netherlands														X	
Norway														X	
Poland	X	X												X	
Portugal		X							X					X	
Romania		X												X	
Slovakia	X	X												X	
Slovenia														X	
Spain													X	X	
Sweden														X	
Switzerland													X	X	
UK	X												X	X	
Total	7	8	0	0	0	0	0	0	1	0	0	0	13	31	0

Source: T&E compilation of national sources as of 1 September 2022.

2.1.7. Comparing vehicle attributes used for energy taxation

Of the seven forms of car taxation, energy excise duty is applied in the most straightforward manner with only one vehicle attribute – fuel type – featuring in the different tax systems. Nearly all countries (29) apply different levels of fuel excise duty for petrol and diesel fuel, with Belgium and the UK as the only exceptions. In all countries (31) electricity taxes are levied at a different rate than fuel excise duty.

In response to the dramatic increase in fuel prices in early 2022, many countries lowered fuel excise duties to support motorists using fuel-based transport.[13] Several countries explored options to target the reductions in fuel excise duty, but very few examples materialised. One example was the Greek government's subsidisation of fuel to families with an income below €30,000. As a pre-2022 example, the Portuguese government's AUTOvoucher programme subsidises fuel up to 50 litres per month (thus benefitting low fuel users proportionately more). Neither policy approach is directly incorporated into the system of energy excise duties.

Taxes on electricity are applied through a different system than fuel excise duty and differ in several important ways. First, whereas fuel excise duties are almost solely relevant to the transport sector, taxes on electricity are relevant throughout the economy including households and businesses. Second, where fuel excise duties are implemented at a standardised rate, electricity taxes, given their wide use across economy sectors, are sometimes levied at different rates for households and businesses. The price of electricity can also vary significantly, especially for public electric vehicle charging stations compared to charging at home or at work. Third, the unit of energy differs between fuel (litres) and electricity (kwh), as does the level of excise duty per equivalent unit of energy (see section 2.2.4.).

Table 7: Taxable base, by country, for energy taxation

Country	CO ₂ emissions	Car price threshold	Engine power	Engine capacity	Euro standard	Air pollutants	Weight	Length	Fuel type	Flat level	Distance	Age of car	Business use	Applied to car price	Buyer attributes
Austria									X						
Belgium									X						
Bulgaria									X						
Croatia									X						
Cyprus									X						
Czechia									X						
Denmark									X						
Estonia									X						
Finland									X						
France									X						
Germany									X						
Greece									X						
Hungary									X						
Iceland									X						
Ireland									X						
Italy									X						
Latvia									X						
Lithuania									X						
Luxembourg									X						
Malta									X						
Netherlands									X						
Norway									X						
Poland									X						
Portugal									X						
Romania									X						
Slovakia									X						
Slovenia									X						
Spain									X						
Sweden									X						
Switzerland									X						
UK									X						
Total	0	0	0	0	0	0	0	0	31	0	0	0	0	0	0

Source: T&E compilation of national sources as of 1 September 2022.

2.1.8. Summary across seven forms of car taxation

Across systems of European car taxation, there are at least twelve different vehicle attributes used (Table 8). The use of certain vehicle attributes varies significantly between different forms of taxation. Energy excise duties are exclusively based on fuel type. In all examples, countries that provide tax benefits in the form of VAT deduction (21) and depreciation write-off (31) on corporate cars base the tax benefit on car price with a small group of countries applying a car price threshold to limit the benefit to luxury vehicles and/or differentiate the benefit by CO₂ emission intensity.

The most varied systems are found in car acquisition, car ownership, and benefit-in-kind taxation, where CO₂ emission intensity is the most commonly taxed vehicle attribute, followed by fuel type, engine power, and a long tail of other attributes. Purchase grants for low- and zero-emission cars are, by their nature, applied based on CO₂ emission intensity. Most of these systems apply a threshold on car price to determine eligibility. Besides car price, no additional vehicle attributes feature in the determination of car purchase grants.

Table 8: Forms of car taxation compared by vehicle attributes used as a taxable base

Country	CO ₂ emissions	Car price threshold	Engine power	Engine capacity	Euro standard	Air pollutants	Weight	Length	Fuel type	Flat level	Distance	Age of car	Business use	Applied to car price	Buyer attributes
Acquisition taxation	20	0	5	3	2	2	2	1	6	0	0	3	0	10	0
Purchase grants	23	16	0	0	0	0	0	0	0	0	0	0	13	2	5
Ownership taxation	23	0	7	5	2	0	3	0	9	1	0	5	1	0	0
Benefit-in-kind taxation	20	11	3	1	2	0	0	0	5	7	4	4	0	27	0
VAT deduction	3	4	0	0	0	0	0	0	1	0	0	0	27	21	0
Depreciation write-off	7	8	0	0	0	0	0	0	1	0	0	0	13	31	0
Energy excise duty	0	0	0	0	0	0	0	0	31	0	0	0	0	0	0

Source: T&E compilation of national sources as of 1 September 2022.

In terms of incentivising the zero-emission transition, some potential issues emerge from this comparison. Ten countries do not have any form of vehicle taxation (acquisition or ownership) directly linked to CO₂ emissions.

2.2. Comparing countries that tax the same vehicle attribute

The previous section identified some examples where multiple countries tax the same vehicle attribute for the same form of car taxation. Where this overlap is present, there is an opportunity to directly compare countries against each other to determine the shape and severity of their respective tax schedules.

However direct comparisons are not possible for all countries that tax the same vehicle attribute for the same form of car taxation (e.g. 18 countries tax CO₂ emission intensity as part of their acquisition tax). A direct comparison is not possible when there are multiple attributes used, for example one country levying an acquisition tax on CO₂ emission intensity and a second country levying an acquisition tax on CO₂ emission intensity applied to car price. In this example there are two units (€ and %) for the same tax on CO₂ emission intensity (this is overcome in section 2.3). As another example, a country might levy an acquisition tax with components for both CO₂ emission intensity and vehicle weight. To provide as much information as possible, this section maximises the number of countries in each comparison, at times isolating specific components of a country's tax system for inclusion (e.g. separating the two ownership taxes in Italy or removing the weight-based components in France). See the figure notes and text footnotes for more details.

These comparisons reveal that even when the same vehicle attribute is used for the same form of car taxation, there is an additional level of variation between countries in the shape of the tax schedule. These tax schedules can vary by the starting point (i.e. which vehicles are tax exempt), the slope (i.e. the severity of the tax with respect to additional CO₂ emissions), the steps (i.e. how many tax brackets there are), and the shape (i.e. whether certain levels are taxed disproportionately more or less).

2.2.1. Comparing car acquisition taxation by common taxable base

Nine countries⁵ have an acquisition tax that charges a specific financial amount on the CO₂ emission intensity of the vehicle. This is published as a tax schedule of rates (e.g. €500 for 120 g CO₂/km) and contrasts with an ad valorem tax on the car value which can also be levied on the CO₂ emission intensity of the vehicle found in other countries. In four of the nine countries (Netherlands, Portugal, Croatia and Lithuania), there are different rates for petrol and diesel vehicles, so petrol vehicles are chosen for comparability as they are the most common fuel type of new registrations.

In taxing the CO₂ emission intensity of new vehicles, most countries have opted for a highly non-linear approach that targets high polluting vehicles proportionately more (Figure 5). For France, this manifests as a steeply increasing tax curve from 170 g CO₂/km that levels off at 220 g CO₂/km.⁶

Of the nine countries, the Netherlands and Norway have the highest and near identical tax schedules per CO₂ emission intensity. France is close to the Netherlands and Norway in terms of the tax burden for the

⁵ Denmark has not been included in order not to distort the graph, as the registration tax is based on more than three components with deductions for low emissions.

⁶ France has an additional acquisition tax based on weight.

highest emitting cars, but has a small tax burden for the vast majority of new registrations as the tax curve sharply increases only after 170 g CO₂/km (i.e. has high convexity). This first group of countries is followed by Malta, where the tax burden starts to increase significantly from 180 g CO₂/km and with a large tax burden for the most polluting cars (~€30,000). The lowest tax schedules are in Lithuania, Slovenia and the UK. These low tax schedules are unlikely to influence behaviour.

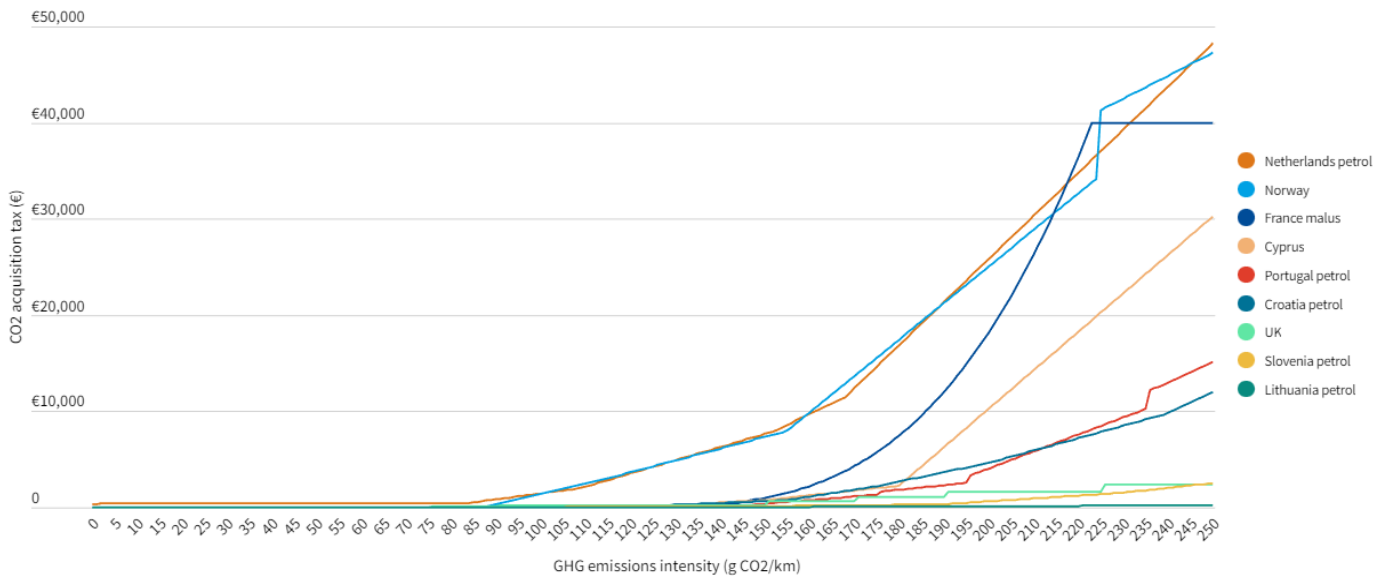


Figure 5: Acquisition tax by CO₂ emission intensity for each relevant European country

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: The graph only illustrates the acquisition tax component based on CO₂ emission intensity. France, Norway, Portugal and Croatia have an additional tax component based on a different variable.

Six more countries tax the CO₂ emission intensity of new vehicles as a percentage of car value (i.e. an ad valorem tax) and thus taxes expensive vehicles proportionately more. As ad valorem taxes are generally bounded (i.e. between 0% and 100%) their rates tend to be closer together and more easily comparable between countries.

However, even with only six countries applying bounded rates there are still visually distinct tax schedules (Figure 6) that vary by the starting point, the slope, the steps, and the shape. While the tax schedules intersect at points, Malta and Iceland have the highest tax schedule for high-emission cars, Ireland has the highest tax schedule for low-emission cars followed by Malta and Finland, and Spain has the lowest tax schedule for both high- and low-emission cars.

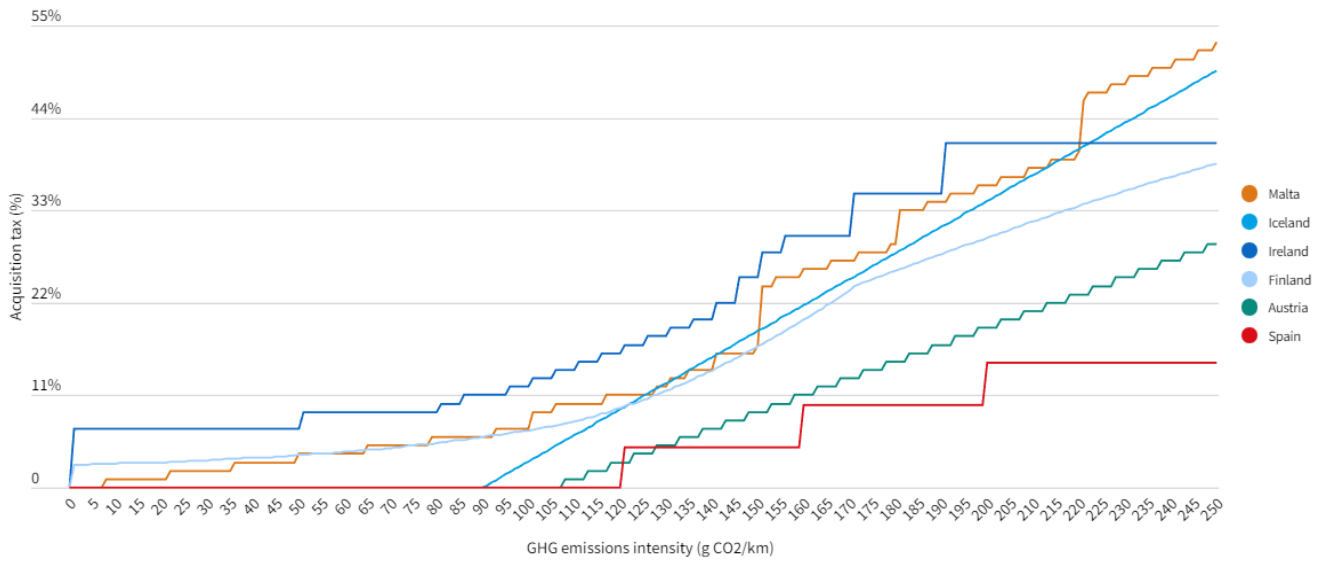


Figure 6: Acquisition tax, as a percentage of car value, by CO₂ emission intensity

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: The graph only illustrates the acquisition tax component based on CO₂ emission intensity. Ireland and Malta have an additional tax component based on a different variable.

Besides the CO₂ emission intensity of new vehicles, engine power is another common attribute with three countries taxing on this basis. All three countries levy the tax as a specific financial amount on the engine power of the vehicle. Both Belgium and Slovakia levy a rate in a stepwise manner, with Belgium the higher of the two. Italy applies a tax formula that increases with each unit (of engine power) with a higher tax burden than Belgium and Slovakia at a low level of engine power and a lower tax burden than Belgium and Slovakia at a high level of engine power.

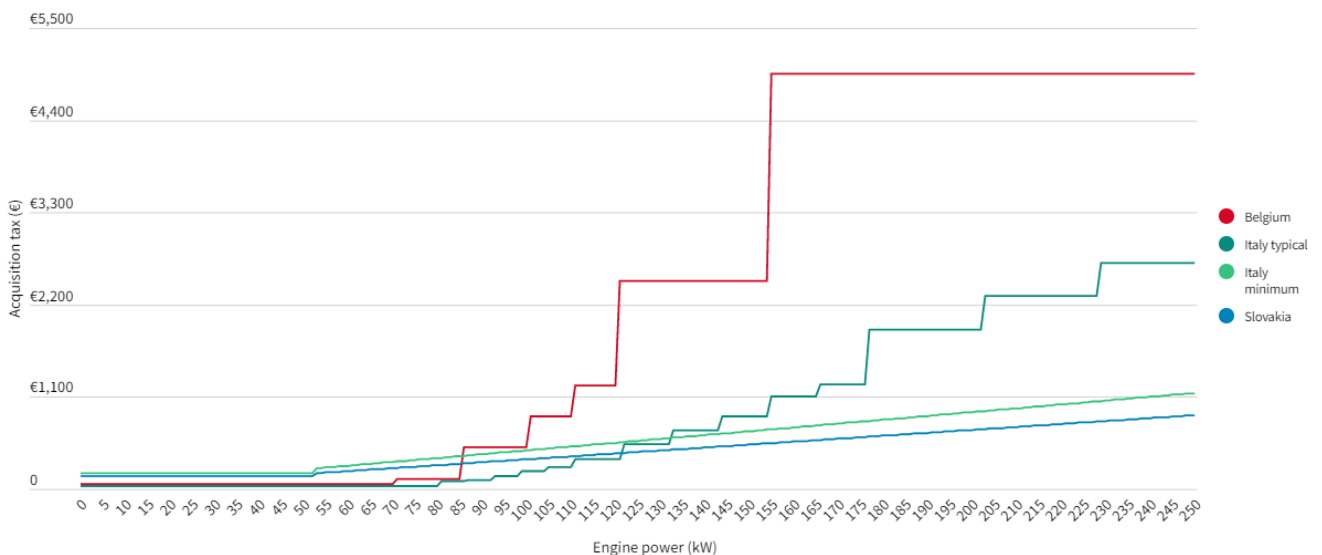


Figure 7: Acquisition tax by engine power for each relevant European country

Source: T&E analysis based on national sources as of 1 September 2022.

The use of other vehicle attributes as a taxable basis for car acquisition taxation (e.g. air pollutants, weight, length) are less common and are therefore not compared in this section.

2.2.2. Comparing purchase grant policies

The 23 countries with purchase grants for zero-emission cars (Table 10) frequently use additional policy criteria such as price thresholds (16), private or corporate registration (12), and an additional bonus for scrapping an old, polluting vehicle (8).

The largest purchase grants are for zero-emission cars and are found in Malta (€11,000), Romania (€10,200 / RON 51,000), and Croatia (€9,283 /HRK 70,000). These countries have low to middle uptake of zero-emission cars for Europe as a whole, but high uptake for their region. The purchase grants in Norway and Iceland, as they are implemented as a VAT exemption, can also reach high levels for expensive vehicles (Section 2.3.2).

In some countries, the size of the funding pot is more relevant than the size of the purchase grant for each car. While many countries (17) limit the available funding for purchase grants, in three countries the available funding is so limited that the funding is exhausted in a matter of days.

There is also significant variation between countries in terms of who applies for the grant and who receives the grant (e.g. the car seller or buyer; the lessor or the lessee), when the grant is received (e.g. whether it is at the point of purchase or applied for), and if a minimum ownership period is required. The latter policy has become popular as a means to combat arbitrage through the export of subsidised vehicles through second-hand transfer or sale. In Germany, where 20% of registered EVs have left the country, there are plans to lengthen the minimum ownership period from six months to twelve months.[14]

There are ten countries with purchase grants for low-emission cars (<50 g CO₂/km) (Table 11), nine of which have a different level of support than their purchase grants for zero-emission cars. As these purchase grants have primarily been used for the PHEVs, several countries have recently ended their low-emission purchase grants due to the high real-world emissions of PHEVs.[15] As a result, the majority of countries with purchase grants for zero-emission cars do not offer purchase grants for low-emission cars (10 with/13 without).

France, Italy, and Romania are the only countries with purchase grants for conventional ICE vehicles (Table 9). These purchase grants are available up to a certain CO₂ emission intensity (up to 135 g CO₂/km in Italy and up to 120 g CO₂/km in Romania) with the scrapping of an old, polluting vehicle.

Table 9: Comparison of purchase grants for conventional ICE vehicles

Country	Private car	Corporate car	Price threshold	Scrapped car conditions	New car conditions
France	€0, €1,500, or €3,000 based on income and usage	-	-	>Crit'Air 2	<127 g CO ₂ /km + Crit'air 1
Italy	€2,000	-	€35,000 +VAT	<Euro 5	<135 g CO ₂ /km
Romania	€1,500 (RON 7,500)	€1,500 (RON 7,500)	-	>6 years	<120 g CO ₂ /km

Source: T&E compilation of national sources as of 1 September 2022.

Table 10: Comparison of main purchase grants for zero-emission cars (0 g CO₂/km)

Country	Private car	Corporate car	Price threshold	Scrapping bonus	Funding limit
Austria	€3,000	€1,000	€60,000	-	€45m
Belgium					
Bulgaria					
Croatia	€9,283 (HRK 70,000)	€9,283 (HRK 70,000)	40%	-	€14m (exhausted)
Cyprus					
Czechia*	-	€12,175	-	-	€24.4m
Denmark					
Estonia	€5,000	-	-	-	Exhausted
Finland	€2,000	-	€50,000	-	€6m
France	€6,000/€2,000	€4,000/€2,000	€47,000/€60,000	€2,500	Open
Germany**	€6,000/€5,000	€6,000/€5,000	€40,000/€65,000	-	€5,000m
Greece	€8,000	€8,000	€50,000	€1,000	€50m
Hungary					
Iceland***	24% VAT	24% VAT	€45,650	-	Open
Ireland	€2,000-€5,000	-	€14,000-€20,000	-	€100m
Italy	€3,000	-	€35,000	€2,000	€650m
Latvia	€4,500	-	€50,000	€1,000	€10m for 2 years
Lithuania	€5,000	€4,000	-	€1,000	€50m for 4 years
Luxembourg	€8,000	€8,000	-	-	Open
Malta	€11,000	€11,000	-	€1,000	€15m
Netherlands	€3,350	-	€45,000	-	€71m (exhausted)
Norway	25% VAT	25% VAT	-	-	Open
Poland	€4,125 (PLN 18,750)	€5,940 (PLN 27,000)	€49,500	-	€154m
Portugal	€4,000	-	€62,500	-	€5.2m/1,300 cars
Romania	€10,200 (RON 51,000)	€10,200 (RON 51,000)	-	Multiple	€82m
Slovakia					
Slovenia	€4,500	-	€65,000	-	Open
Spain**	€4,500	€2,900	€45,000	€2,500/€1,100	€400m for 2 years
Sweden	€6,790 (SEK 70,000)	€6,790 (SEK 70,000)	€67,900	-	Open
Switzerland					
UK					

Source: T&E compilation of national sources as of 1 September 2022. *Municipalities, state-owned enterprises, public institutions, non-profit organisations. **Manufacturer component excluded. ***Maximum deduction of ~€11,000

Table 11: Comparison of main purchase grants for low-emission cars (<=50 g CO₂/km)

Country	Private car	Corporate car	Price threshold	Scrapping bonus	Eligibility
Austria	€1,250	€500	€60,000	-	>50km electric range
Belgium					
Bulgaria					
Croatia	€5,304 (HRK 40,000)	€5,304 (HRK 40,000)	40%	-	<50 g CO ₂ /km
Cyprus					
Czechia					
Denmark					
Estonia					
Finland					
France	€1,000	€1,000	€50,000	€2,500	<50 g CO ₂ /km; >50km urban electric range
Germany*	€4,500/€3,750	€4,500/€3,750	€40,000/€65,000	-	Or >60km electric range
Greece					
Hungary					
Iceland					
Ireland					
Italy	€2,000	-	€45,000	€2,000	21 - 60 g CO ₂ /km
Latvia	€2,250	-	€50,000	€1,000	-
Lithuania					
Luxembourg					
Malta	€11,000	€11,000	-	€1,000	>30km electric range
Netherlands					
Norway					
Poland					
Portugal					
Romania	€5,200 (RON 26,000)	€5,200 (RON 26,000)	-	Multiple	<80g CO ₂ /km
Slovakia					
Slovenia					
Spain*	€2,500	€1,700	€45,000	€2,500 / €600	>30km electric range
Sweden	Variable	Variable	-	-	<50 g CO ₂ /km
Switzerland					
UK					

Source: T&E compilation of national sources as of 1 September 2022. *Manufacturer component not included.

2.2.3. Comparing car ownership taxation by common taxable base

More European countries have car ownership taxes in place (27) than acquisition taxes (22). While fewer European countries base their ownership tax (14) on CO₂ emission intensity than their acquisition tax (18), because no ownership tax is based on car value, many more of the taxes based on CO₂ emission intensity are directly comparable. In total, thirteen countries are directly comparable. Of these countries, France stands out for having the highest annual tax burden, although the French ownership tax only applies to corporate cars (*Taxe sur les véhicules des sociétés*) and private cars are completely exempt (Figure 8). Among the other countries, the tax burden is fairly low and there is a roughly equal split between countries that levy tax in a stepwise manner and those using a tax formula that increases with each unit (of engine power).

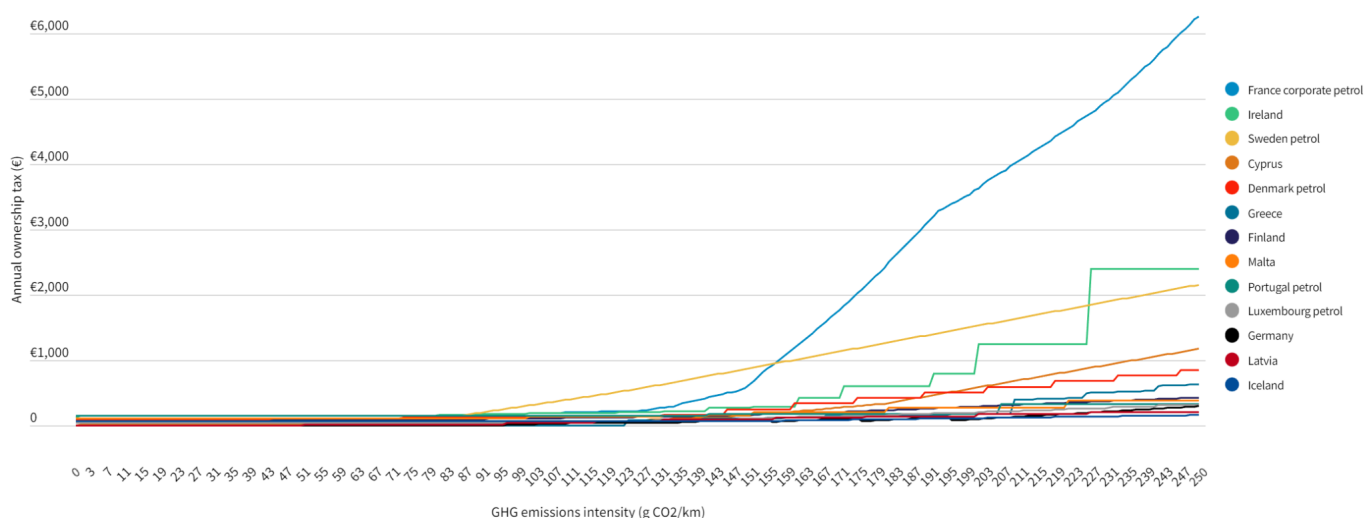


Figure 8: Ownership tax by CO₂ emission intensity for each relevant European country

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: Sweden ownership tax decreases after 3 years. The graph only illustrates the ownership tax component based on CO₂ emission intensity. Germany and Portugal have an additional tax component based on a different variable.

Like car acquisition taxes, for car ownership tax the second most common vehicle attribute for a tax base is engine power. In total, four countries are directly comparable. Also like the car acquisition taxes on engine power, the four country examples reveal four visually distinct tax schedules (Figure 9) that vary by the starting point, the slope, the steps, and the shape). Belgium and Croatia both apply an ownership tax in a stepwise manner with Croatia levying a higher tax burden on most vehicles and Belgium levying a higher tax burden on only the most powerful engines (the two tax schedules intersect at 170 KW). The car ownership tax in Hungary applies a tax formula that increases with each unit (of engine power) and is the lowest tax burden of the four countries at all levels of engine power. Italy also uses a tax formula that increases with each unit (of engine power) but there is a ‘step’ in the tax schedule at 185 KW when an additional tax (*Superbollo*) kicks in.

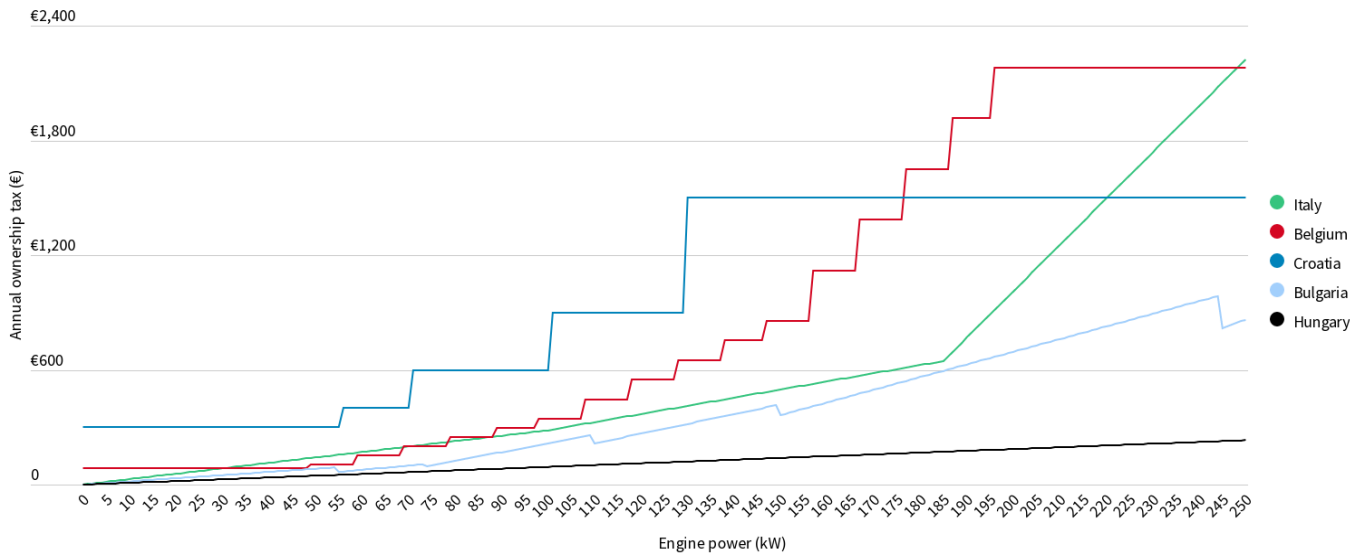


Figure 9: Ownership tax by engine power for each relevant European country

Source: T&E analysis based on national sources as of 1 September 2022.

Engine capacity is another common vehicle attribute for car ownership taxation in Europe and three countries - Romania, Slovenia, and Slovakia - are directly comparable (Figure 10). All three countries apply their car ownership tax in a stepwise manner and the tax schedules intersect at multiple points. In general, Slovenia has the highest tax burden of the three countries at small sizes of engine capacity, Romania at the largest sizes, and Slovakia for the middle sizes.

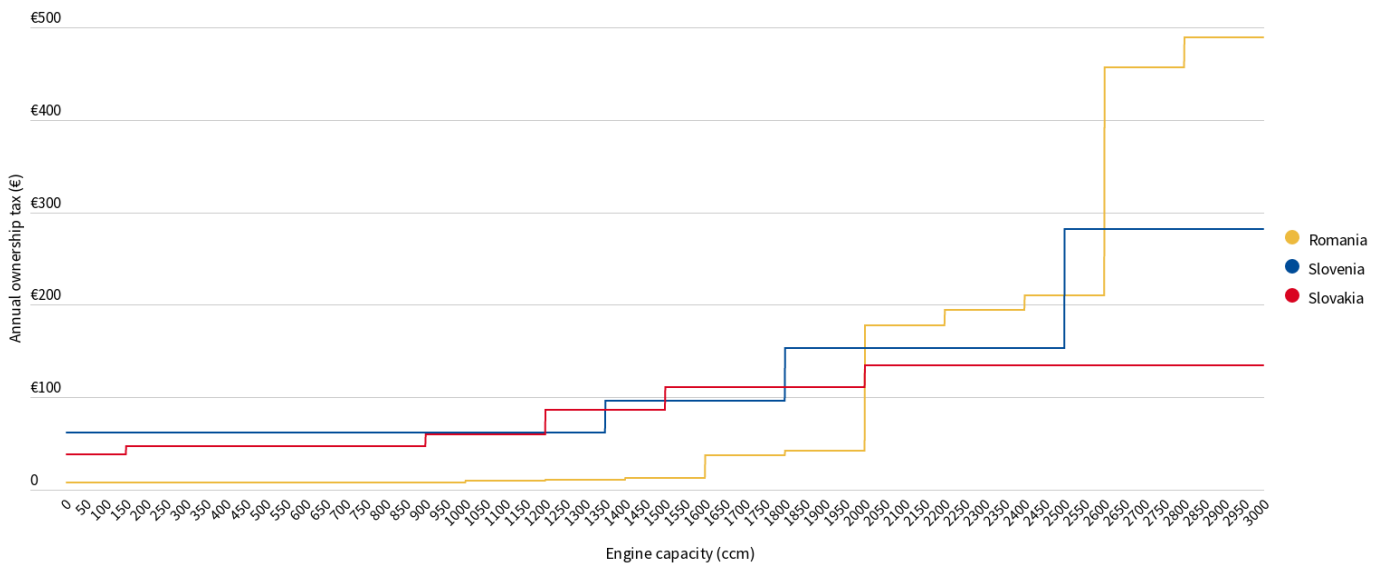


Figure 10: Ownership tax by engine capacity for each relevant European country

Source: T&E analysis based on national sources as of 1 September 2022.

The use of other vehicle attributes as a taxable basis for car ownership taxation (e.g. weight, fixed rate) are less common and are therefore not compared in this section.

2.2.4. Comparing benefit-in-kind taxation by common taxable base

Due to the nature of the tax as a means of treating salary cars as an alternate form of income, most (27) European countries determine benefit-in-kind taxation as a percentage of car value. However to achieve policy goals, most European countries have included vehicle attributes in the calculation of benefit-in-kind taxation. The inclusion of vehicle attributes, particularly CO₂ emission intensity, is also in recognition that as benefit-in-kind taxation is applied as a percentage of car value, low- and zero-emission cars - which tend to cost more - will face a higher tax burden. The most common attributes, like acquisition and ownership taxation are CO₂ emission intensity and engine power.

Seven countries - including several of the largest car markets in Europe - are directly comparable as they levy benefit-in-kind taxation as a percentage of car value that increases with CO₂ emission intensity (Figure 11). Nearly all countries apply the tax in a stepwise manner with a small number of thresholds (e.g. three tax bands for zero-emission, low-emission, and high-emission cars). The UK is an exception by applying a tax formula that increases with each unit (of CO₂ emission intensity). The UK's benefit-in-kind taxation is also the steepest tax schedule.

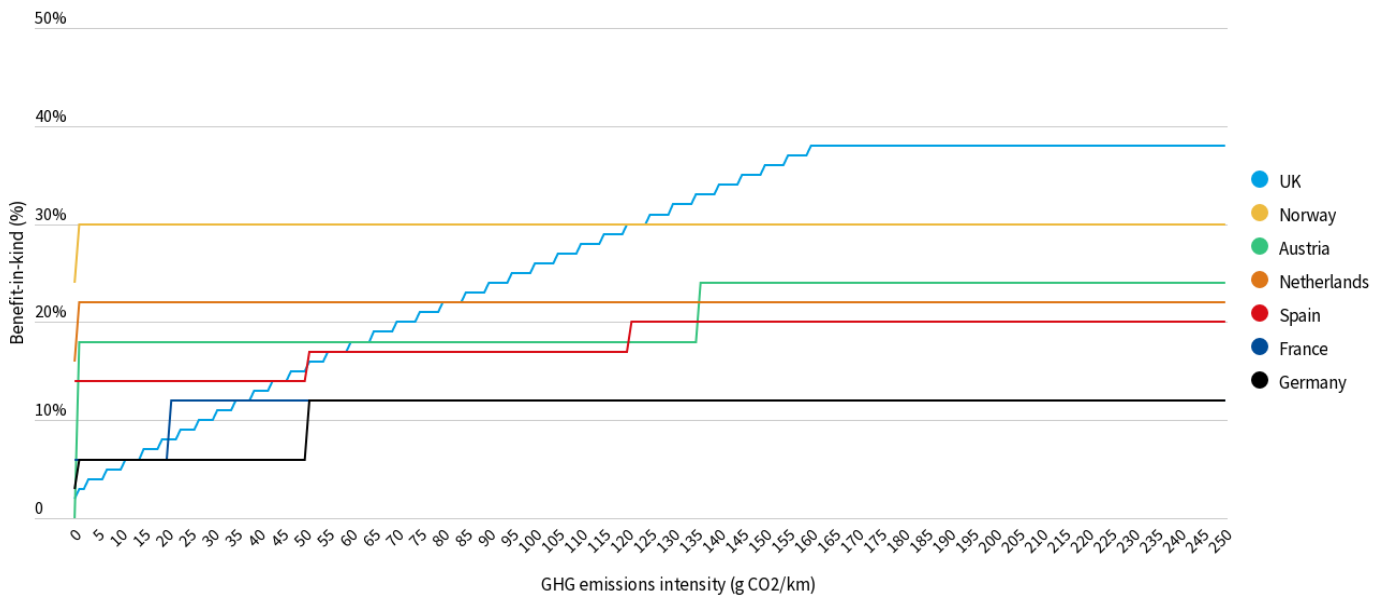


Figure 11: Benefit-in-kind, as a percentage of car value, by CO₂ emission intensity for each relevant European country

Source: T&E analysis based on national sources as of 1 September 2022.

Engine power is used as a tax base for benefit-in-kind taxation in three countries: Estonia, Poland, and Hungary. Both Poland and Hungary apply the tax in a stepwise manner with a small number of thresholds (two for Poland and four for Hungary) with Poland levying a higher tax burden across the entire spectrum of engine power (Figure 12). Estonia applies a tax formula that increases with each unit (of engine power) starting from a very small tax burden for the least powerful engines to a large tax burden for the most powerful engines.

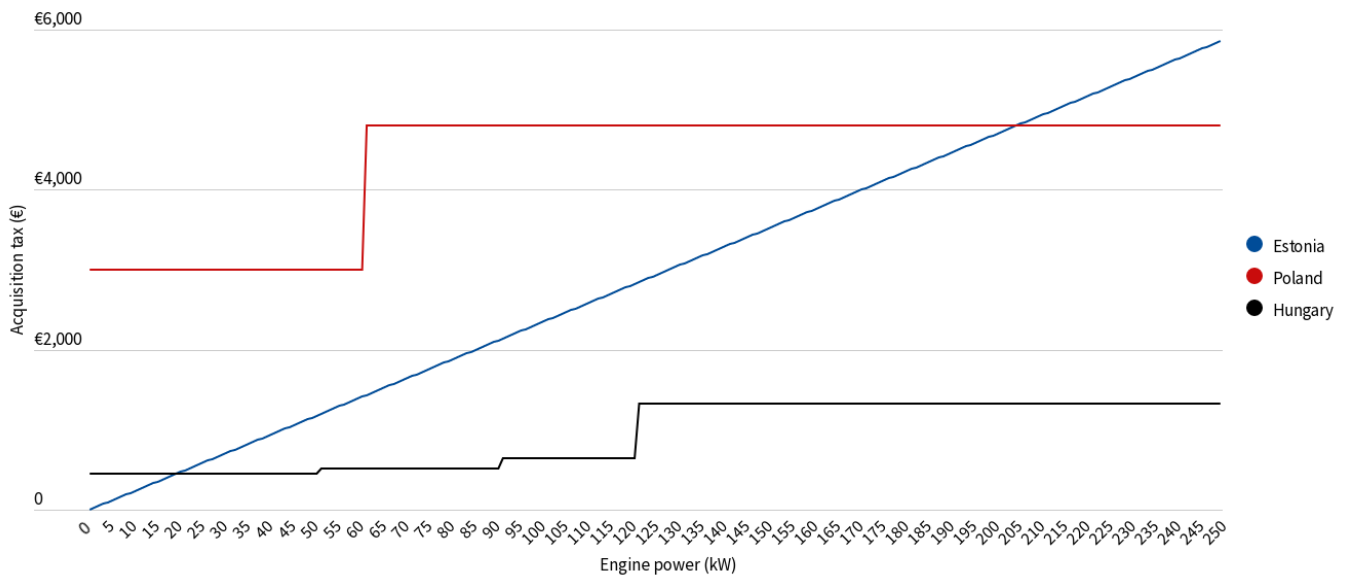


Figure 12: Benefit-in-kind by engine power for each relevant European country

Source: T&E analysis based on national sources as of 1 September 2022.

There are six countries that apply a fixed rate on car value but no other vehicle characteristic. For these countries, benefit-in-kind taxation is simply applied as a percentage of car value. Like all other forms of benefit-in-kind taxation, the tax burden still varies by vehicle with most expensive vehicles facing a larger tax burden.

Of the countries that apply a fixed rate on car value, Romania has the highest tax burden (20.4%) and Lithuania has the lowest (9.0%) (Figure 13). Three of the six countries apply a benefit-in-kind tax rate of 12%, or 1% per month, which is also commonly used in some of the taxes based on CO₂ emission intensity (e.g. in Germany and France).

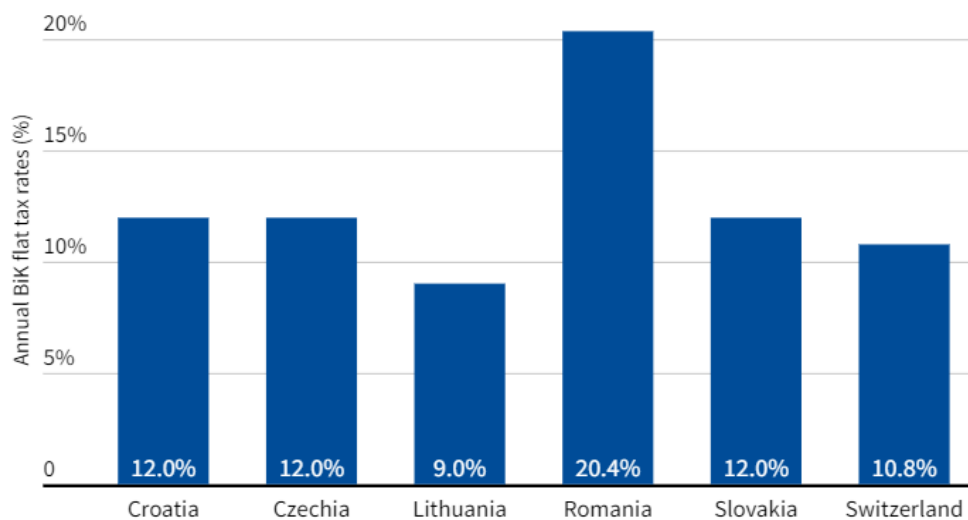


Figure 13: Benefit-in-kind, as a percentage of car value, for each relevant European country

Source: T&E analysis based on national sources as of 1 September 2022.

The use of other vehicle attributes as a taxable basis for car ownership taxation (e.g. engine capacity, distance) are less common and are therefore not directly compared in this section.

2.2.5. Comparing VAT deduction policies

Of the 31 countries, 21 allow corporate entities to deduct VAT from the purchase of corporate cars (Table 11). For some countries, VAT deduction policy is also based on whether or not the car is leased, for example a policy whereby 50% of the cost of leasing a vehicle is deductible (e.g. Ireland, Sweden, the UK). All countries (31) allow for VAT deduction for transport business (e.g. leasing companies, taxi services, rent-a-car, driving schools).

In most countries (17), a distinction is made between corporate cars used exclusively for business purposes and corporate cars used privately. Some countries (10) specify a predetermined level of VAT deduction for privately used corporate cars at the point of purchase, other countries (5) request that private usage is declared by the corporate entity and subsequently adjust the VAT deduction, and a few countries (2) specify a default level of private usage that is then adjusted based on corporate declarations.

Table 11: VAT deduction policy by country

Country	Business use deduction	Private use deduction	Differentiation
Austria	0% / 100% for ZEV	0% / 100% for ZEV	CO ₂ emission intensity, price
Belgium	50%	Business usage (35% default)	Business usage (real)
Bulgaria	0%	0%	*
Croatia	50%	50%	-
Cyprus	0%	0%	*
Czechia	100%	Business usage	Business usage (real)
Denmark	0%	0%	*
Estonia	100%	50%	If any private usage
Finland	100%	0%	If any private usage
France	0%	0%	*
Germany	100%	Business usage	Business usage (real)
Greece	0%	0%	*
Hungary	0%	0%	*
Iceland	100%	0%	If any private usage/**
Ireland	20%	14%	If any private usage, CO ₂ emission intensity (<140 g CO ₂ /km)
Italy	100%	40%	If any private usage
Latvia	100%	50%	If any private usage, price threshold (<€50,000)
Lithuania	0%	0%	*
Luxembourg	100%	Business usage	Business usage (real)
Malta	0%	0%	*
Netherlands	100%	Business usage	Business usage (real)
Norway	0%	0%	*
Poland	100%	50%	If any private usage
Portugal	Variable by fuel type	Variable by fuel type	Fuel type, price
Romania	100%	50%	If any private usage
Slovakia	100%	Business usage	Business usage (real)
Slovenia	0% / 100% for ZEV	0% / 100% for ZEV	CO ₂ emission intensity, price
Spain	100%	Business usage (50% default)	Business usage (real)
Sweden	0%	0%	*
Switzerland	100%	100% (of 10.8% taxable basis)	If any private usage
UK	100%	0%	If any private usage

Source: National sources as of 1 September 2022. *Allowable for transport businesses. **VAT exemptions for ZEVs

2.2.6. Comparing depreciation write-off policies

All 31 countries allow corporate entities to write-off the depreciation of corporate cars (Table 12). The speed of depreciation (and thus the annual depreciation allowance) using straight line depreciation varies greatly between countries, with a low of one year (as a form of ‘superdepreciation’ for zero-emission cars) to a high of 17 years. Other variations include the method of depreciation (with straight line, declining balance, accelerated, or a choice of method allowed), and what costs can be included in depreciation write-offs (typically only purchase costs, but sometimes repair, maintenance, and energy costs can be included).

As noted in the attribute comparison (Section 2.1.6.), depreciation policy is typically less differentiated than other policies with respect to vehicle attributes. This is true even with respect to business use where countries follow more similar patterns than VAT deductions. All 31 countries allow for full depreciation write-off (i.e. 100%) for cars used exclusively for business purposes. Full depreciation write-off is also common for privately used cars (17 countries), as is basing the share on private usage (8 countries), and exclusion (i.e. 0%) from depreciation write-off allowance (5 countries). Italy is the only country that specifies percentage shares of allowable depreciation write-off. Although this practice of specifying rates is common for VAT deduction, VAT is paid at the point of sale, prior to any vehicle usage, whereas depreciation write-offs are incorporated annually through corporate taxation and can therefore be better linked to vehicle usage.

Table 12: Depreciation write-off policy by country

Country	Business rate	Private rate	Speed (years)	Level (€)
Austria	100%	0%	8	<€40,000
Belgium	100%	Private usage	5	Formula based on CO ₂ emissions
Bulgaria	100%	Private usage	4	-
Croatia	100%	0%	5	-
Cyprus	100%	Private usage	5	-
Czechia	100%	100%	5	-
Denmark	100%	Private usage	4	-
Estonia	100%	100%	Flexible	-
Finland	100%	0%	4	-
France	100%	100%	4-5	Four thresholds by CO ₂ emissions
Germany	100%	0%	6	-
Greece	100%	100%	Varies by CO ₂ emissions	-
Hungary	100%	100%	5	-
Iceland	100%	100%	5-10	-
Ireland	100%	Private usage	8 (1 for 0 g CO ₂ /km)	Four thresholds by CO ₂ emissions
Italy	100%	70% fringe benefit, 20% fully private	5	Non-instrumental use: <€18,076 purchase, <€3,615 rental
Latvia	100%	100%	5	<€50,000
Lithuania	100%	100%	6	-
Luxembourg	100%	100%	Flexible	-
Malta	100%	Private usage	5	-
Netherlands	100%	100%	5	-
Norway	100%	100%	5	-
Poland	100%	100%	5	<€33,000 for >0 g CO ₂ /km, <€49,500 for 0 g CO ₂ /km
Portugal	100%	100%	4	<€25,000 ICE, <€50,000 PHEV, <€62,500 BEV
Romania	100%	100%	4	<€14,400
Slovakia	100%	100%	4 (2 for EVs)	<€48,000
Slovenia	100%	100%	5	-
Spain	100%	0%	6-14	-
Sweden	100%	100%	5	-
Switzerland	100%	Private usage	5	-
UK	100%	Private usage	17 (1 for 0 g, 6 for 1-50 g)	-

Source: T&E analysis based on national sources as of 1 September 2022.

2.2.7. Comparing taxation by energy source

Nearly all European countries (29) apply different levels of fuel excise duty per litre of petrol and diesel fuel, with Belgium and the UK as the only exceptions (Figure 14). The vast majority of countries (26) apply a higher fuel excise duty on petrol, with only three countries (Iceland, Switzerland, and Slovenia) applying a higher excise duty on diesel.⁷ This incentivisation of diesel fuel contrasts with many acquisition, ownership, and benefit-in-kind taxes, where diesel vehicles are often disincentivised through higher tax schedules compared to petrol vehicles. Twelve countries generate mixed incentives by applying a lower tax schedule on diesel fuel compared to petrol fuel, but a higher tax schedule on diesel vehicles compared to petrol vehicles.

In response to the dramatic rise in fuel prices in early 2022, many countries reduced fuel excise duties to support drivers of petrol and diesel vehicles. These tax cuts have come at a significant financial loss to the government, currently estimated at €30 billion⁸ and growing.^[13] Some countries (Slovenia, Germany) have allowed these tax cuts to expire, but most countries have extended the measures and in France the size of the cut was increased.

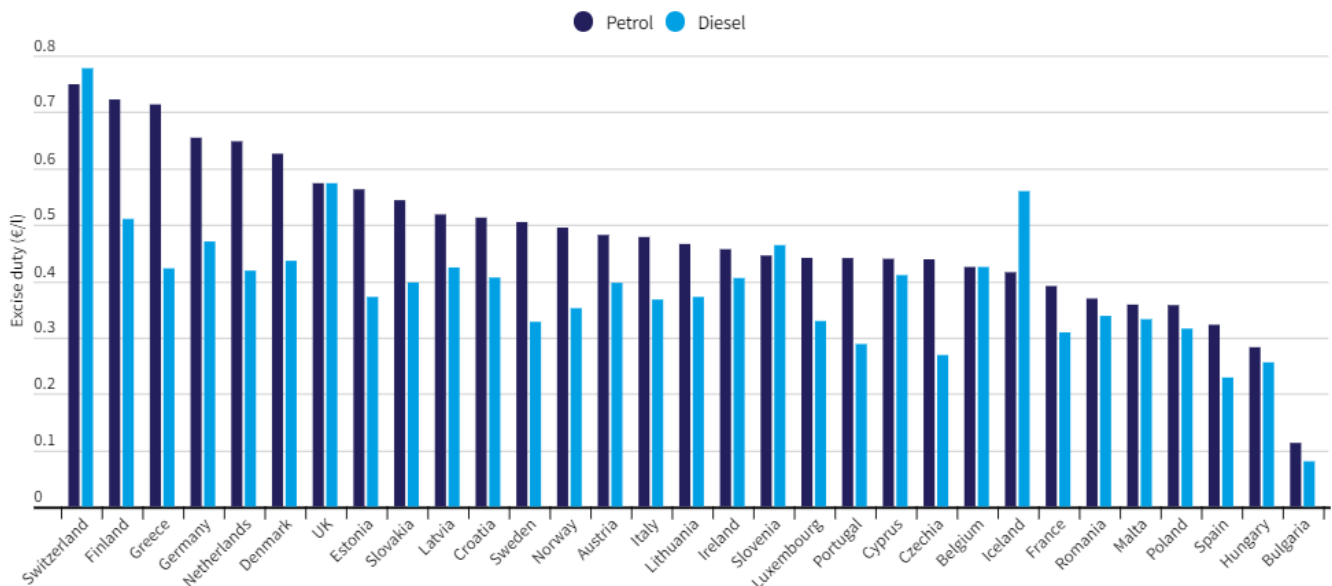


Figure 14: Petrol and diesel excise duties

Source: T&E calculations compiled from the European Commission’s Oil Bulletin and national sources.

Notes: Calculations exclude VAT.

Using the current fuel excise duties,⁹ Switzerland, Finland, Greece, Germany and the Netherlands levy the highest rates of petrol excise duty (0.65-0.75 €/l) while Bulgaria, Hungary, Spain, Poland and Malta levy

⁷ As diesel is a denser fuel than petrol, an equivalent excise duty between the two fuels based on energy content would lead to a ~15% higher excise duty on diesel per litre of liquid fuel.

⁸ Across the 31 countries (EU and non-EU) covered in this report.

⁹ 1 September 2022, as in the rest of this report.

the lowest rates (0.11-0.36 €/l).¹⁰ There is some, but not complete, overlap with diesel excise duty, where Switzerland, the UK, Iceland, Finland, Germany and Slovenia levy the highest rates of diesel excise duty (0.46-0.78 €/l) while Bulgaria, Spain, Hungary, Czechia, Portugal, and France levy the lowest rates (0.08-0.31 €/l).

Some of the lowest fuel excise duties, particularly after the reductions in early 2022, are below the legal minimums of 0.359 €/l for petrol and 0.33 €/l for diesel in the European Tax Directive (ETF).[16]

The largest difference between fuel excise duties is found in Greece, Czechia, Netherlands, Sweden, and Portugal, where the petrol excise duty is 53-69% higher than the diesel excise duty. Iceland is the only country where the diesel excise duty is significantly higher (35%) than the petrol excise duty.

Comparing electricity taxes between European countries reveals a wide range in tax levels (Figure 15) – much wider than fuel excise duties. Denmark, Germany, Switzerland, Belgium and Spain levy the highest rates of electricity tax (0.17-0.23 €/kwh), while Hungary, Bulgaria, Malta, Iceland, and Czechia levy lowest rates (0.01-0.02 €/kwh).

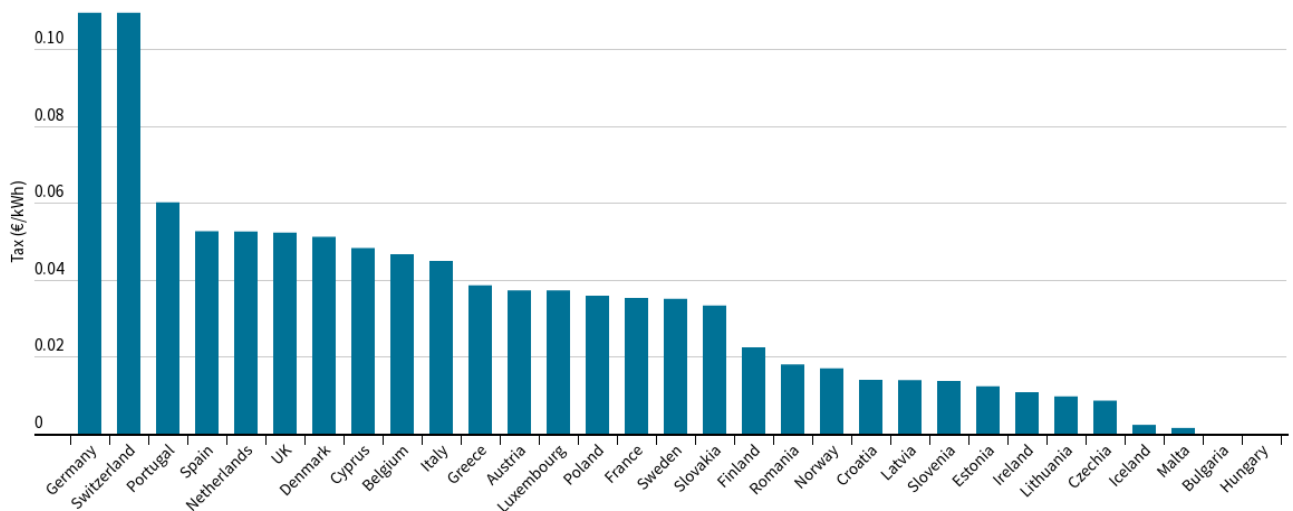


Figure 15: Electricity taxes

Source: T&E calculations based on the difference between before tax and after tax electricity prices in Eurostat

Notes: Based on energy band DD (5 000 kWh < Consumption < 15 000 kWh). Calculations exclude VAT.

Converting fuel excise duties (levied as €/l) and electricity taxes (levied as €/kwh) to the same unit of energy (€/MJ) reveals that the different energy sources are taxed within a similar range, with electricity taxes below diesel excise duties in 18 countries and above diesel excise duties in 13 countries (24 and 7 for petrol excise duties) (Figure 16).¹¹ As explained in the comparison of vehicle attributes (Section 2.1.7.), electricity tax is distinct from fuel excise duties in several ways.

¹⁰ Calculated using the difference between before and after tax prices excluding VAT as recorded in the European Commission’s Weekly Oil Bulletin.

¹¹ Using conversions of 41.031 litres to MJ for diesel, 36.006 litres to MJ for petrol, and 3.6 kwh to MJ.

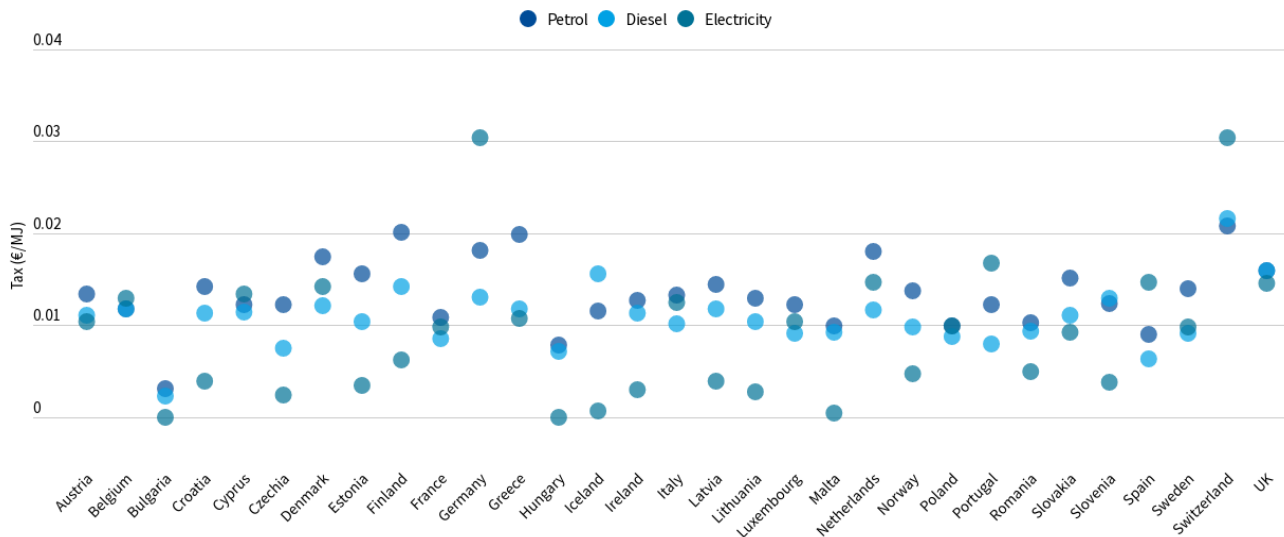


Figure 16: Fuel excise duties and electricity taxes by common unit of energy

Source: T&E analysis based on national sources as of 1 September 2022.

The differences between countries in terms of the relative favourability of electricity versus liquid fuel is also influenced by the energy efficiency of cars powered by electricity versus those powered by liquid fuel (or both). The comparison of taxation per unit of distance for both liquid fuel, electric, and hybrid powertrain in the next section (2.3.7.).

2.3. Comparing countries by the resulting tax burden on typical car models

The previous sections illustrated the diversity present in systems of car taxation across Europe. By levying car taxes on different vehicle attributes (e.g. CO₂ emission intensity, engine power) and using different methods (e.g. as a fixed amount, as a percentage of car value), most tax systems cannot be directly compared.

To overcome this challenge with direct comparability, a series of illustrative examples can be used to calculate the tax burden related to the ownership and usage of the same vehicle in each country. For this report, five typical vehicles are used to calculate the comparative tax burden in each European country. The five vehicles cover two different fuel types for a small car (BEV and petrol) and three different fuel types for a compact SUV (BEV, PHEV, and petrol).¹² These typical car models cover a range of vehicle attributes including size, fuel type, and CO₂ emission intensity, within the range of common purchases (Table 13). The vehicle attributes do not align with any one specific model, but are an approximate average across multiple brands and models of the particular segment and fuel type.¹³

¹² No PHEV model is used for the small car as few, if any, are commercially sold.

¹³ The disadvantages of using vehicle attributes for a specific model, for example a Dacia Sandero, is that it may be a common registration in one country and one tax system but not in another. Additionally, with so many model variants available, the chosen vehicle attributes may not provide any benefit to the reader in familiarity.

The most common registrations used to generate the five typical car models are:

- **B segment BEV:** Renault Zoe, Peugeot 208, Mini One, Opel e-Corsa, BMW I3, Honda E
- **B segment petrol:** Dacia Sandero, Renault Clio, Toyota Yaris, Citroen C3, Opel Corsa, Peugeot 208, VW Polo
- **C segment SUV BEV:** VW ID.4, Kia Niro, Mercedes EQA, Ford Mustang Mach-E, MG ZS, Audi Q4 E-tron, Mazda MX-30, Volvo XC40
- **C segment SUV PHEV:** Ford Kuga, Peugeot 3008, Volvo XC40, BMW X1, Jeep Compass, Hyundai Tucson
- **C segment SUV petrol:** VW Tiguan, Hyundai Tucson, Nissan Qashqai, Peugeot 3008, Kia Sportage, Skoda Karoq, Volvo XC40

Table 13: Vehicle attributes used in the tax burden comparisons

Attribute	Small car (B segment)		Compact SUV (C segment)		
	BEV	Petrol	BEV	PHEV	Petrol
Fuel type	BEV	Petrol	BEV	PHEV	Petrol
List price (€ excluding VAT)	24,000	14,000	37,500	36,000	33,000
CO₂ emission intensity (g CO₂/km WLTP)	0	110	0	40	150
Engine capacity (cc)	0	999	0	1.700	1.400
Engine power (kW)	100	65	135	155	110
Weight (kg)	1,500	1,100	1,700	1,800	1,600
NOx emission intensity (mg/km)	0	70	0	50	90
Length (mm)	4,050	4,050	4,500	4,450	4,500
Cylinders (number)	.	3	-	4	4
Electric range (km)	300	-	500	55	-
Car related expenses for private use (€)*	4,500	3,500	7,000	7,000	7,000
Fuel efficiency (l/100 km)	-	5.5	-	5.5- 7.5	7.5
Electricity efficiency (Wh/km)	165	-	185	200	-
Battery capacity (kwh)	50	-	90	11	-

Source: approximate average across multiple brands and models of the particular segment and fuel type. Data obtained from the car manufacturers' website in the car specifications section.

* Used for BiK calculations in Bulgaria. Data obtained from the Ministry of Economy and Industry ([link](#)).

2.3.1. Comparing car acquisition taxation for typical car models

Car acquisition taxation varies significantly for the same typical car models across European countries (Figure 17). At the extremes, a typical compact petrol SUV faces a tax burden over 1000x higher in Denmark than Lithuania (€41,800 vs €33). Nine countries – nearly one-third of the countries – do not have any acquisition taxation.

While eleven countries levy a significant tax (>5%, i.e. >€1,650) on large petrol vehicles (compact petrol SUV), only five countries reach a significant tax on small petrol vehicles (small petrol car) considering the same threshold for financial amount (>€1,650) or eight countries considering the same threshold as a percentage of vehicle cost (>5%). This is due to the fact that small petrol vehicles are less than half the cost of large ones.

There is evidence of differentiation between typical car models, with the compact petrol SUV facing the highest acquisition tax and BEVs (both models) typically exempt from any tax burden in most countries. There is some variation between countries in the tax burden faced by large PHEVs and small petrol vehicles. In ten countries large PHEVs face a higher acquisition tax burden (i.e. the blue dot is higher than the light grey dot in Figure 16) and in seven countries small petrol vehicles face a higher acquisition tax burden (i.e. the light grey dot is higher than the blue dot in Figure 17).

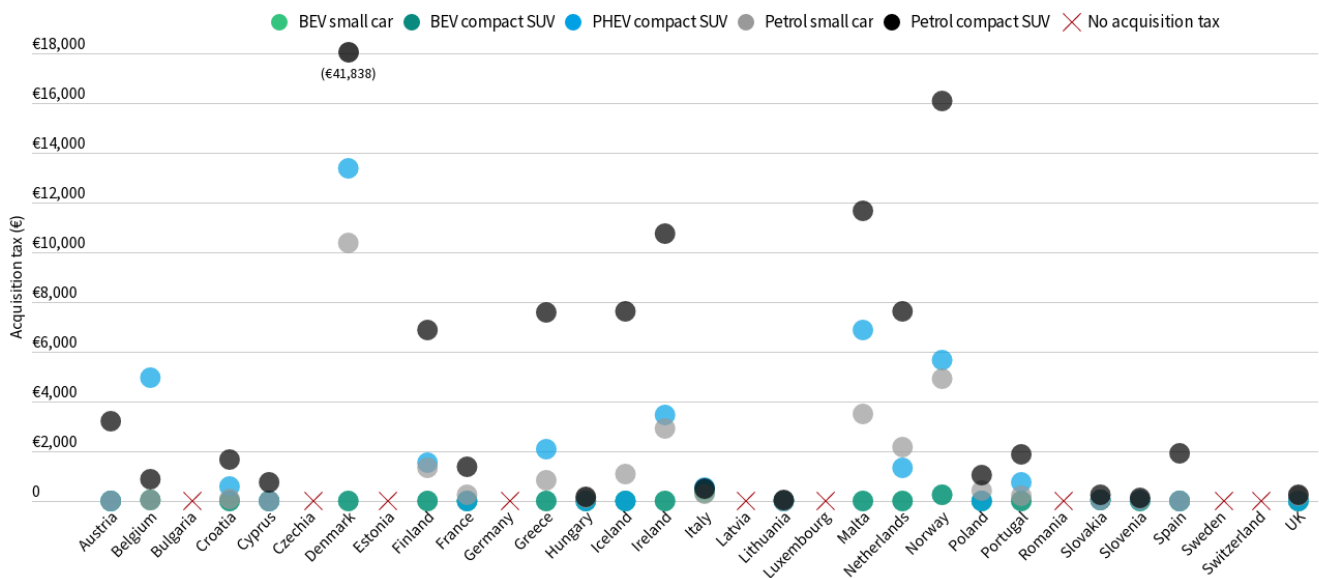


Figure 17: The acquisition tax burden on a new car by typical model

Source: T&E analysis based on national sources as of 1 September 2022.

For some countries, the differentiation in acquisition tax burden between typical models is very small and therefore unlikely to incentivise change. This includes countries like France and the UK that, at least on paper, have acquisition taxes that target differentiation by CO₂ emission intensity (e.g. *bonus-malus* and *vehicle excise duty*). This finding emphasises the importance of numerical comparison in addition to standard descriptive comparison.

Although several of the acquisition taxes are levied as excise duties, which would place the highest tax burden on PHEV and BEV models as they are more expensive than petrol models, these countries also tend to apply exemptions or reduced rates for low- and zero-emission cars.

2.3.2. Comparing purchase grants for typical car models

As purchase grants typically only vary by CO₂ emission intensity and car price, the results by typical car model align closely with the general information on the 22 countries that offer purchase grants in the previous section (2.2.2.). There are, however, some cases where the compact BEV SUV and the small BEV car are eligible for different levels of purchase grant (Figure 18). This includes Norway and Iceland (with a maximum deduction), where the purchase grant takes the form of a VAT exemption, and Italy, the Netherlands, and Spain where the large BEV is ineligible for a purchase grant as its price exceeds the maximum threshold.

In addition to the large purchase grants for zero-emission cars in Malta, Romania, and Croatia, there is Norway, and Iceland that can also have large purchase grants, depending on the model (with a deduction limit for Iceland of ~€11,000). In all ten countries with purchase grants for low-emission cars, the PHEV SUV model is eligible. The grant amount is lower for the PHEV model than the BEV models in all countries with the exception of Malta.

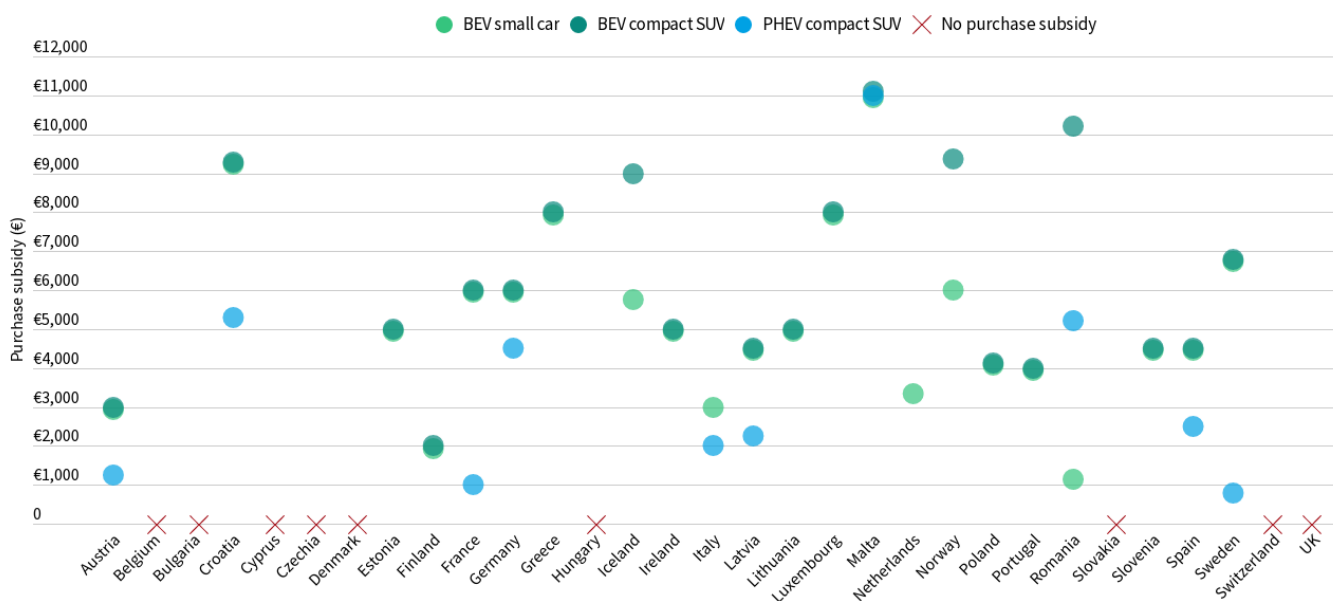


Figure 18: Purchase grants for a new private car by typical model

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: The Netherlands, Croatia and Estonia have exhausted the funds. Therefore, the grants will not be included in the latter calculations. In the next section the purchase grants of Spain will be taxed at the marginal tax rate (using the average marginal income tax) as they are considered as income. The purchase grant of Norway and Iceland takes the form of VAT exemption.

Eight of the 22 countries that offer purchase grants for low- or zero-emission cars have additional bonuses with the scrapping of an old, polluting vehicle (Figure 19). These scrapping bonuses tend to be small, in comparison to the purchase grants, so the ranking of countries with the largest grants remains unchanged. Romania is a particular case, due to the fact that in order to obtain the grant for the purchase of an electric car it is compulsory to scrap an old car.

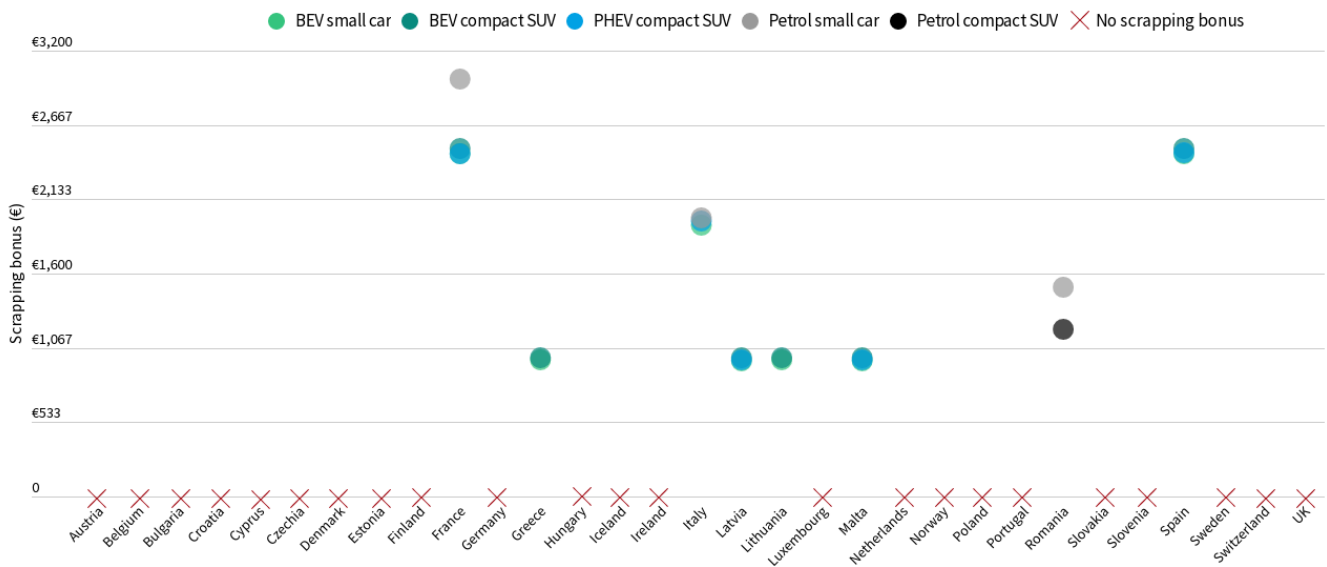


Figure 19: Additional scrapping bonus for the purchase of a new car by typical model

Source: T&E analysis based on national sources as of 1 September 2022.

France, Italy and Romania have purchase grants for new ICE cars but only with vehicle scrapping (i.e. the grey dots on Figure 19 do not appear on Figure 18). In France and Italy, the small petrol vehicle is eligible but the large petrol vehicle is not (under 127 g CO₂/km in France and up to 135 g CO₂/km in Italy). Romania is the only country where all polluting vehicles are eligible for a purchase grant (€1,500 under 120 g CO₂/km and €1,200 above this threshold).

Thirteen of the 22 countries that offer purchase grants for zero or low-emission private vehicles also offer it to companies at different rates (Figure 20). In most countries, purchase grants are equal to or lower than those offered to private individuals. In many cases, they are even non-existent. Poland is the only country in Europe where the zero-emission purchase grant is higher for companies than for individuals (~€6,000 vs. ~€4,200). Spain has the particularity that depending on the size of the company the amount of the subsidy varies, where small companies receive a higher amount.

As in the case of private car grants, Malta and Romania offer the highest grants for zero-emission cars, reaching €11,000 and €10,200 respectively, and for low-emission cars, reaching €11,000 and €5,200 respectively. Out of the total of 13 countries where companies are eligible for purchase grants for zero-emission cars, only six have purchase grants for low-emission cars.

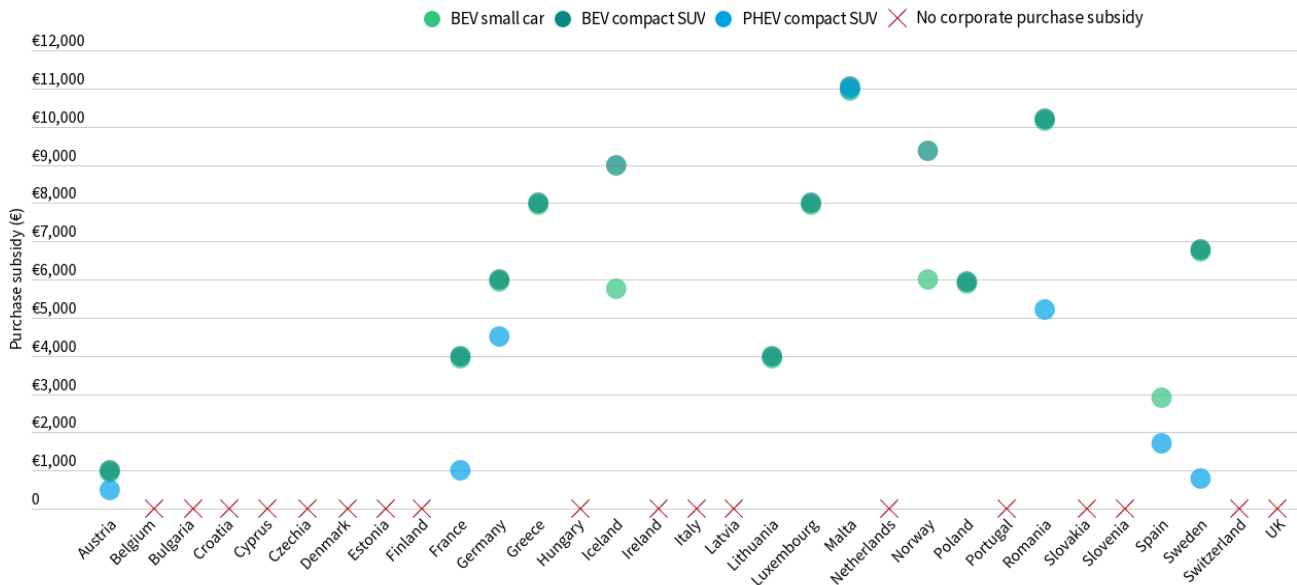


Figure 20: Purchase grants for a new corporate car by typical model

Source: T&E analysis based on national sources as of 1 September 2022.

2.3.3. Comparing car ownership taxation for typical car models

Like acquisition taxation, there is a wide variation in the ownership tax burden faced by the same typical car models across European countries (Figure 21). At the extremes, a typical C segment petrol SUV faces a tax burden over 80x higher in the Netherlands than Romania (€920 vs €11). While the differences between countries can appear small in terms of the financial amount (in €), these differences compound over the lifetime of the vehicles. Four countries do not have any ownership taxation and the ownership taxation in France only applies to corporate cars.

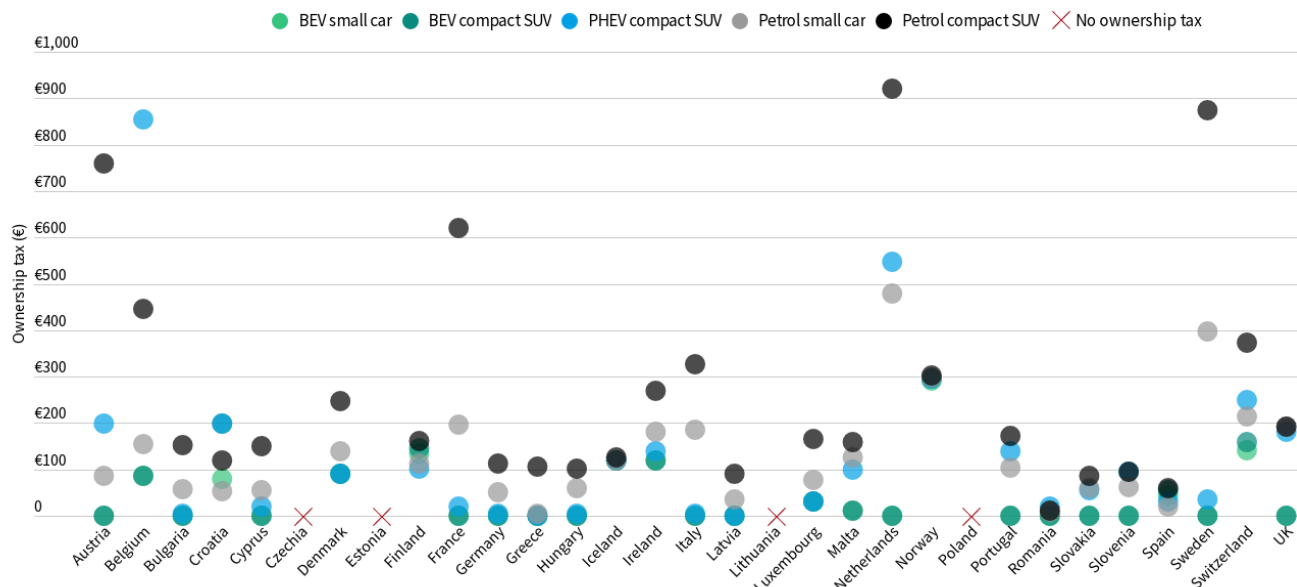


Figure 21: The ownership tax burden on a new car by typical model

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: For private cars in France there is no ownership tax.

Of the typical models, large petrol SUVs tend to face the highest tax burden and BEV models tend to face the lowest tax burden, although there is some variation between countries and more variation than acquisition taxation. This is largely due to fewer ownership taxes based on CO₂ emission intensity and more ownership taxes based on engine power. In Bulgaria, Croatia, Finland and Spain, a large BEV faces a higher ownership tax burden than a small petrol vehicle, and in Bulgaria and Croatia both BEV models face a higher ownership tax burden than an equivalent petrol vehicle.

2.3.4. Comparing benefit-in-kind tax on a salary car for typical car models

The benefit-in-kind tax burden faced by typical car models can be compared in terms of the size of the benefit that is added to an employee's salary or in terms of the tax contribution that is paid after relevant income taxes are applied. Both methods are presented here.

For acquisition and ownership taxation, the examples of countries with the highest tax burdens are also those with the highest differentiation between typical car models (i.e. a large tax burden for large petrol SUVs and a small tax burden for BEVs). For benefit-in-kind taxation, this is not always the case (Figure 22), as there are countries that are generally high tax across all five typical car models (Denmark, Iceland, the Netherlands, Norway) and countries that are generally low tax (Hungary, Italy, Latvia, Poland). These countries do not necessarily have a high degree of differentiation in tax burden between models. Portugal, the UK, and Austria are examples of countries with a high degree of differentiation in tax burden between the models, with a large petrol vehicle adding over €10,000 to an employee's salary and a BEV (small or large) adding less than €1,000.

Another difference with benefit-in-kind taxation compared to both acquisition and ownership taxation is that car value features much more strongly in the determination. As PHEVs are the most expensive of the typical car models, the result is that PHEVs face the highest tax burden in fourteen countries – nearly half of the countries. This is far from universal however, as PHEVs face low benefit-in-kind taxation in some countries and zero benefit-in-kind taxation in Greece and Hungary.

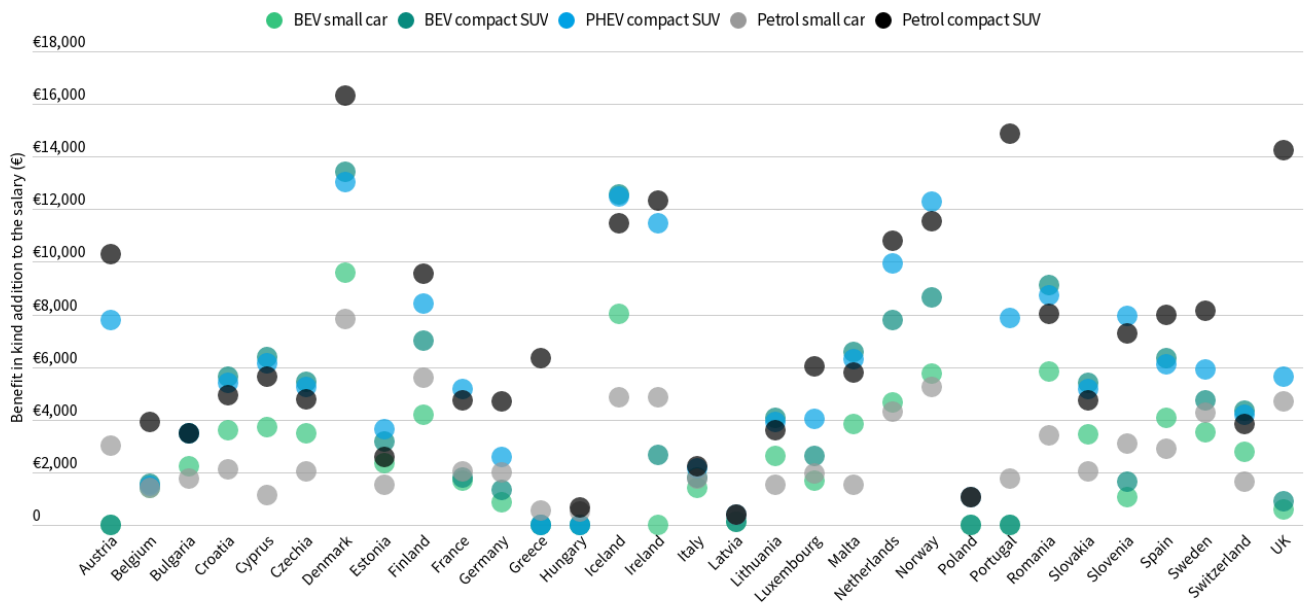


Figure 22: The benefit-in-kind of a new salary car by typical model

Source: T&E analysis based on national sources as of 1 September 2022.

To calculate the tax burden, the benefit-in-kind that is added to an employee's salary is subjected to the employee's marginal tax rate – here using the average marginal income tax rate (including social insurance contributions by the employee). As taxes are a share of income, the resulting tax burden (Figure 23) is a lower amount than the benefit-in-kind addition (Figure 22).

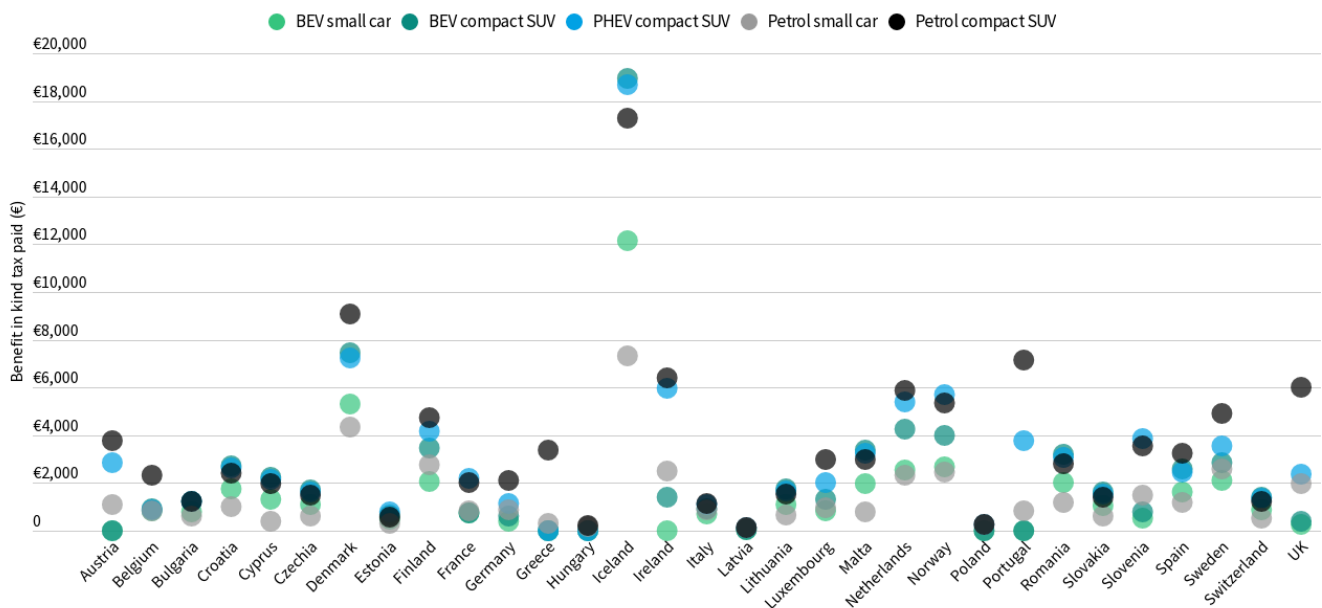


Figure 23: The benefit-in-kind tax burden on a new salary car by typical model

Source: T&E analysis (2022) using Eurostat national tax rates.

Notes: Employer contribution not included.

Analysing the results at a country level reveals that despite income taxes lowering the tax burden, this step generally compounds the relative difference between countries, with the high tax countries separating even further from the low tax countries. There thus appears to be a correlation where the countries with the highest benefit-in-kind calculations are also those countries with the highest income tax rates (e.g. Denmark, the Netherlands).

2.3.5. Comparing VAT deduction on a corporate car for typical car models

Like benefit-in-kind taxation and income tax, VAT deductions are another policy where the tax burden/benefit relates not just on car taxation, but on other elements of a country’s tax system: both the VAT rate and the corporate tax rate. The higher the VAT and corporate tax, the greater the tax benefit. Portugal has the highest tax benefit from VAT deduction across vehicle models not because of its VAT deduction policy for corporate cars, but because its VAT (23%) and corporate tax (32%) are relatively high (Figure 24 and 25).

Similarly, the resulting tax benefits and the range between vehicle models is heavily influenced by the price of the different vehicle models in addition to specific policy on VAT deductions. This is an accurate reflection of the lost tax revenue, per vehicle, from VAT deduction policy and the fact that this amount is greater for more expensive vehicles.

Despite these other factors, the effects of VAT deduction policy are still noticeable, from the absence of VAT deductions in seven countries to the differentiation of VAT deductions by CO₂ emission intensity in Austria, Ireland, and Slovenia.

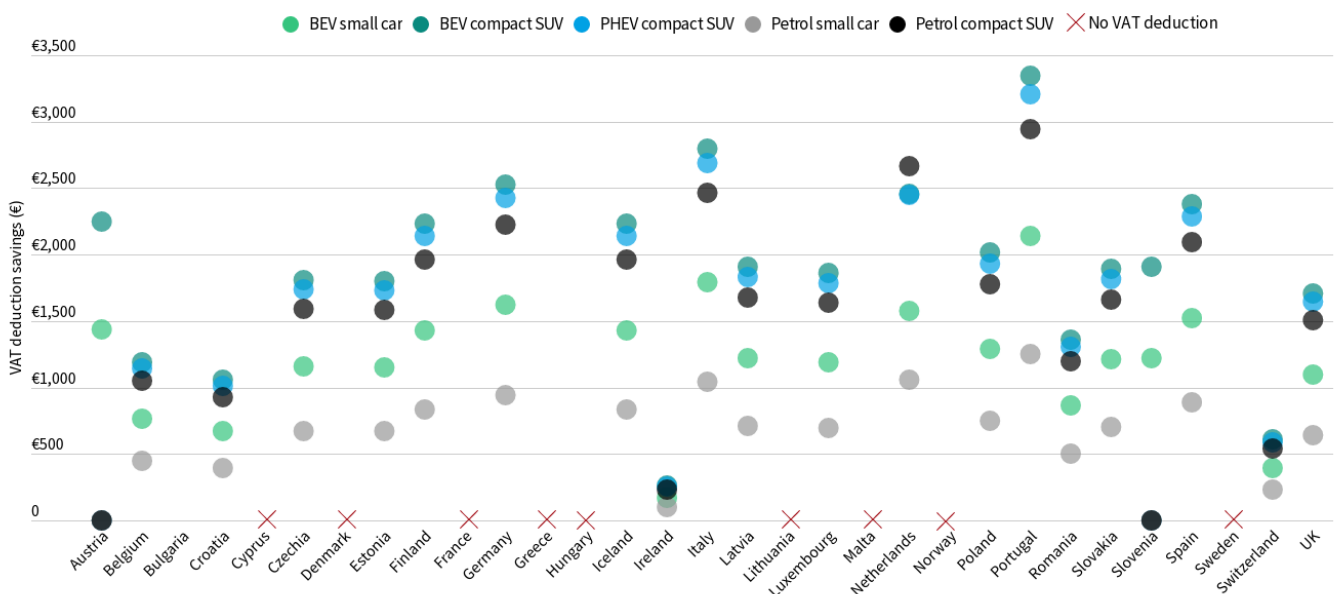


Figure 24: The VAT deduction tax benefit for a new corporate car by typical model

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: based on a corporate car used exclusively for business purposes.

For some countries, there is a very different treatment of VAT deductions between corporate cars that are used exclusively for business purposes and those used privately (Figure 24 and Figure 25).

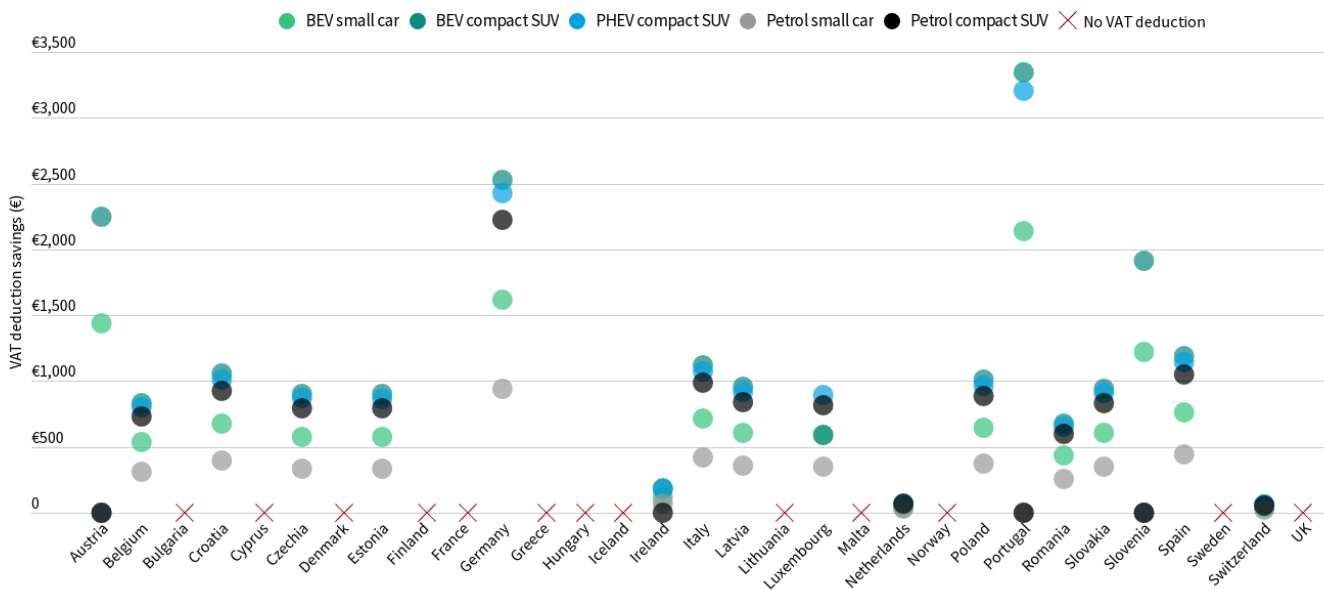


Figure 25: The VAT deduction tax benefit for a corporate car privately used by typical model

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: based on a corporate car used for business and personal purposes (50%).

2.3.6. Comparing depreciation write-off on a corporate car for typical car models

Like VAT deduction, the tax benefit from depreciation write-off relates not just to depreciation write-off policy but also corporate tax rates and the value of the vehicle (but not VAT rates). The higher the corporate tax, the greater the tax benefit. Malta has the highest tax benefit from depreciation write-off across due to its 35% corporate tax rate that is avoided (Figure 26).

The resulting tax benefits and the range between vehicle models is heavily influenced by the price of the different vehicle models. This is an accurate reflection of the lost tax revenue, per vehicle, from depreciation allowance policy and the fact that this amount is greater for more expensive vehicles.

The tax benefits from depreciation write-offs are large, reaching as high as €15,000. For many countries the tax benefit from depreciation write-off on a corporate car is much larger than the tax benefits from VAT deduction and much larger than the tax burden for many corporate cars (especially those without benefit-in-kind). This finding explains the dominance of corporate cars in the European market (58%) and why in recent years more countries have used depreciation write-offs as a means to incentivise the uptake of zero-emission cars.

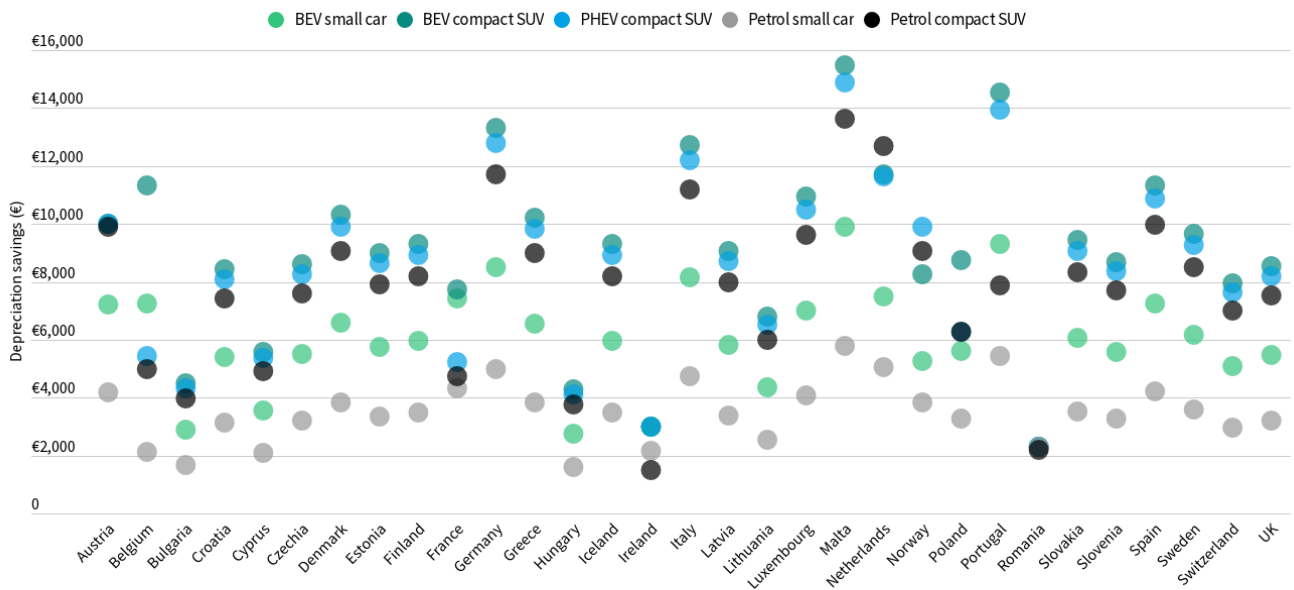


Figure 26: The depreciation write-off tax benefit for a new corporate car by typical model

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: based on a corporate car used exclusively for business purposes.

For some countries (14), there is a different treatment of depreciation write-off between corporate cars that are used exclusively for business purposes and those used privately (Figure 27). In all cases, the exclusive use of the car for business purposes has a higher percentage deduction than if the use is mixed.

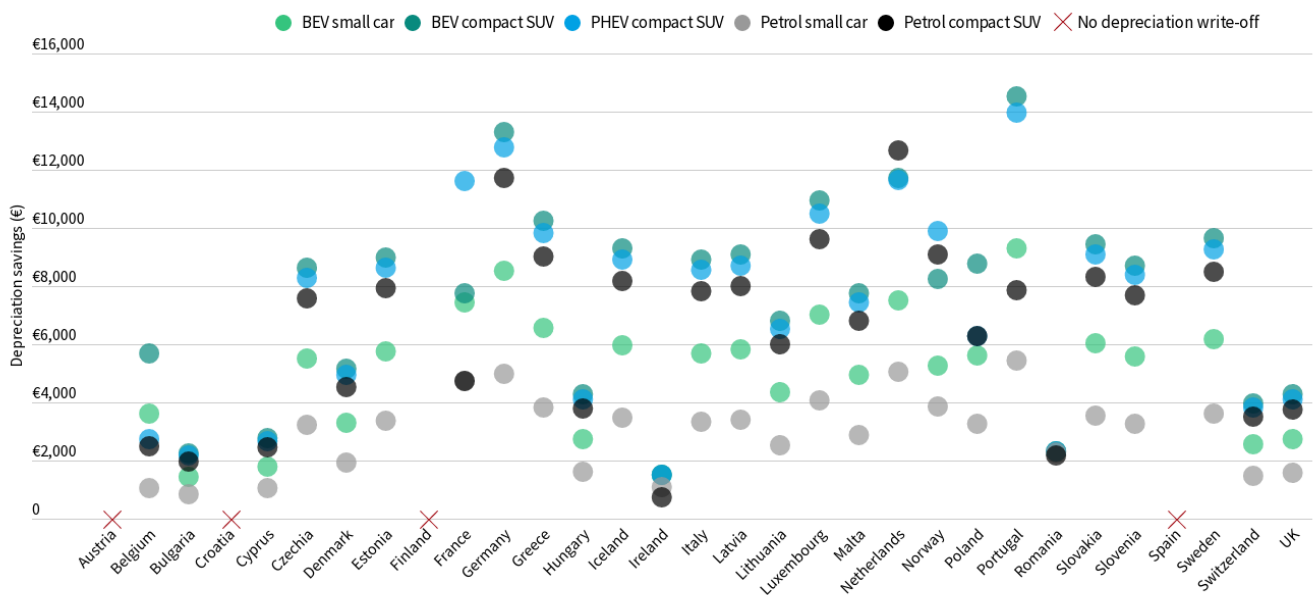


Figure 27: The depreciation write-off tax benefit for a corporate car privately used by typical model

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: based on a corporate car used for business and personal purposes (50%).

2.3.7. Comparing energy taxation for typical car models

The previous section (2.2.7.) found that energy taxes on electricity and liquid fuel taxes are within a similar range, with electricity taxes typically just around or below diesel excise duty (per unit of equivalent energy). This difference in taxation by fuel type is further accentuated in a comparison of typical car models driving 15,000 kilometres as electric cars are much more efficient at converting energy into motion – by a factor of around three times.[17]

The resulting tax burden varies by country but is typically around €100 per 15,000 km for a BEV, €250 for a PHEV, €400 for a small petrol car, and €500 for a compact petrol SUV (Figure 28). For ICE vehicles especially, vehicle segment influences the results as larger, heavier cars are less energy efficient to cover the same distance.

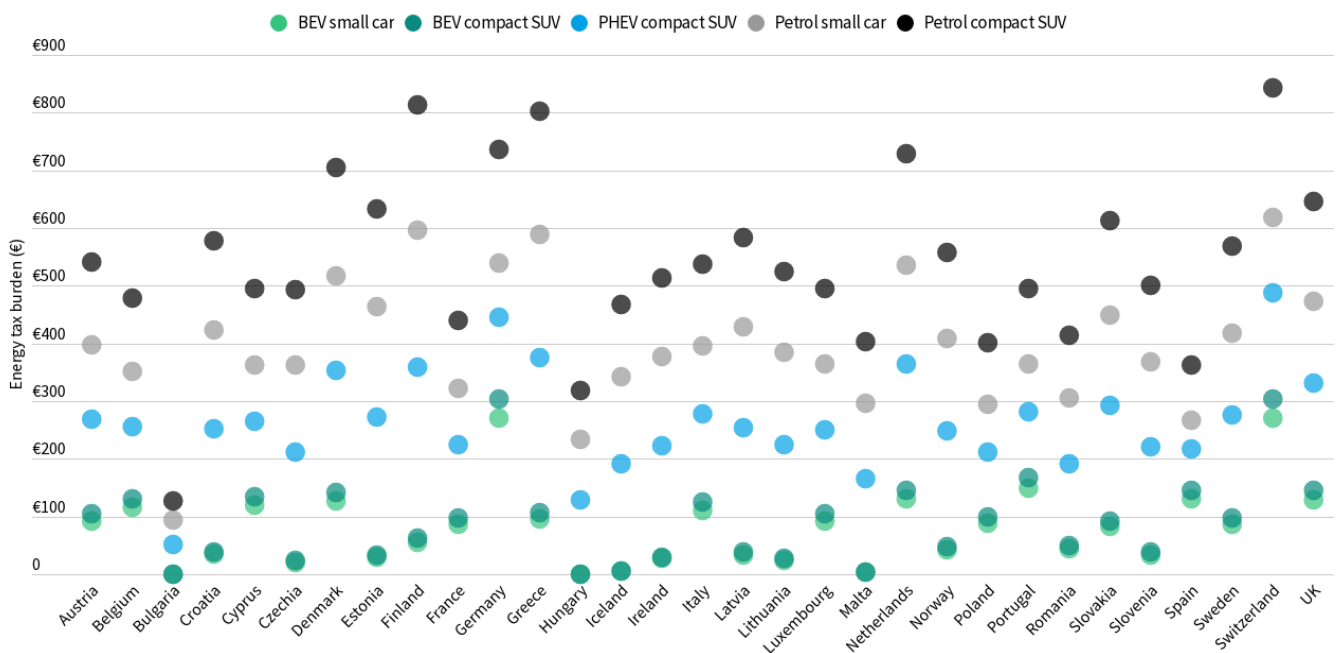


Figure 28: The energy tax burden on 15,000km of driving by typical model

Source: T&E analysis (2022) using Eurostat data on tax rates.

These results illustrate a key component that contributes to a lower total cost of ownership for BEVs as a higher energy efficiency means that cost savings are made on energy taxation as well as the cost of energy itself.

The size of the energy tax burden compared to other car tax burdens is covered in the next section (2.3.8.)

2.3.8. Comparing the total tax burden for typical car models

The total tax burden for typical car models is a summation of the previously calculated tax burdens. To combine the different forms of taxation, typical ownership periods (for ownership taxation) and driving distances (for energy taxation) are used (Table 14). The total tax burdens are calculated for both a private car and a salary car. Additional vehicle usage parameters are included for business and private usage and the PHEV electric driving share for private and salary cars.

Table 14: Vehicle usage parameters used in the tax burden comparisons

Attribute	Private car	Salary car
Ownership period (years)	10	4
Distance (km/year)	15,000	25,000
PHEV electric driving share	45%	12%
Private use of the car	100%	50%
Business use of the car	0%	50%
Tax burden calculation	<ul style="list-style-type: none"> ● Acquisition taxation ● Ownership taxation ● Energy taxation 	<ul style="list-style-type: none"> ● Acquisition taxation ● Ownership taxation ● Energy taxation ● Benefit-in-kind taxation

Source for PHEV electric driving share: ICCT (2022). Real-world usage of plug-in hybrid vehicles in Europe: A 2022 update on fuel consumption, electric driving, and CO₂ emissions.

The total tax burden calculations use a common set of vehicle usage parameters and methodology across all car models and countries. For each model, the car base price is identical (light grey in Figures 29-38), unless a purchase grant is applied. VAT is added on top of this price (dark grey in Figures 29-38), but is not used in the calculation of total tax burden, which only covers car-specific taxation (see section 1.4.).

The total tax burden for private cars (indicated beside the horizontal bar in Figures 29-33) is calculated over a ten-year period and includes acquisition taxation, ownership taxation, and energy taxation. The total tax burden for salary cars (indicated in brackets in Figures 34-38) is calculated over a four-year period and includes acquisition taxation, ownership taxation, energy taxation, as well as benefit-in-kind taxation. For conceptual clarity, purchase grants and tax benefits for corporate cars are not included in the calculation of total tax burden (but are depicted in Figures 29-38 as a lower car price in the case of purchase grants and as green bars with a negative tax burden in the case of depreciation write-offs and VAT deduction).

The figures in this section (Figures 29-38) display the total tax burden for the five typical car models, first private cars over ten years of ownership of the five typical models, followed by salary cars over four years of ownership. The results are ordered by total tax burden from largest to smallest. The order of the total tax burden (blue bars) may not match the total cost (total horizontal width including blue and grey bars) which also includes purchase grants and VAT.

The total tax burden for a small petrol car over ten years of private ownership varies significantly between countries, with a difference over €15,000 (11 times difference) between the largest and smallest tax burden (Figure 29). The largest total tax burden is in Denmark (€16,930) and the Netherlands (€12,294) and the smallest is in Bulgaria (€1,512) and Spain (€2,862).

For most countries, energy taxation (i.e. fuel excise duty) is the largest component of the tax burden, even with the recent reductions in excise duties [13]. In the countries with the largest tax burden, such as Denmark, the Netherlands, Norway, and Malta, acquisition and ownership taxation also contribute a large share to the total tax burden.

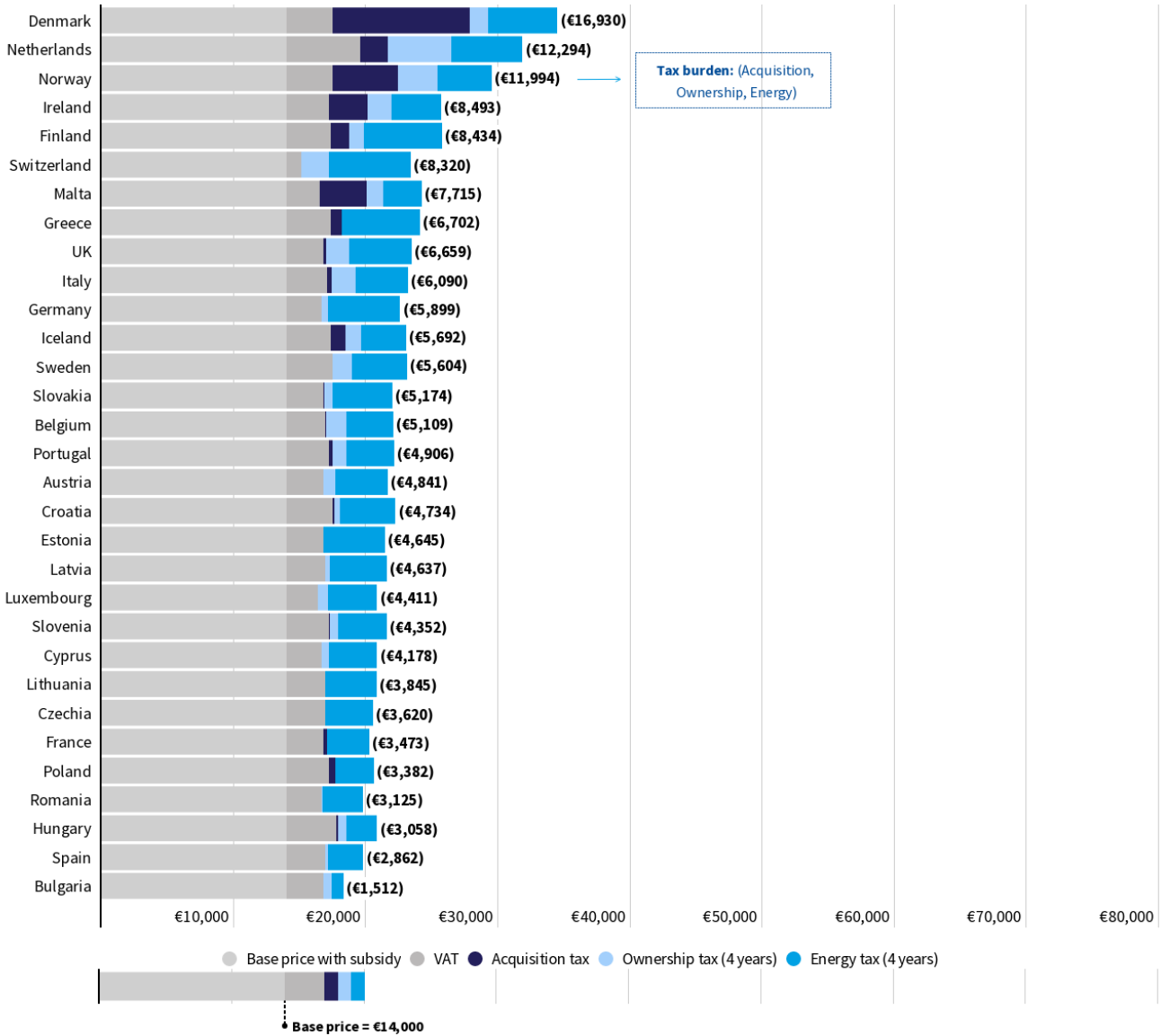


Figure 29: Total tax burden for a small petrol car over ten years of private ownership

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: Ordered by tax burden (acquisition, ownership and energy tax). VAT in the Netherlands is calculated over car price + acquisition tax.

For a small BEV car, the largest total tax burden over ten years of private ownership is in Switzerland (€4,117) and Norway (€3,636) and the smallest total tax burden is in Hungary (€0) and Bulgaria (€0), where there is no taxation for a BEV (including energy use) (Figure 30).

The largest total cost for a small BEV is in Denmark (€32,181) and Belgium (€31,110) due to the lack of purchase incentives and high VAT. In contrast, Malta (€17,475) and Romania (€18,806) have the lowest total cost due to large purchase grants.

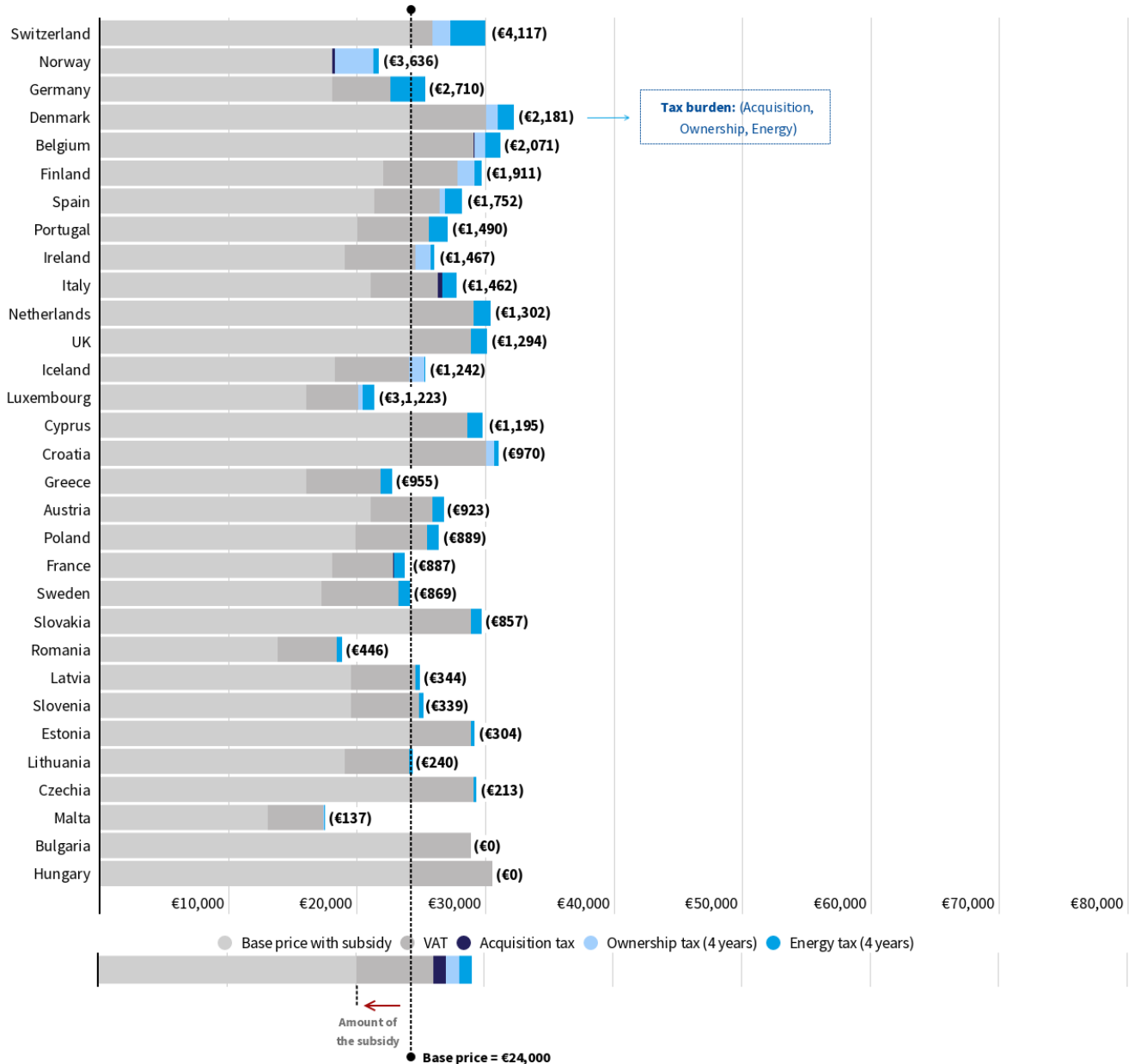


Figure 30: Total tax burden for a small BEV car over ten years of private ownership

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: Ordered by tax burden (acquisition, ownership and energy tax). Purchase grants in Spain are taxed at the marginal tax rate (using the average marginal income tax) as they are considered as income.

For a compact petrol SUV, the difference between countries in total tax burden over ten years of private ownership (Figure 31) is even larger than for a small car (Figure 29). The total tax burden exceeds €24,000 in countries with the largest total tax burden, such as Denmark, Norway and the Netherlands, and is less than €5,000 in countries with the smallest total tax burden, such as Bulgaria, Romania and Hungary. There is a difference of €48,600 (18 times difference) between the largest and smallest tax burden over a ten year period.

As with the total tax burden for a small petrol car, the countries with the largest tax burden often have larger acquisition and ownership taxes, whereas countries with the smallest tax burden rely only on energy taxation.

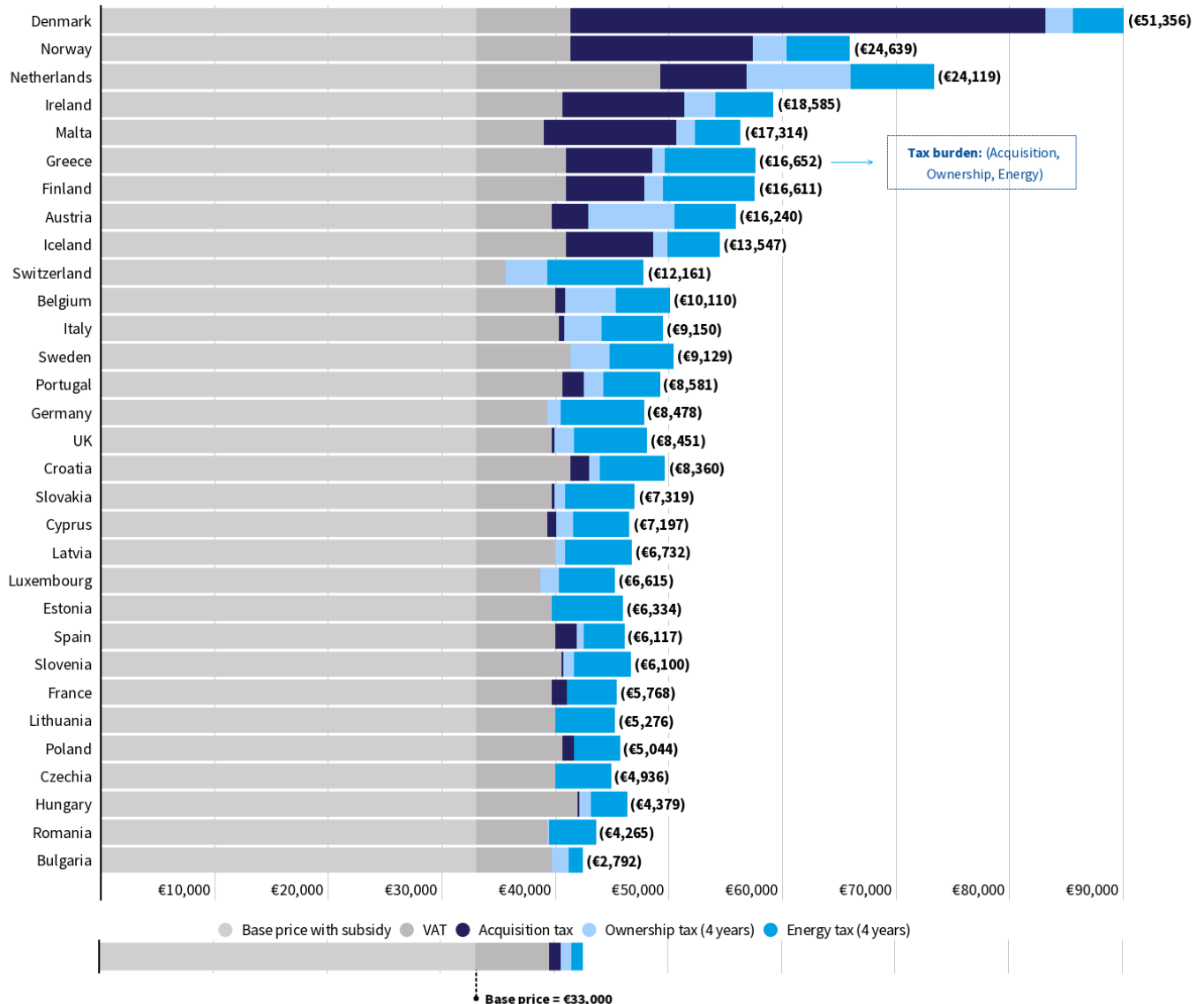


Figure 31: Total tax burden for a compact petrol SUV over ten years of private ownership

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: Ordered by tax burden (acquisition, ownership and energy tax). VAT in the Netherlands is calculated over car price + acquisition tax.

The total tax burden for a compact BEV SUV over ten years of private ownership is similar to a small BEV car, indicating that model characteristics have a limited impact on BEV taxation (Figure 32). The largest total tax burden is in Switzerland (€4,615) and Norway (€3,687) and the smallest total tax burden is in Hungary (€0) and Bulgaria (€0). In Switzerland, most of the tax burden is from energy taxation, whereas in Norway most of the tax burden is from ownership taxation. Although Norway has the second highest tax burden, it also has the lowest total cost (€31,812) as BEVs are exempt from VAT. In contrast, Hungary, which has the lowest tax burden, ranks third in total cost (€47,625) due to a high VAT. Denmark has the highest total cost for a compact SUV BEV private car (€49,210).

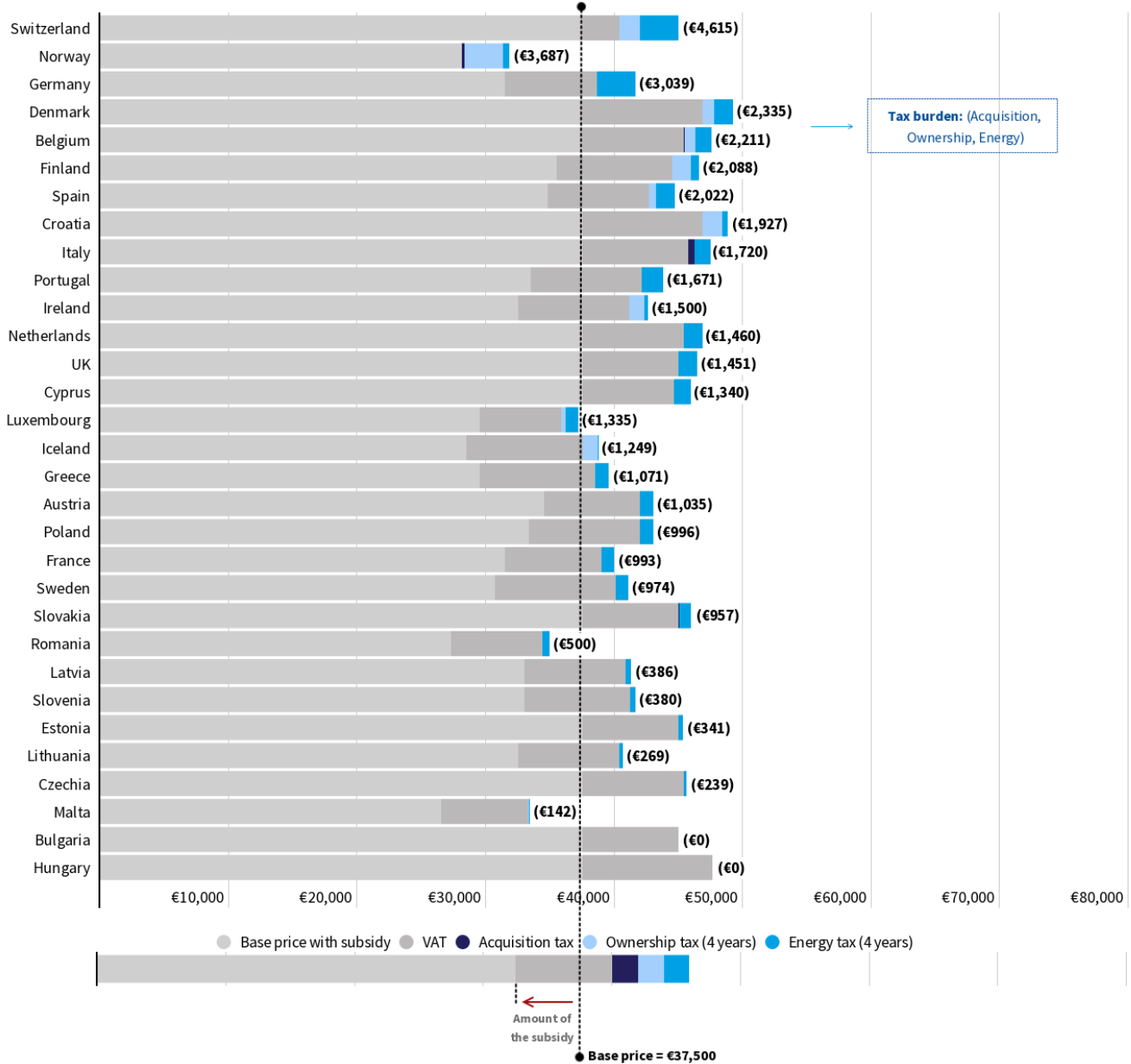


Figure 32: Total tax burden for a compact BEV SUV over ten years of private ownership

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: Ordered by tax burden (acquisition, ownership and energy tax). Purchase grants in Spain are taxed at the marginal tax rate (using the average marginal income tax) as they are considered as income.

The total tax burden for a compact PHEV SUV over ten years of private ownership (Figure 33) is often higher than the total tax burden for a compact BEV SUV (Figure 32) as many countries grant tax exemptions to zero-emission cars but not low-emission cars. For many of the countries with the largest total tax burden, acquisition taxation and ownership taxation contribute a large share. This is not the case for countries with the smallest tax burden which rely only on energy taxation. The largest total tax burden is in Denmark (€17,822) and Belgium (€16,067) and the smallest is in Bulgaria (€513) and Hungary (€1,283). In terms of total cost, Romania (€39,747) and Malta (€40,987) have the lowest amounts due to the high purchase grants for PHEVs.

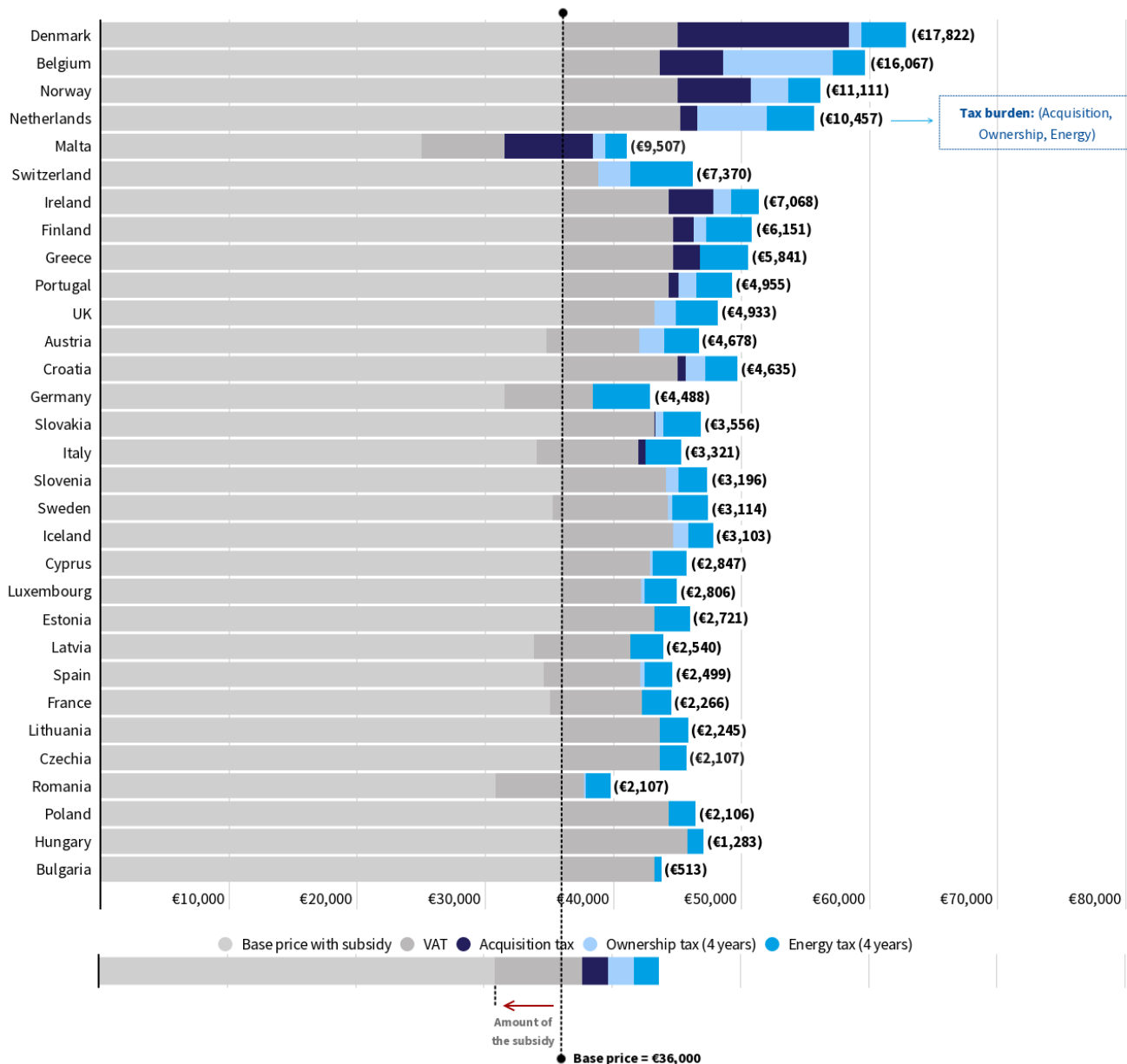


Figure 33: Total tax burden for a compact PHEV SUV over ten years of private ownership

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: Ordered by tax burden (acquisition, ownership and energy tax). Purchase grants in Spain have been taxed at the marginal tax rate (using the average marginal income tax) as they are considered as income.

The total tax burden for a salary car includes acquisition taxation, ownership taxation, energy taxation, and, unlike a private car, benefit-in-kind taxation (Figures 34-38). The total tax burden for a small petrol salary car varies significantly between countries, with a difference of €29,000 (11 times difference) between the largest and smallest tax burden over a four year period (Figure 34). The largest total tax burden is in Denmark (€31,805) and Norway (€18,592) and the smallest is in Hungary (€2,611) and Bulgaria (€3,304). The ranking is similar for total cost (base price of the vehicle, VAT, total tax burden), with the largest costs in Denmark (€49,305) and Netherlands (€36,523) and the lowest costs in Bulgaria (€20,104) and Hungary (€20,391).

For most countries, benefit-in-kind tax is the largest component of the tax burden, but for some countries with low benefit-in-kind taxation (and total tax burden), energy taxation composes the largest share.

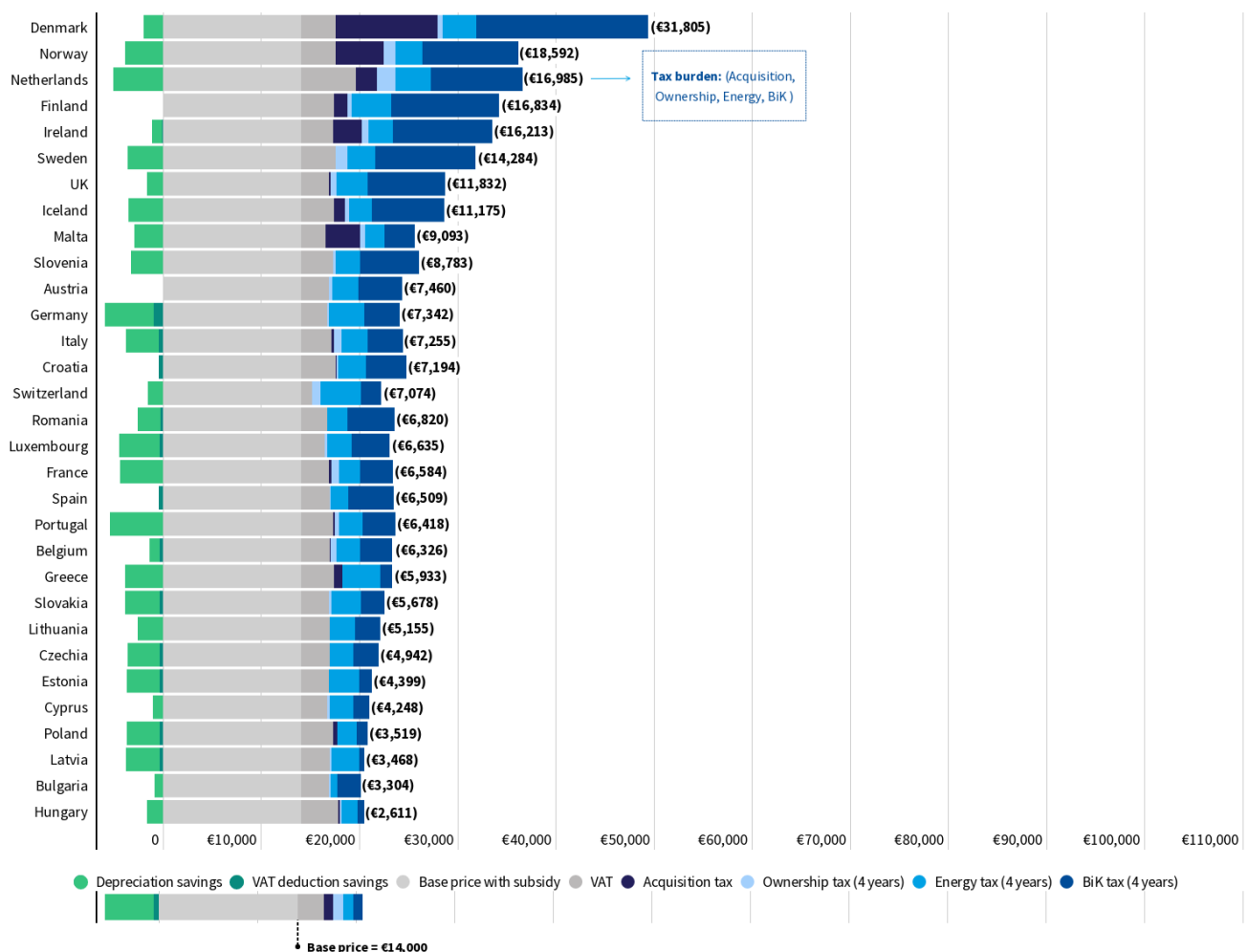


Figure 34: Total tax burden for a small petrol car over four years as a salary benefit

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: Ordered by tax burden. Calculations from a government revenue flow perspective. VAT in the Netherlands is calculated over car price + acquisition tax. Based on a corporate car with 50% private use.

For a small BEV car over four years as a salary benefit, the largest total tax burden over four years is in Denmark (€22,516) and Iceland (€12,642) and the smallest total tax burden is in Hungary (€0) and Latvia (€382) (Figure 35). There is a much larger range in taxation between countries for a small BEV salary car than a small BEV private car due to the different approaches to benefit-in-kind taxation (Sections 2.1.4, 2.2.4, and 2.3.4).

The highest total cost for a small BEV is in Denmark (€52,516) and Netherlands (€40,018) due to the lack of purchase incentives and higher taxes, in particular benefit-in-kind taxation. In contrast, Greece (€22,397) and Luxembourg (€24,158) have the lowest total cost due to high purchase grants.

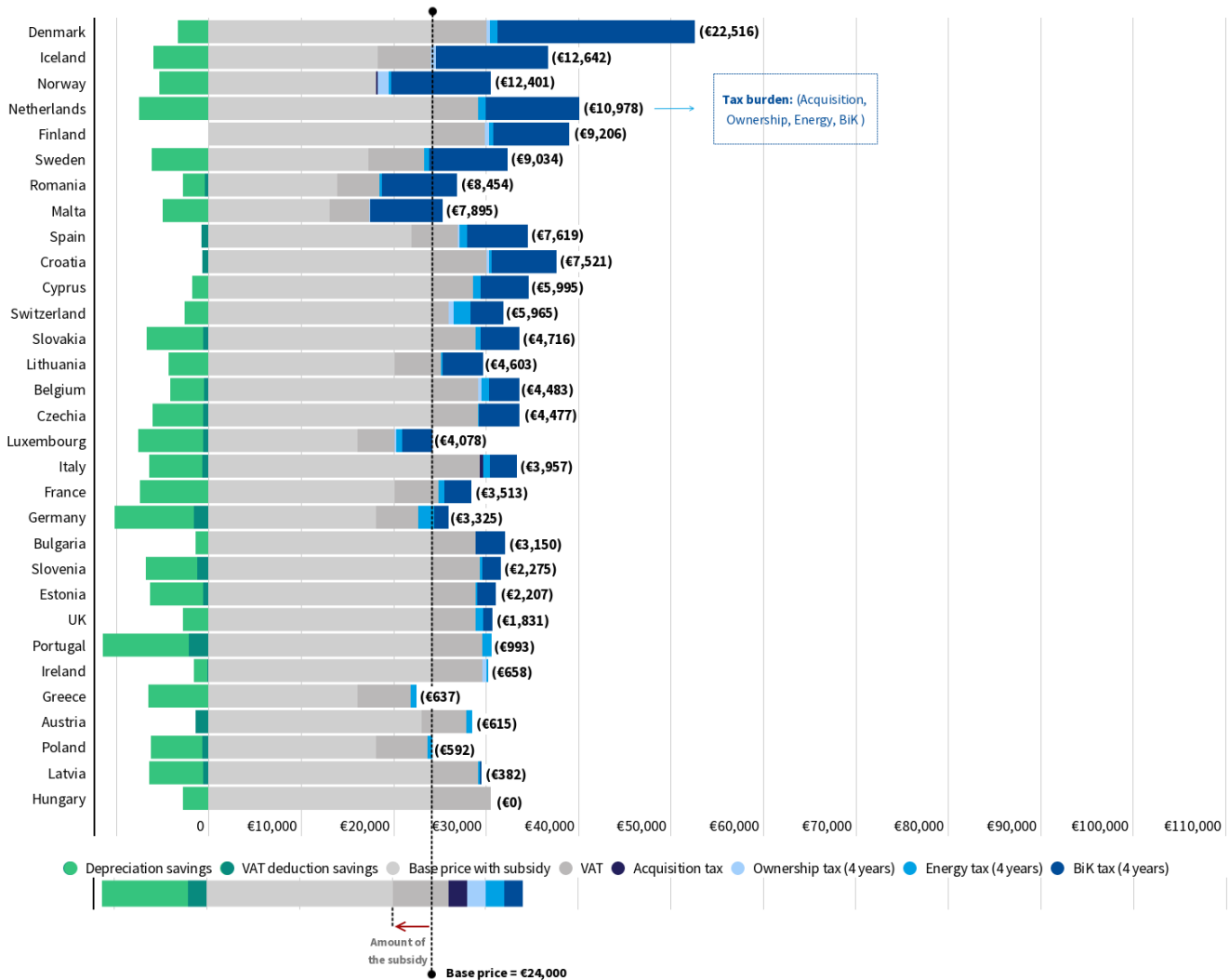


Figure 35: Total tax burden for a small BEV car over four years as a salary benefit

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: Ordered by tax burden. Calculations from a government revenue flow perspective. VAT in the Netherlands is calculated over car price + acquisition tax. Based on a corporate car with 50% private use. Purchase grants in Spain have been taxed at the corporate tax as they are considered as revenue.

For a compact petrol SUV over four years as a salary benefit, the difference in total tax burden between countries (Figure 36) is even larger than for a small car (Figure 34). While in Denmark, Norway and Ireland, the total tax burden is higher than €40,000, in Hungary, Latvia, and Poland the tax burden is less than €5,000. Between Denmark and Hungary there is a difference in total tax burden of €80,000 (34 times difference) over a four year period. Benefit-in-kind and acquisition taxation vary significantly between countries whereas ownership and energy taxation tend to be similar.

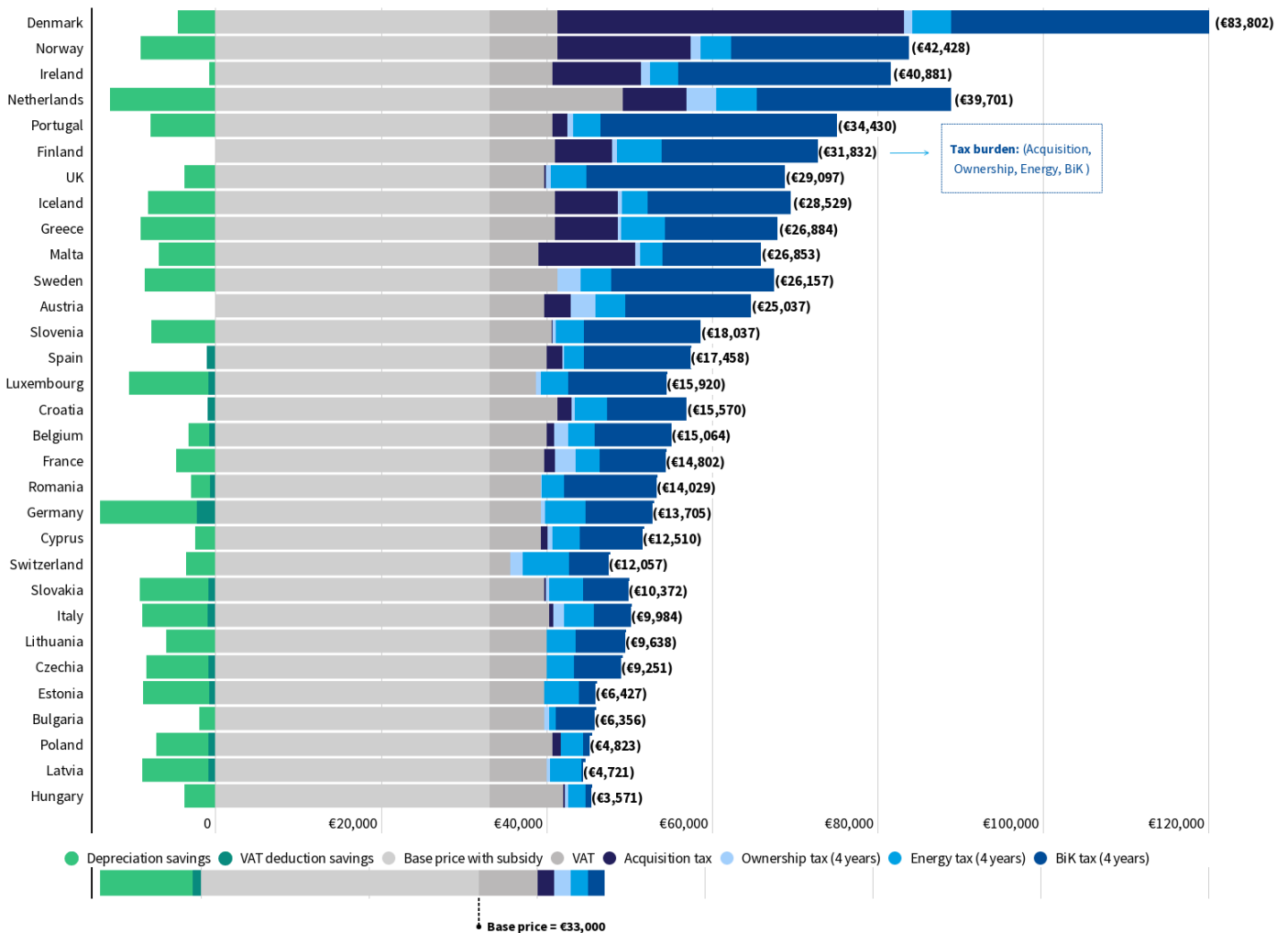


Figure 36: Total tax burden for a compact petrol SUV over four years as a salary benefit

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: Ordered by tax burden. Calculations from a government revenue flow perspective. VAT in the Netherlands is calculated over car price + acquisition tax. Based on a corporate car with 50% private use.

The total tax burden for a compact BEV SUV over four years as a salary benefit (Figure 37) is similar to the total tax burden for a small BEV car (Figure 25), with a small increase in benefit-in-kind taxation in many countries due to the highest price of the salary car. Once again, the largest total tax burden is in Denmark (€31,189) and Iceland (€19,470) and the smallest total tax burden in Hungary (€0) and Latvia (€420).

While many countries with a large total tax burden for a compact BEV SUV salary car also have a high uptake of BEVs, these countries have an even higher total tax burden for a compact petrol SUV salary car (Figure 36). The net differential is compared in the following section (2.4.).

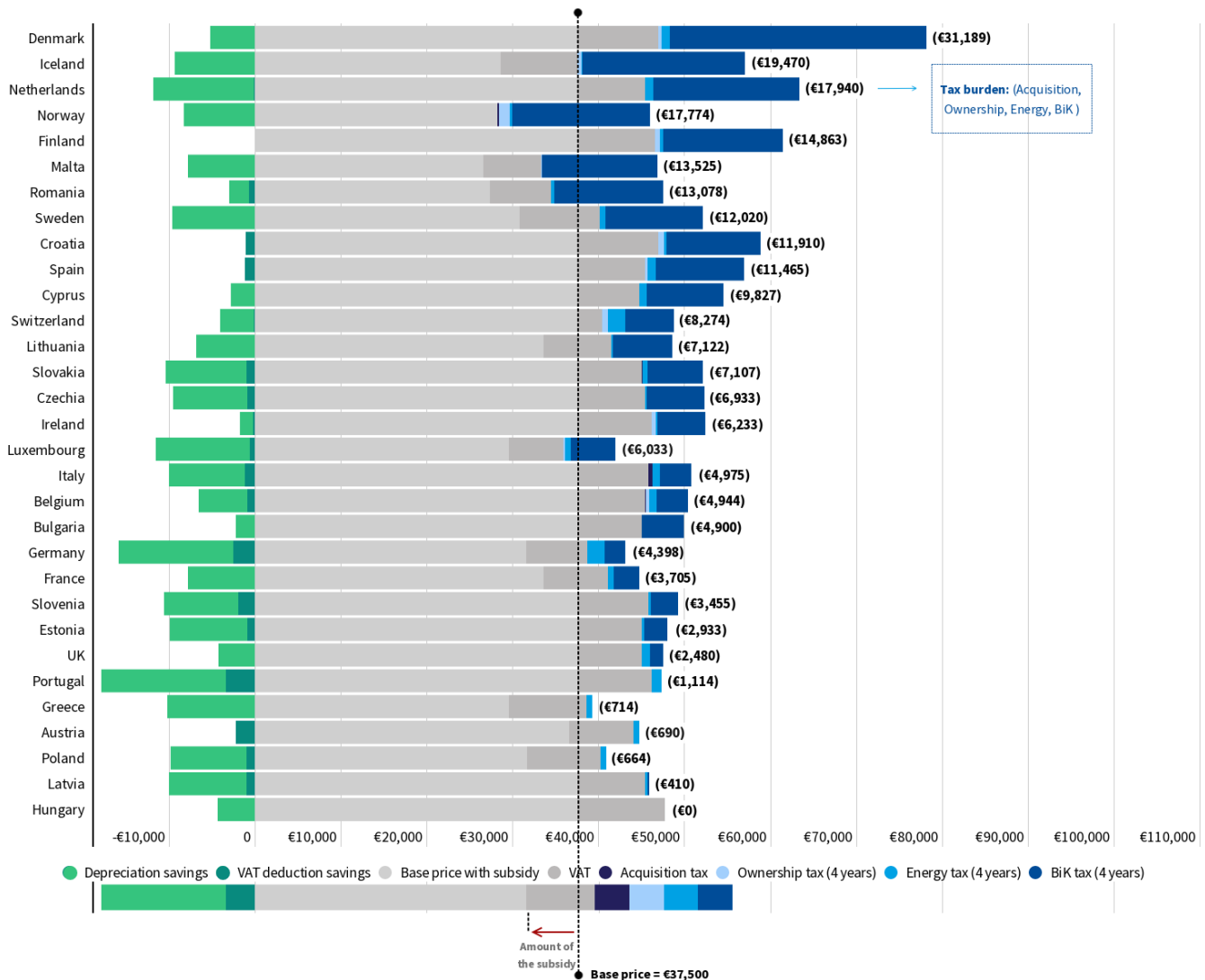


Figure 37: Total tax burden for a compact BEV SUV over four years as a salary benefit

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: Ordered by tax burden. Calculations from a government revenue flow perspective. VAT in the Netherlands is calculated over car price + acquisition tax. Based on a corporate car with 50% private use. Purchase grants in Spain have been taxed at the corporate tax as they are considered as revenue.

The total tax burden for a compact SUV PHEV salary car (Figure 38) is often higher than the total tax burden for a compact SUV BEV salary car (Figure 37) as many countries grant tax exemptions to zero-emission cars but not low-emission cars. This is particularly the case in countries that levy large acquisition taxes.

In terms of country ranking, the first and last positions remain the same, with the largest total tax burden in Denmark (€44,997) and the smallest total tax burden in Hungary (€1,867). In Portugal, Slovenia, and the UK, the total tax burden for a compact SUV BEV salary car is comparatively small, but the total tax burden for a compact SUV PHEV salary car is comparatively large, ranking them among the countries with the highest tax burden.

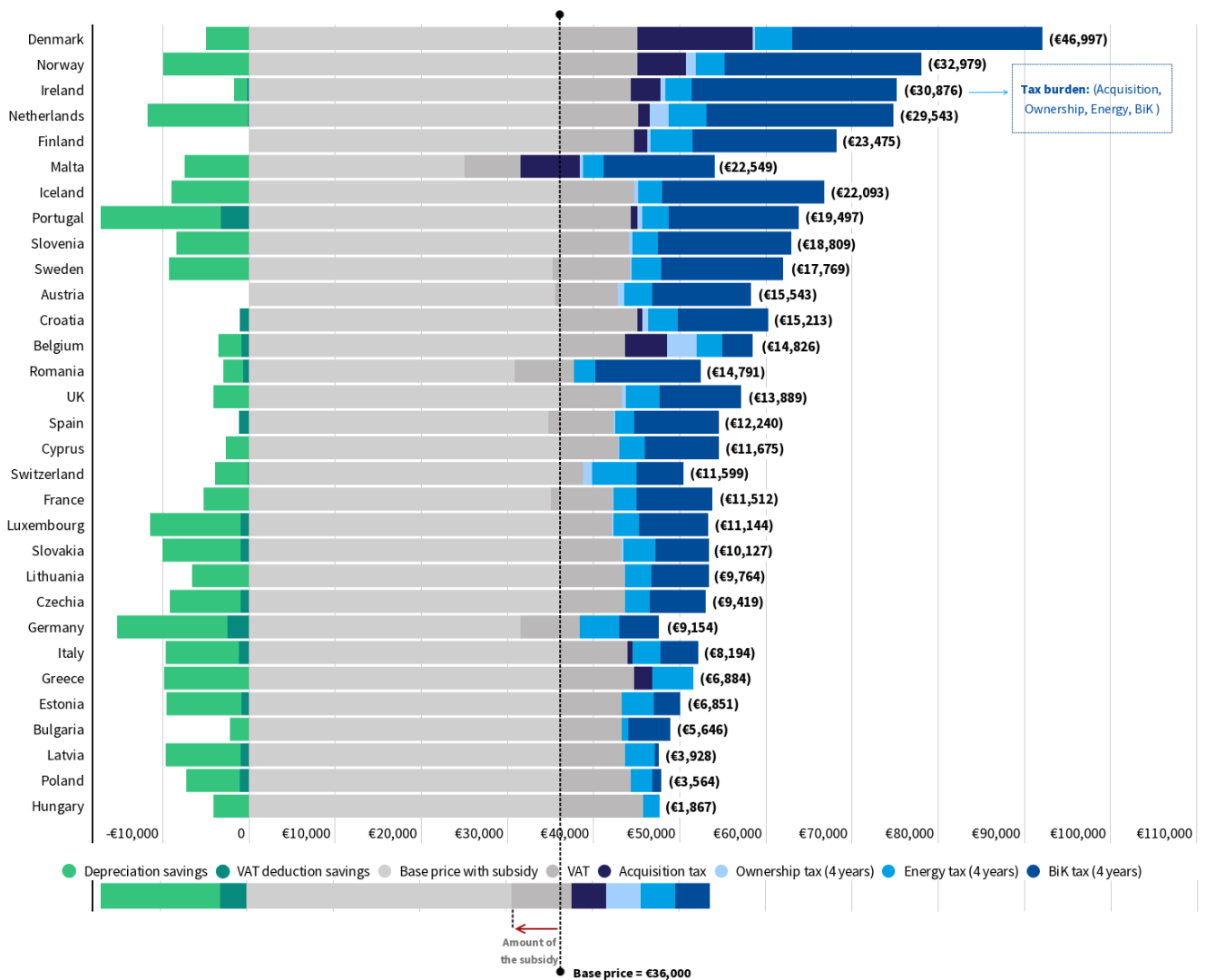


Figure 38: Tax burden for a compact PHEV SUV over four years as a salary benefit

Source: T&E analysis based on national sources as of 1 September 2022.

Notes: Ordered by tax burden. Calculations from a government revenue flow perspective. VAT in the Netherlands is calculated over car price + acquisition tax. Based on a corporate car with 50% private use. Purchase grants in Spain have been taxed at the corporate tax as they are considered as revenue.

2.4. Net tax differentials between BEV, PHEV, and petrol cars

This section calculates the net tax differential between typical models by comparing the total tax burdens from the previous section (2.3.). The net tax differential is a critical measure to determine if and how European countries are incentivising the zero-emission transition. A high net tax differential is achieved by levying a large tax burden on polluting cars and/or a small tax burden on zero-emission cars.

There are three relevant net tax differentials comparing low- and zero-emission cars with conventional ICE vehicles:

- the net tax differential for a small private car over ten years: BEV versus petrol;
- the net tax differential for a compact SUV private car over ten years: BEV versus petrol;
- the net tax differential for a compact SUV private car over ten years: PHEV versus petrol.

For additional clarity, the three comparisons are calculated with and without purchase grants (as some funding pots may become exhausted or programmes expire), and for two registration types: private cars (Section 2.4.1.) and salary cars (Section 2.4.2.). This produces a total of twelve tax differentials.

2.4.1. Net tax differentials for private cars

The tax differential between a small BEV car and a small petrol car over ten years of private ownership varies significantly by country (Figure 39), from a high of €18,400 in Malta to a low of €1,500 in Bulgaria.

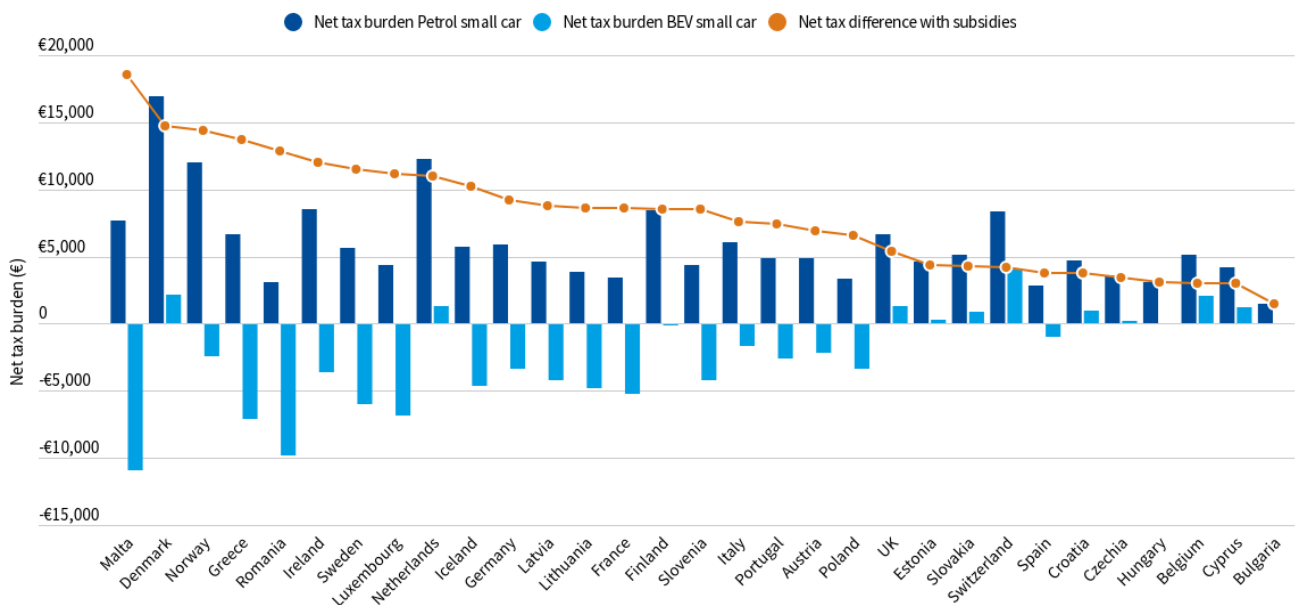


Figure 39: Tax differential (with subsidies) for a small car over ten years of ownership: BEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

The presence of large purchase grants that generate a negative tax burden (i.e. a tax benefit) for BEVs explains much of the variation in tax differential between countries, especially for Malta, Greece, and Romania. Without purchase grants, the ordering of countries changes significantly, for example Spain

drops to the bottom of the ranking with a €1,110 tax differential between a small BEV car and a small petrol car (Figure 40). Purchase grants are not necessary to generate a high tax differential, however, for example in Denmark (€14,749) and the Netherlands (€10,992) a high tax differential is achieved through a large tax burden on polluting cars rather than a large tax benefit for zero-emission cars.

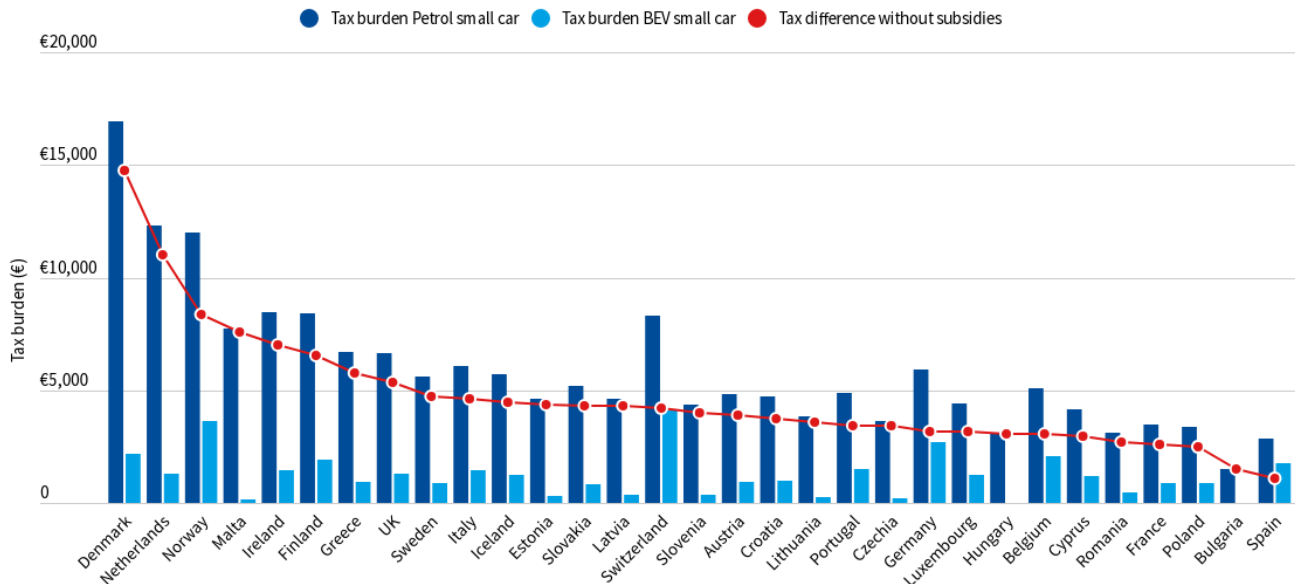


Figure 40: Tax differential (without subsidies) for a small car over ten years of private ownership: BEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

The tax differential between a compact BEV SUV and a compact petrol SUV over ten years of private ownership (Figure 41) varies by country to an even greater extent than for a small car (Figure 39). The highest tax differential is in Denmark (€49,021) and the lowest tax differential is once again in Bulgaria (€2,792).

The larger tax differential results from the fact that taxes based on vehicle attributes (e.g. CO₂ emission intensity) tend to increase with vehicle size, whereas the tax exemptions for zero-emission cars remain unchanged (i.e. the tax burden remains at €0).

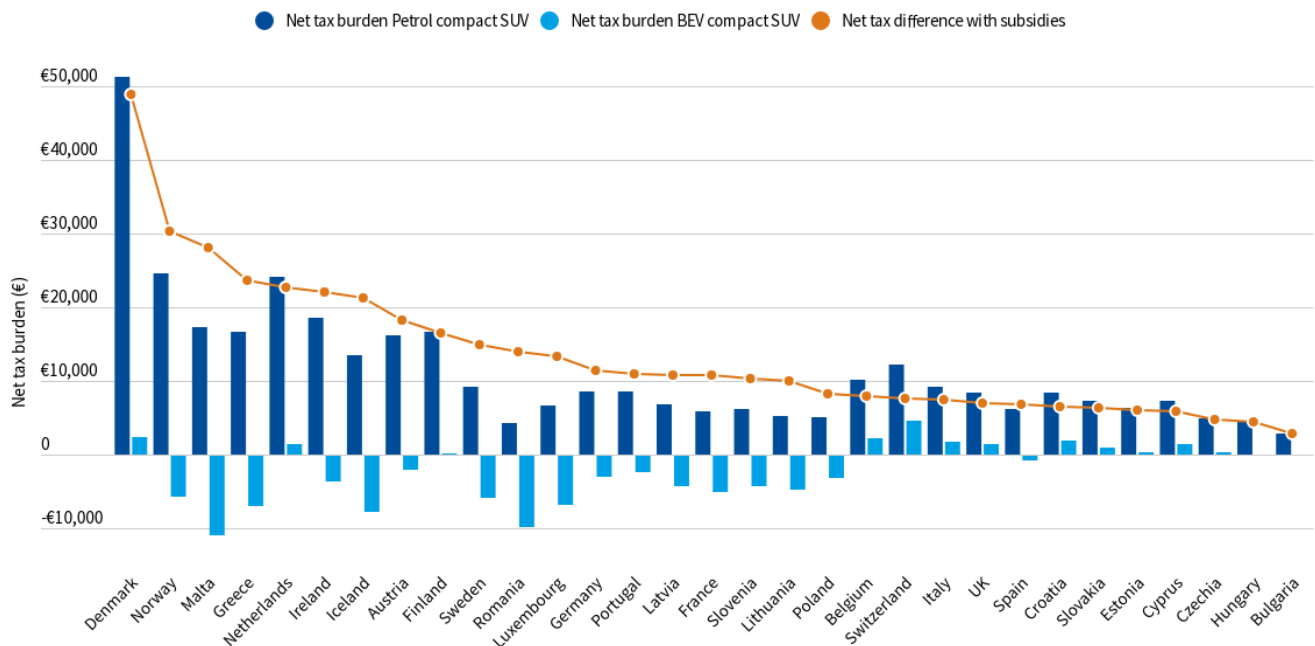


Figure 41: Tax differential (with subsidies) for a compact SUV over ten years of private ownership: BEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

Similarly, the presence of large purchase grants that generate a negative tax burden (i.e. a tax benefit) for BEVs is important for the compact SUV tax differential, but less so than small cars. This is because other forms of taxation (e.g. acquisition taxation, ownership taxation) form a great share of the tax differential for a compact SUV compared to purchase grants. This is especially the case where countries limit their purchase grants for low-emission models based on the car price, a limit that may be exceeded for compact SUV models.

The result is that the ranking of countries by compact SUV tax differential is largely the same with and without purchase grants (Figure 42). Some notable changes include Romania, Germany, France, and Spain, which rely mostly on purchase grants to generate a tax differential and have a small tax burden on polluting vehicles. Therefore, without subsidies, these countries have a lower tax differential compared to their peers.

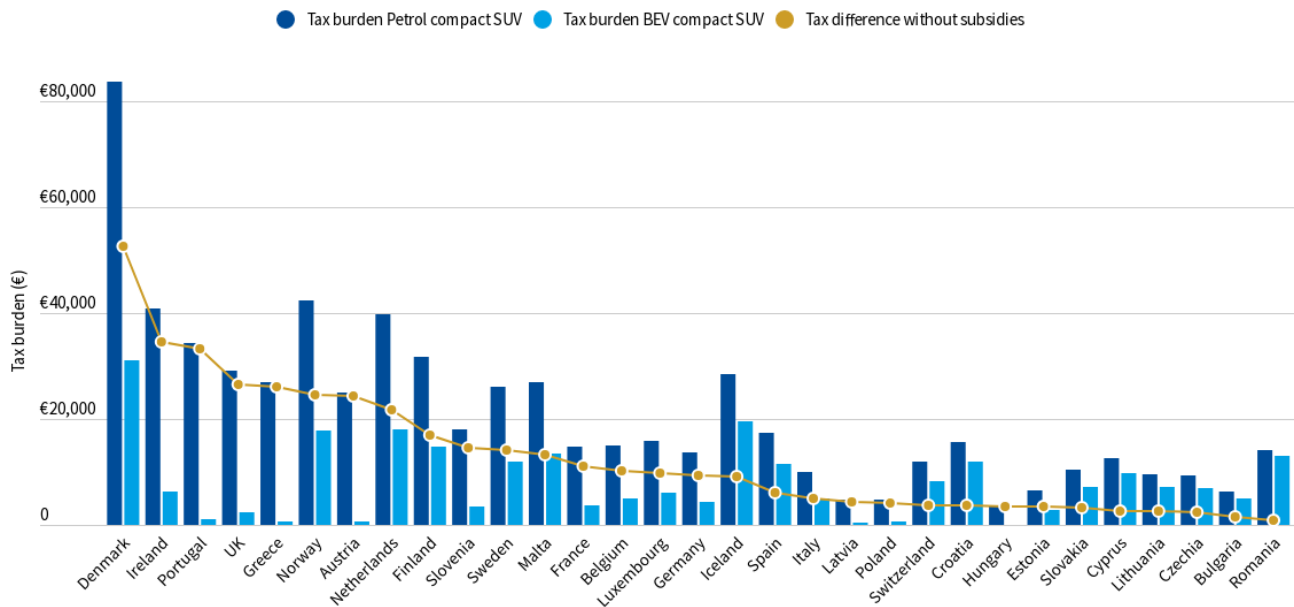


Figure 42: Tax differential (without subsidies) for a compact SUV over ten years of private ownership: BEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

The tax differential between a compact PHEV SUV and a compact petrol SUV over ten years of private ownership varies in a similar manner to the tax differential for the compact BEV SUV (Figure 43). The highest tax differential is in Denmark (€33,500) while the lowest tax differential is in Belgium, where there is a negative tax differential (-€5,950), indicating that a compact PHEV SUV faces a higher tax burden than a compact petrol SUV.

The placement of countries (i.e. the countries that have a high, medium, or low tax differential) is also similar for the low-emission tax differential (PHEV vs petrol) and the zero-emission tax differential (BEV vs petrol). Malta and Romania are the only countries with a negative tax burden for a PHEV.

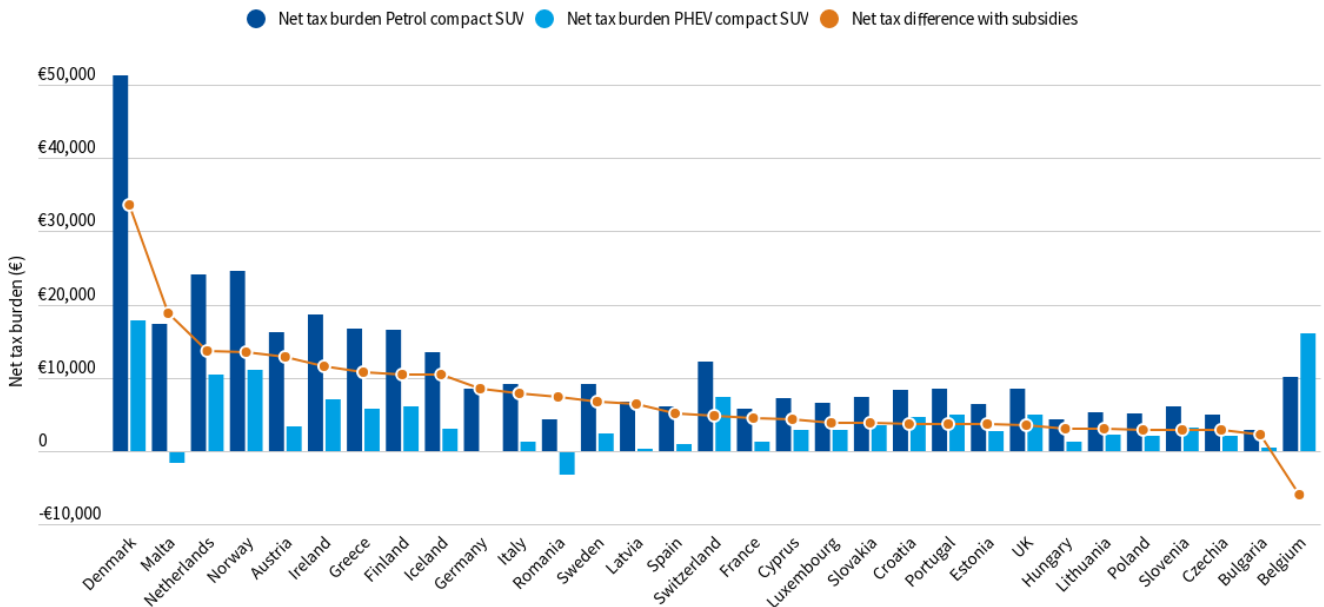


Figure 43: Tax differential (with subsidies) for a compact SUV over ten years of private ownership: PHEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

Fewer countries offer low-emission purchase grants than zero-emission purchase grants (and in lower amounts), and the price threshold excludes a typical compact PHEV SUV in many countries that do offer purchase grants (Sections 2.2.2. and 2.3.2.). As a result, the ranking of countries by tax differential is largely unchanged (Figure 44), with the exception of Malta and Romania.

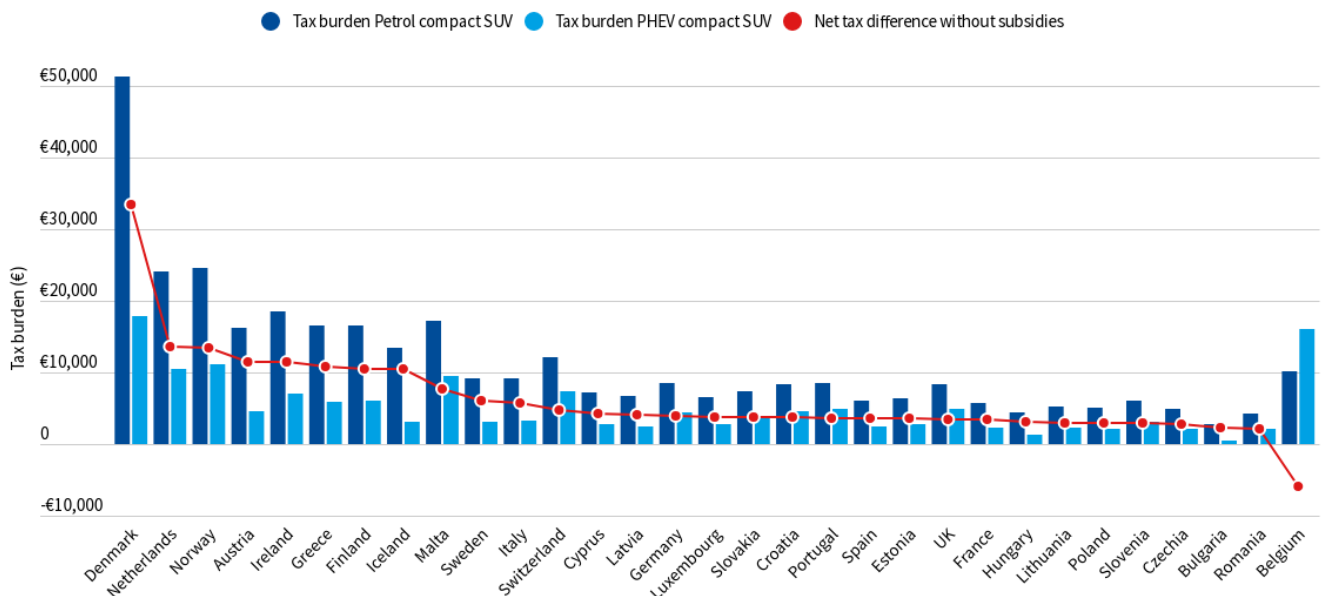


Figure 44: Tax differential (without subsidies) for a compact SUV over ten years of private ownership: PHEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

2.4.2. Net tax differentials for salary cars

The tax differential between a small BEV car and a small petrol car over four years as a salary benefit varies significantly by country (Figure 45), from a high of €15,555 in Ireland to a low of -€1,747 in Cyprus. Compared to the tax differentials for private cars, Ireland and the UK shift up the ranking as favourable benefit-in-kind taxation for BEVs generates a large tax differential, whereas the Netherlands, Denmark, and Romania shift down the ranking due to a weak differentiation in benefit-in-kind taxation by emissions or fuel type.

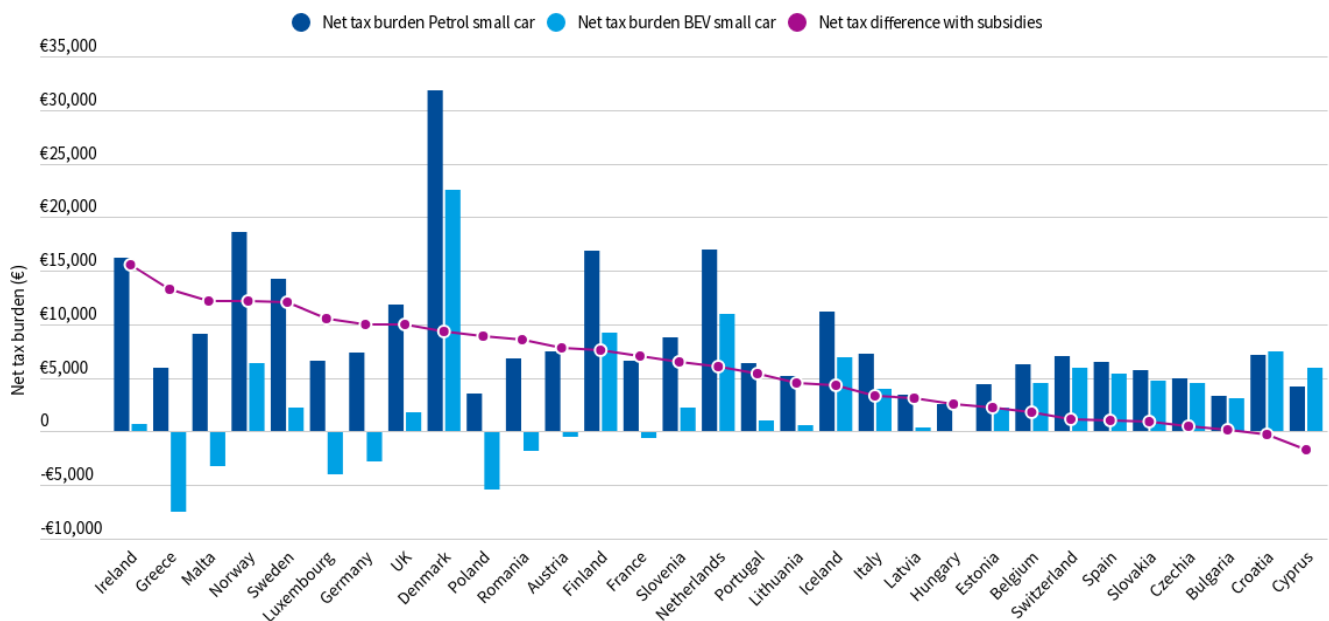


Figure 45: Tax differential (with subsidies) for a small car over four years as a salary benefit: BEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

Without purchase grants, five countries have a negative tax differential between a small BEV car and a small petrol car over four years as a salary benefit (Figure 46). Some of these countries (Croatia, Romania) apply a fixed percentage to car value for benefit-in-kind taxation (Figure 13), and therefore tax BEVs more as they are more expensive. At the other end of the spectrum, the UK joins Ireland as the highest tax differential due to highly differentiated benefit-in-kind taxation (Figure 11).

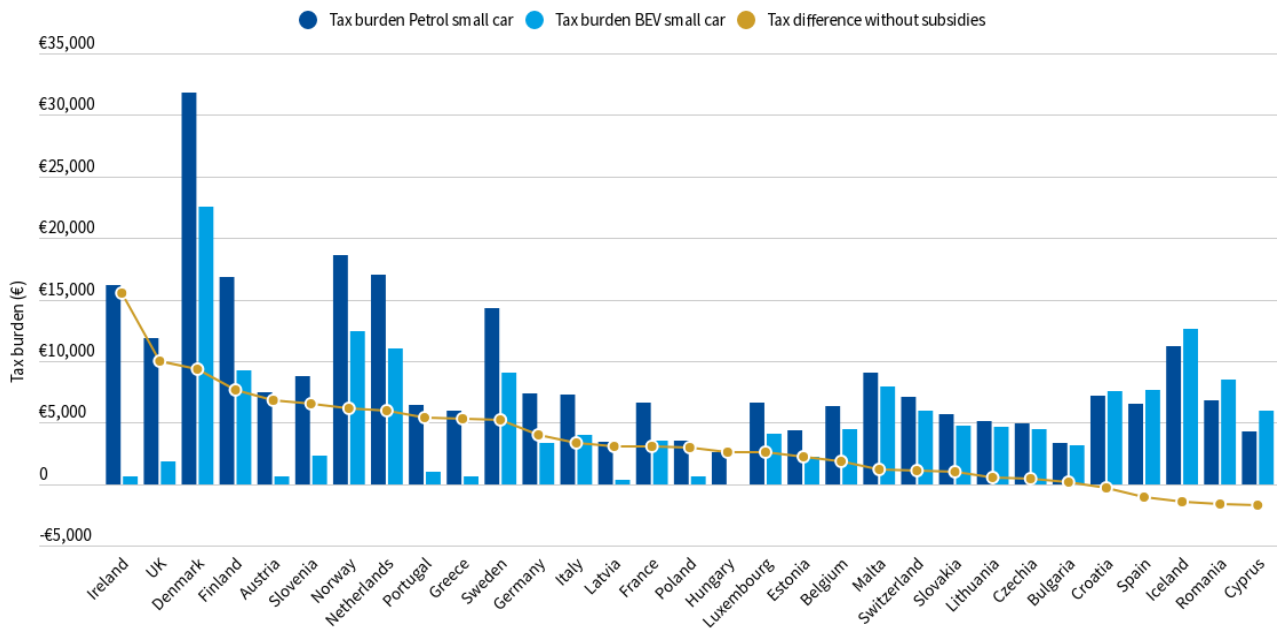


Figure 46: Tax differential (without subsidies) for a small car over four years as a salary benefit: BEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

The tax differential between a compact BEV SUV and a compact petrol SUV over four years as a salary benefit (Figure 47) varies by country to an even greater extent than for a small car (Figure 45). The highest tax differential is in Denmark (€52,614) and the lowest tax differential is in Bulgaria (€1,456). These tax differentials are fairly similar to a privately owned car (Figure 41) as the additional benefit-in-kind tax is compensated by the shorter ownership period.

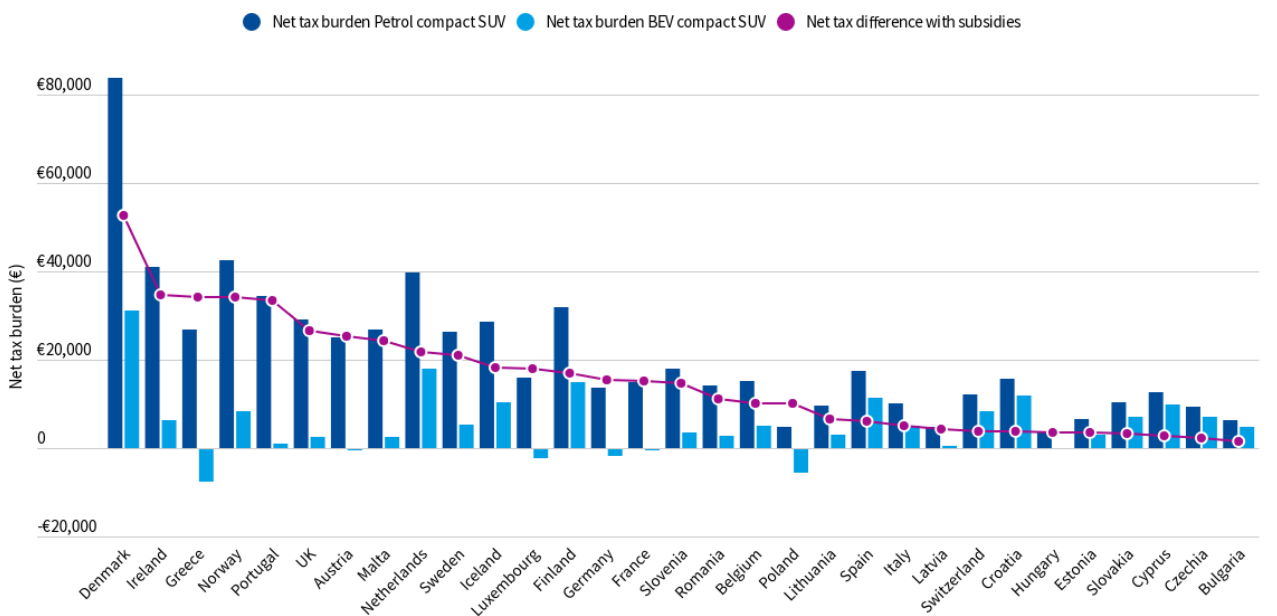


Figure 47: Tax differential (with subsidies) for a compact SUV over four years as a salary benefit: BEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

The presence of large purchase grants that generate a negative tax burden (i.e. a tax benefit) for BEVs is important for the compact SUV tax differential, but less so than small cars. This is because other forms of taxation (e.g. acquisition taxation, ownership taxation, benefit-in-kind taxation) form a great share of the tax differential for a compact SUV compared to purchase grants. The result is that the ranking of countries by compact SUV tax differential is largely the same with and without purchase grants (Figure 48), with Romania as the only notable change (due to its large purchase grant).

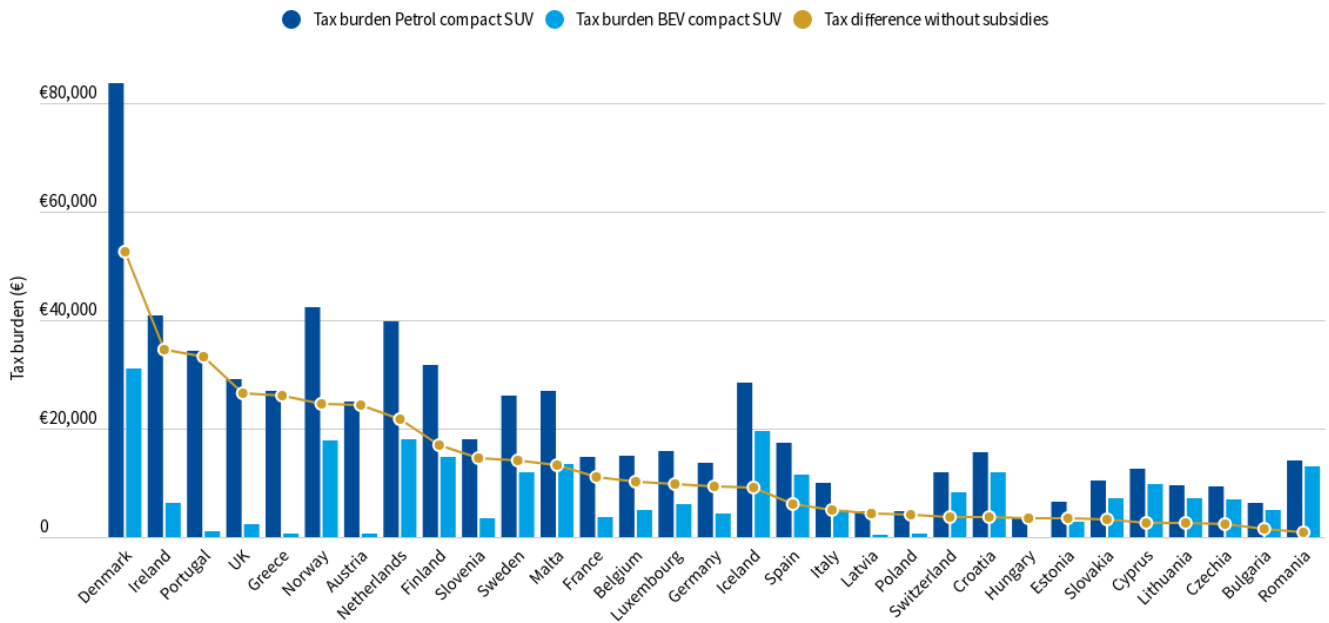


Figure 48: Tax differential (without subsidies) for a compact SUV over four years as a salary benefit: BEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

The tax differential between a compact PHEV SUV and a compact petrol SUV over four years as a salary benefit differs significantly from the BEV differential. For a compact BEV SUV, the tax differential exceeds €1,000 in every European country (Figure 47), whereas for a compact PHEV SUV, 11 countries have a tax differential less than €1,000 (Figure 49). This is a small financial incentive over four years and reflects the fact that benefit-in-kind taxation is typically applied to car price (Table 4) and PHEVs are more expensive than BEVs.

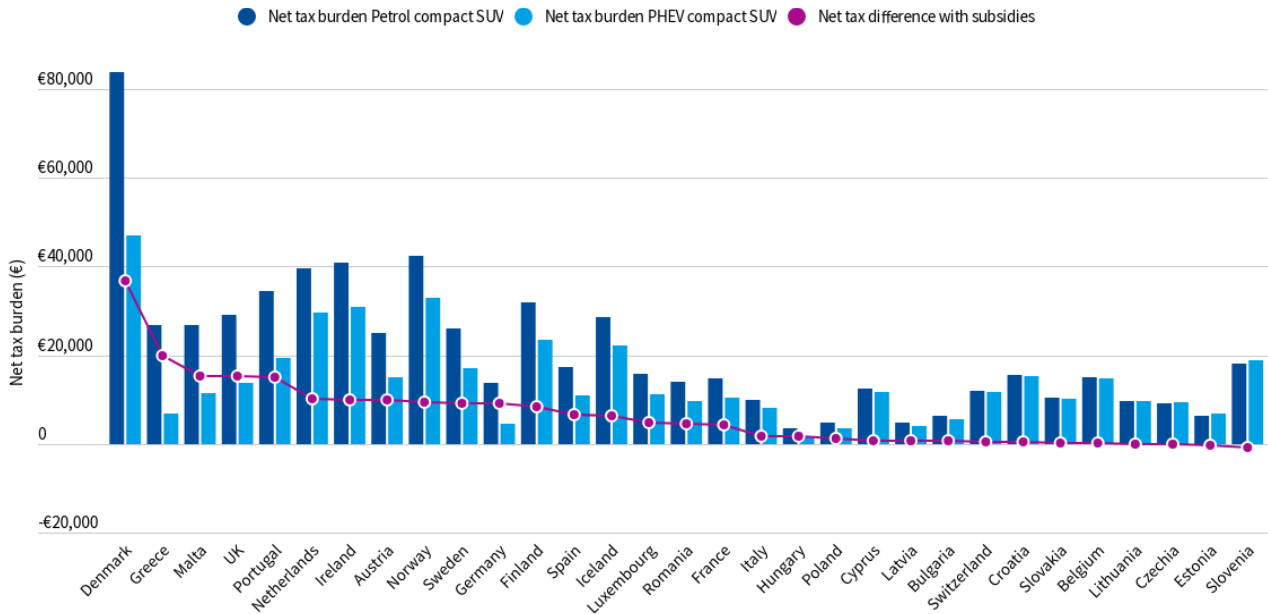


Figure 49: Tax differential (with subsidies) for a compact SUV over four years as a salary benefit: PHEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

As with privately-owned cars (Section 2.4.1.) fewer countries offer low-emission purchase grants than zero-emission grants (and in lower amounts), and the price threshold excludes a typical compact PHEV SUV in many countries that do offer purchase grants (Sections 2.2.2. and 2.3.2.). As a result, the ranking of countries by tax differential is largely unchanged (Figure 49), with the exception of Malta and Romania.

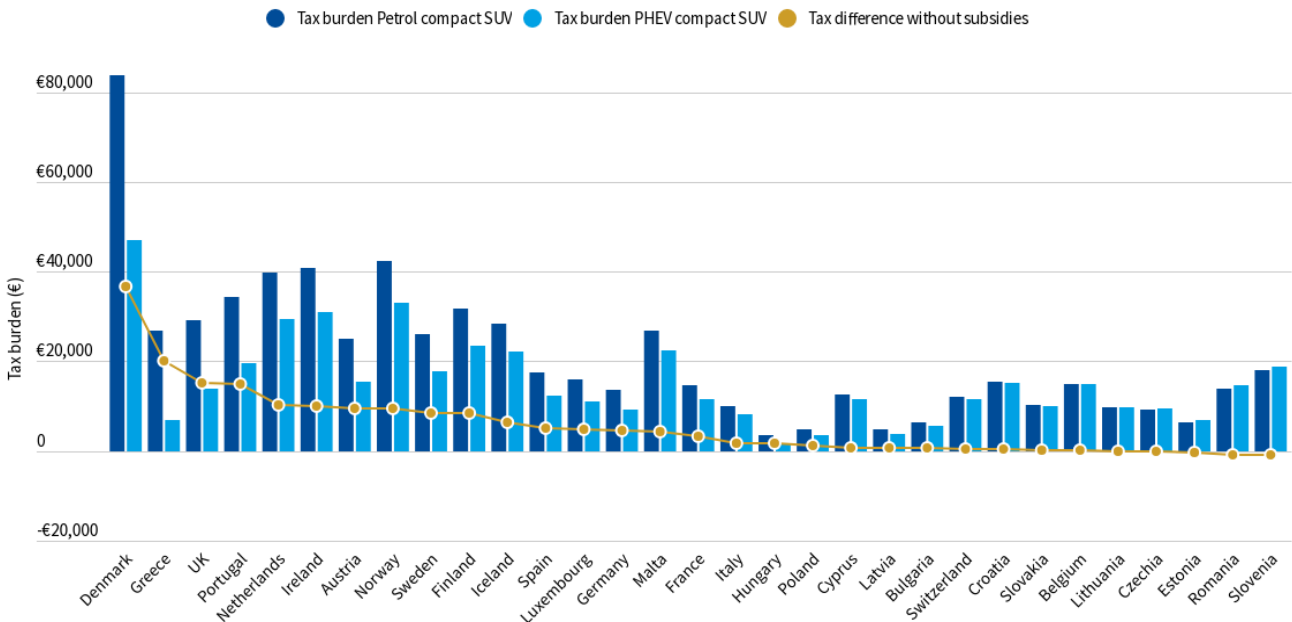


Figure 50: Tax differential (without subsidies) for a compact SUV over four years as a salary benefit: PHEV vs petrol

Source: T&E analysis based on national sources as of 1 September 2022.

3. Discussion

The tax comparisons in the previous section reveal a wide variance in how countries approach car taxation. This variance makes direct, numerical comparison between countries difficult, but not impossible. By calculating the tax burden on typical cars, countries can be directly compared, as can fuel types and other vehicle attributes through the use of net tax differentials.

The resulting numerical comparisons are illuminating and at times counterintuitive. There are several countries that, at least on paper, have differentiated their car taxation by CO₂ emissions, but because the taxes levy a small burden (e.g. the acquisition tax in the UK) or are only introduced above a high emissions threshold (e.g. the acquisition tax in France) the resulting tax differential between polluting and zero-emission cars is relatively small and unlikely to incentivise behavioural change.

These results are highly relevant to countries designing their tax system, in particular for learnings on how other European countries are – or are not – incentivising the transition to a zero-emission fleet.

3.1. Trends in taxable attributes and tax burden by tax forms

Most of the 31 countries employ all seven forms of car taxation covered in this report. The exceptions to this coverage are: nine countries do not have a car acquisition tax, four do not have a car ownership tax, eight do not have purchase grants for zero-emission cars, and ten do not allow for VAT deduction on the purchase of corporate cars. Benefit-in-kind taxation for salary cars and depreciation write-offs are applied in all countries without exception.

While it is expected that tax rates between countries differ – as with income tax, corporate tax, or value added tax – for car taxation there is also a wide variance in the tax base. In total, fourteen different vehicle attributes are used across countries and tax forms.

The most commonly used attributes are CO₂ emission intensity, fuel type, car price, engine power, and business usage, with the relative frequency of attributes varying depending on the form of taxation. For car acquisition taxation, car ownership taxation, and benefit-in-kind taxation, the most commonly taxed vehicle attributes are CO₂ emission intensity and car price, followed by fuel type, engine power, and a long tail of other attributes. Energy excise duties are exclusively based on fuel type. VAT deduction and depreciation write-off on corporate cars are applied to car price in all countries, with a small group of countries applying a car price threshold as a means to limit the tax benefit to luxury vehicles and another group of countries differentiating the tax benefit by CO₂ emission intensity – with significant overlap between the two groups. Purchase grants for low- and zero-emission cars are, by their nature, applied based on CO₂ emissions. Most countries apply a threshold on car price to determine eligibility for these grants, with only one example of an additional vehicle attribute (engine power) being used.

In terms of the resulting tax burden for a private car over a ten year ownership period, energy taxes generate the highest tax burden for all five typical models in nearly all countries. The exceptions are for a compact petrol SUV in Iceland, Ireland, Malta, and Norway, where the acquisition tax burden still exceeds

the energy tax burden over ten years of car usage. This is also the case in Norway for a small petrol car. In most countries, ownership taxation raises a higher tax burden than acquisition taxation, a result partly explained by the absence of acquisition taxation in nearly one-third of the countries.

The sizable contribution of energy taxation to the total tax burden is perhaps surprising. Most EU countries set rates for fuel excise duties close to the minimum allowable rates in the European Tax Directive (ETD) – rates have not been updated since 2003, even with inflation. In July 2021, the Commission presented a proposal for a revision, aiming to bring the ETD in line with the EU's energy and climate objectives. As part of this revision, the minimum tax rates would be updated and automatically adjusted annually, based on relevant consumer price figures.[18] These reforms were also recommended by the European Court of Auditors.[19]

For salary cars, benefit-in-kind taxation generates the highest tax burden for nearly all models and countries. The exceptions are for the BEV models for countries that apply a large benefit-in-kind discount. The tax benefit from depreciation write-offs is also significant, exceeding nearly all forms of taxation on salary cars except for benefit-in-kind taxation.

There are advantages and disadvantages to levying a large share of the tax burden, and thus the resulting incentive, through different tax forms (Info box 1).

Info box 1: What to tax – car purchase, car ownership, or car usage?

In considering the principle of effectiveness and the question of “the right tax at the right time”, a large literature has developed on whether taxation intended to green car transportation should be levied on car purchase, car ownership, or car usage (which roughly align with acquisition taxation, ownership taxation, energy taxation as documented in this report.)

In most cases, the empirical research has concluded that acquisition taxation has proven more effective in driving consumers' purchasing decisions than ownership taxes. This is credited to general myopia (consumers tend to attach greater importance to short-term costs and benefits) and uncertainty about future taxes.[20–24]

There may be an important role for ownership taxes for other policy objectives, for example in revenue generation. In roughly half of European countries, ownership taxation on a typical vehicle will raise a higher tax contribution than acquisition taxation over a ten year period (Figures 29-33). There is also not necessarily a dichotomy between acquisition and ownership taxes in providing incentives. In the UK tax system, acquisition and ownership taxes are integrated into the same vehicle excise duty and therefore aligned. In Germany, where there is no acquisition tax, it has been proposed to simply extend the ownership tax to the first year – including with an increased rate to frontload the tax burden – to mimic an acquisition tax and its beneficial effects.[25]

Taxes on car usage, particularly fuel excise duties are generally considered the most effective tax instrument as they are most directly targeted to the externality (i.e. by incorporating vehicle use,

fuel excise duties approximate the creation of CO₂ emissions rather than CO₂ emission intensity). Fuel excise duties, as they are incorporated in well-advertised prices at the pump are also a very salient form of taxation. While exactly how much consumers discount the longer-term financial savings of increased fuel efficiency is a matter of research debate[26–28], the overwhelming conclusion is that higher fuel prices lead to a more fuel efficient and CO₂ emission efficient fleet as well as substitution between fuel types[22, 29–31].

However, effectiveness is also determined by political feasibility. Over the past decade, fuel excise duties have been stagnant in most European countries and falling in real terms. In early 2022, in response to increasing fuel prices, many governments reduced fuel excise duties further, although these reductions do not cancel out the impact from rising oil prices on car purchase.

3.2. Trends in total tax burden by country

The range in total tax burden between countries is substantial. For a small petrol car, the tax burden over ten years of private ownership ranges from €1,500 in Bulgaria to €17,000 in Denmark. For a compact petrol SUV, the range is from €2,800 to €51,400.

The ranking of European countries by tax burden has some similarities to previous work on car taxation, for example the calculation of average tax burden by vehicle produced by the the European Automobile Manufacturers' Association[32], the fiscal revenues raised as a percentage of GDP produced by the International Monetary Fund (IMF)[33], and the share of transport taxes in total tax revenues produced by CE Delft for the European Parliament[34]. There are significant differences, however, that could have one of several explanations. First, whereas this report limits its scope to new purchases, the other studies attempt an estimate for the whole fleet. Secondly, the unit of analysis is different, with this report analysing the tax burden per typical vehicle, whereas the IMF report and CE Delft report convert their tax burden as a share of GDP and as a share of total tax revenues, respectively. Unfortunately there is no open source of calculations, or in some cases described methodology, for the other studies so these potential explanations cannot be explored further.

Due to the differentiation in car taxation for certain attributes – notably CO₂ emission intensity – the countries with the highest tax burden vary significantly by vehicle model. For BEV private cars, the tax burden is typically low, reaching a high of €4,100 for a small car and €4,600 for a compact SUV in Switzerland. The lowest tax burdens are –€10,800 for both a small car and a compact SUV in Malta (including purchase grants). For a petrol car, the highest tax burden is €17,000 for a small car and €51,400 for a compact SUV in Denmark. The lowest tax burdens are €1,500 for a small car and €2,800 for a compact SUV in Bulgaria. Finally, for a PHEV, where there is only a compact SUV among the typical car models, the highest tax burden is €17,800 in Denmark and the lowest tax burden is –€3,100 in Romania.

From these results, it is clear that Denmark is a ‘high tax’ country with respect to car taxation while Bulgaria is a ‘low tax’ country. Other examples of countries that are typically ‘high tax’ with respect to car taxation are Finland and Ireland, whereas Germany and Romania are typically ‘low tax’. Other countries

may appear as ‘high tax’ for one type of vehicle and ‘low tax’ for another if they apply a high degree of tax differentiation. This is discussed with respect to vehicle emissions in the following section (3.3).

With such a large range of tax burden between countries for the same vehicle, there is a strong potential for cross-border arbitrage. This concern has been expressed for Denmark and Germany, for example, where the former levies the highest tax burden in Europe for most vehicle types and the latter levies a low tax burden for most vehicle types coupled with purchase grants for low- and zero-emission cars. Due in part to the distortions that could result in the EU’s common market, there have been attempts to harmonise car taxation, but none have resulted in EU legislation.[34]

One potential explanation for the positioning of countries as high or low taxation is the presence of OEMs. Across typical models, the tax burden in Sweden is low among Northern European countries, as is the tax burden in Germany and France among Western European countries.

This result is logical given the objective of many governments to support their domestic OEMs, but is perhaps surprising given some well known examples of taxation, such as the high acquisition tax in the French bonus-malus system. However a closer examination reveals that the French malus levies a relatively small tax burden on the vast majority of new registrations and only reaches a significant tax burden (>€1,000) at high levels of emissions – a level that reaches few registrations from French OEMs (2%) but a higher proportion from German OEMs (12%) (Figure 51).

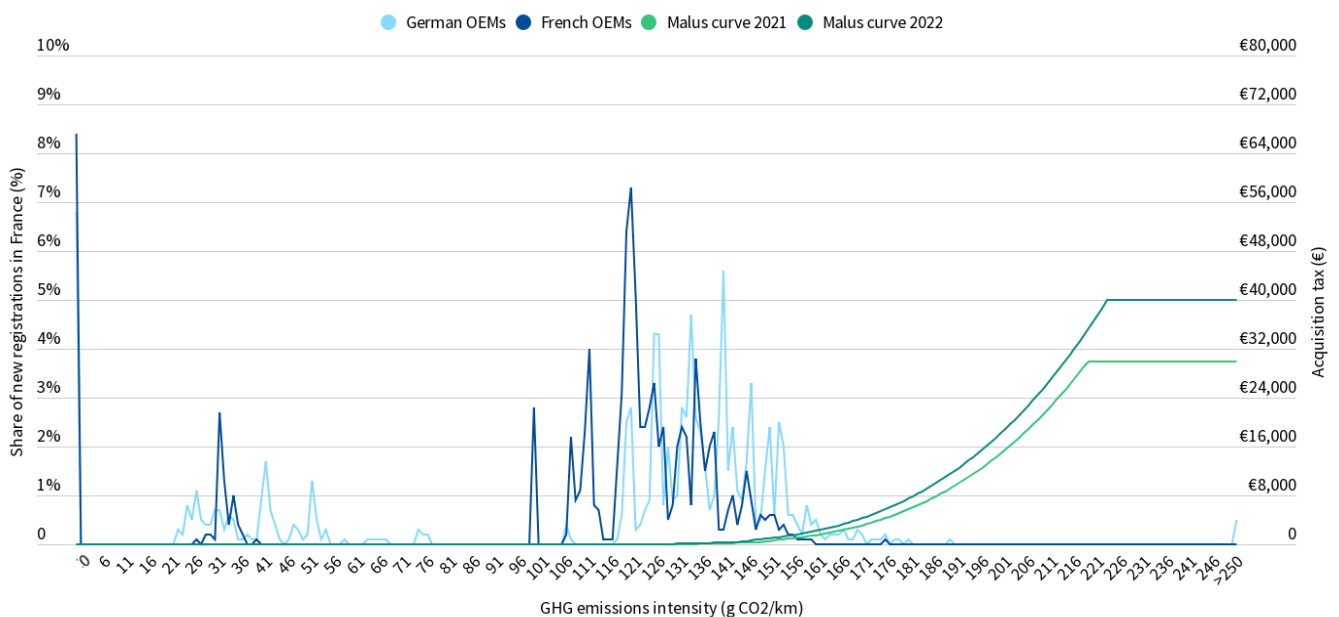


Figure 51: New passenger car registrations in France vs acquisition tax rates

Source: T&E analysis based on Dataforce (2022) New passenger car registrations 2021

The total tax burden also varies by registration type. Corporate cars are eligible for tax benefits, chief among them VAT deduction and depreciation write-off that significantly reduce corporate taxation and explain the popularity of corporate car registrations in Europe.

If these corporate cars are provided to employees as salary cars, the revenues are offset by benefit-in-kind taxation, although this is complicated by the fact that in the absence of salary cars employers would offer taxable income in its place and thus benefit-in-kind revenues are not additional revenue for the government. In light of these corporate tax benefits, some countries have made reforms to their VAT deduction and depreciation write-off policies to help incentivise the transition to a zero-emission fleet, although differentiation is still less common than car acquisition or car ownership taxation (Info box 2).

Info box 2: Should corporate cars be taxed differently than private cars?

In all 31 countries included in this report, corporate cars are taxed differently than private cars. All 31 countries allow for businesses to write-off the depreciation of corporate cars, and 21 countries allow for VAT to be deducted on the purchase of corporate cars. The advantages for employees receiving a car as a salary perk in place of income is also recognised, with estimates of the benefit ranging from 21% to 50% (i.e the amount that salary cars are ‘undertaxed’).[35, 36]

In this context, there is a strong case that as long as such privileges for corporate cars exist, they can – and should – be used to pursue policy objectives. This compromise in keeping corporate car benefits but ‘greening’ them is present in many countries where depreciation write-offs, VAT deductions, and benefit-in-taxation vary by CO₂ emission intensity or other environmental factor (Section 2.1.). The compromise is sometimes politically explicit, as with Belgium’s decision to keep controversial and widely used salary car benefits but phasing out depreciation write-offs for polluting corporate cars.[37] This approach of opportunistically targeting corporate cars for policy objectives shares similarities with the targeting of public sector fleets.

There is also a simple fact of numbers in the case for taxing corporate cars differently as a means to pursue policy objectives. Corporate cars are the majority of new registrations, so impacting the purchasing decisions of corporate cars influences the largest filter through which cars enter the European market. Corporate cars are also driven twice as much as private cars, so displacing an ICE company car is better than an ICE private car.

Finally, corporations are also more able to withstand a higher tax burden on their balance sheet compared to many private households. This socio-economic and distributional argument, together with the focus of businesses on the total cost of ownership rather than purchase prices, likely explains the lower purchase grants for zero-emission cars in many countries (section 2.2.2.) for corporate cars and in one example, France, a higher ownership tax for corporate cars. By shifting the financial burden to businesses, for example by greening corporate car tax benefits, governments can also provide a route to affordable ownership of zero-emission cars (with low operating costs) to low and middle-income families. These user groups tend to purchase cars on the second-hand market, and given the much faster turnover of cars in the corporate channel (generally 3-4 years), the more zero-emission corporate cars implies – perhaps counterintuitively – more zero-emission cars for low and middle-income families.

3.3. Net tax differentials and the transition to a zero-emission fleet

Taxation is a powerful tool to incentivise behavioural change. Taxation can raise/lower the overall tax burden for cars, or in a more targeted manner, taxation can raise/lower the tax burden for particular fuel types or emission levels. The country comparisons illustrate this latter differentiated approach through the ‘net tax differential’ between the typical models (Section 2.4.). The five typical models used in these comparisons allow for the calculation of a net tax differential between a small BEV car and a small petrol car, between a compact BEV SUB and a compact petrol SUV, and between a compact PHEV SUV and a compact petrol SUV. A high tax differential is achieved by levying a large tax burden on conventional ICE cars and/or a small tax burden on low- and zero-emission cars.

It is a highly intuitive but critically important finding that a higher tax differentiation for zero-emission cars is associated with higher uptake of these vehicles. Denmark and Norway have high tax differentials for BEVs and high BEV uptake. Bulgaria and Czechia have low tax differentials for BEVs and low BEV uptake. Across European countries, there is a weak positive correlation between the tax differential for low- and zero-emission cars and their respective uptake (Figure 52a-b). The finding for PHEVs is more complicated, especially as taxation for these vehicles significantly changed in many countries in 2022 while the uptake figures are for 2021 (Figure 52b).

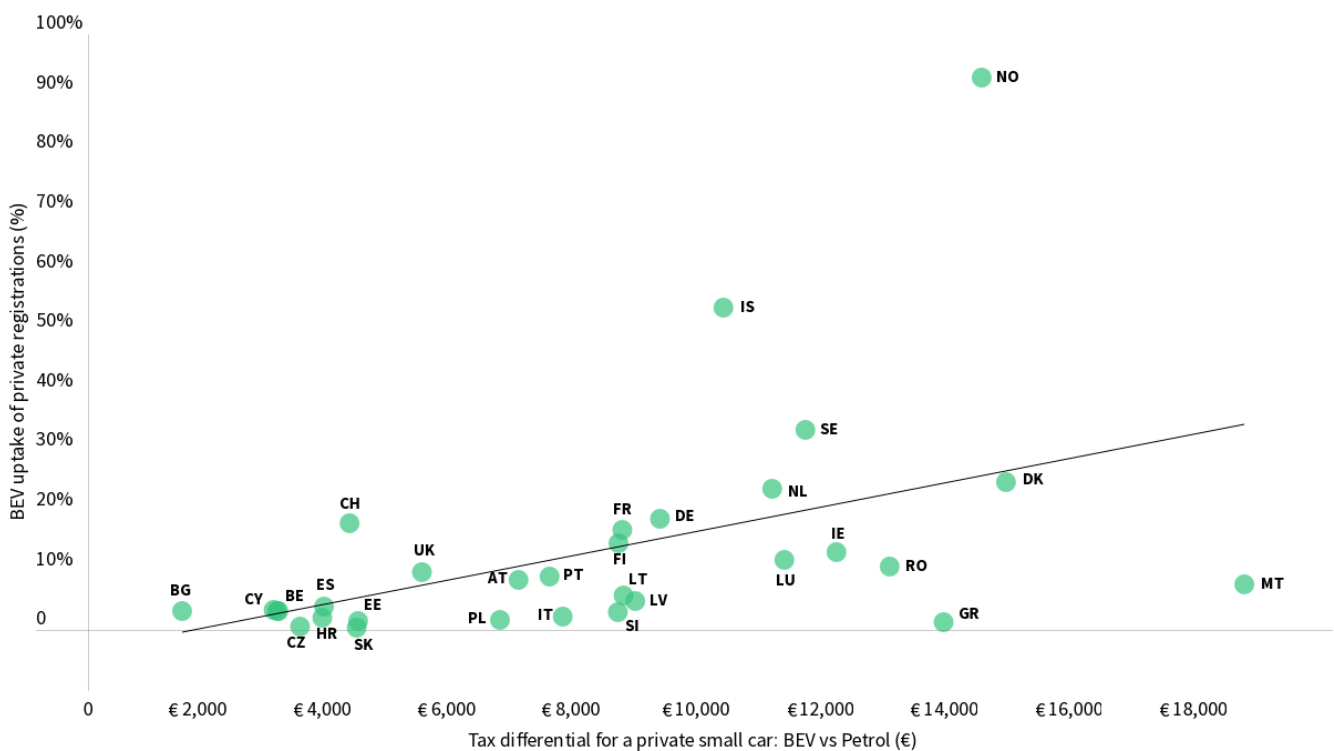


Figure 52a: Tax differential between a small BEV car and small petrol car over ten years of private ownership compared to private BEV uptake

Source: T&E analysis based on national sources as of 1 September 2022 and Dataforce (2022) New passenger car registrations H1 2022.

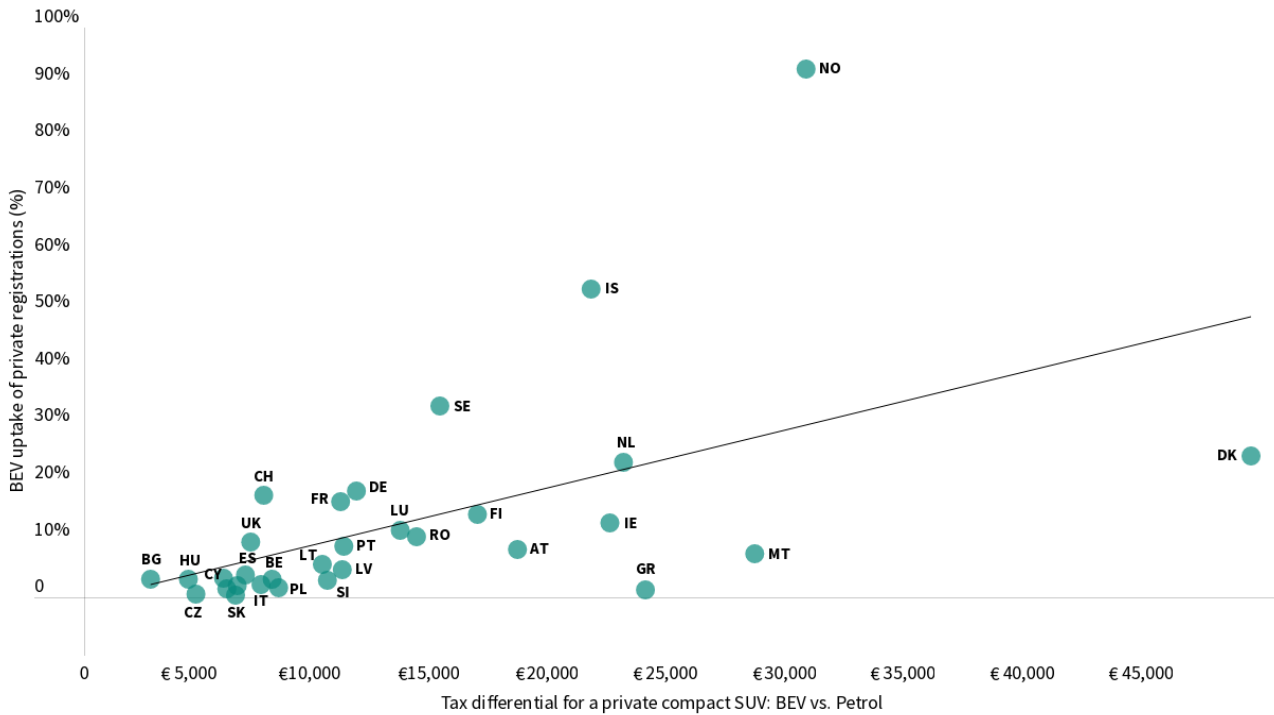


Figure 52b: Tax differential between a compact BEV SUV and compact petrol SUV over ten years of private ownership compared to BEV uptake

Source: National sources as of 1 September 2022 and Dataforce (2022) New passenger car registrations H1 2022.

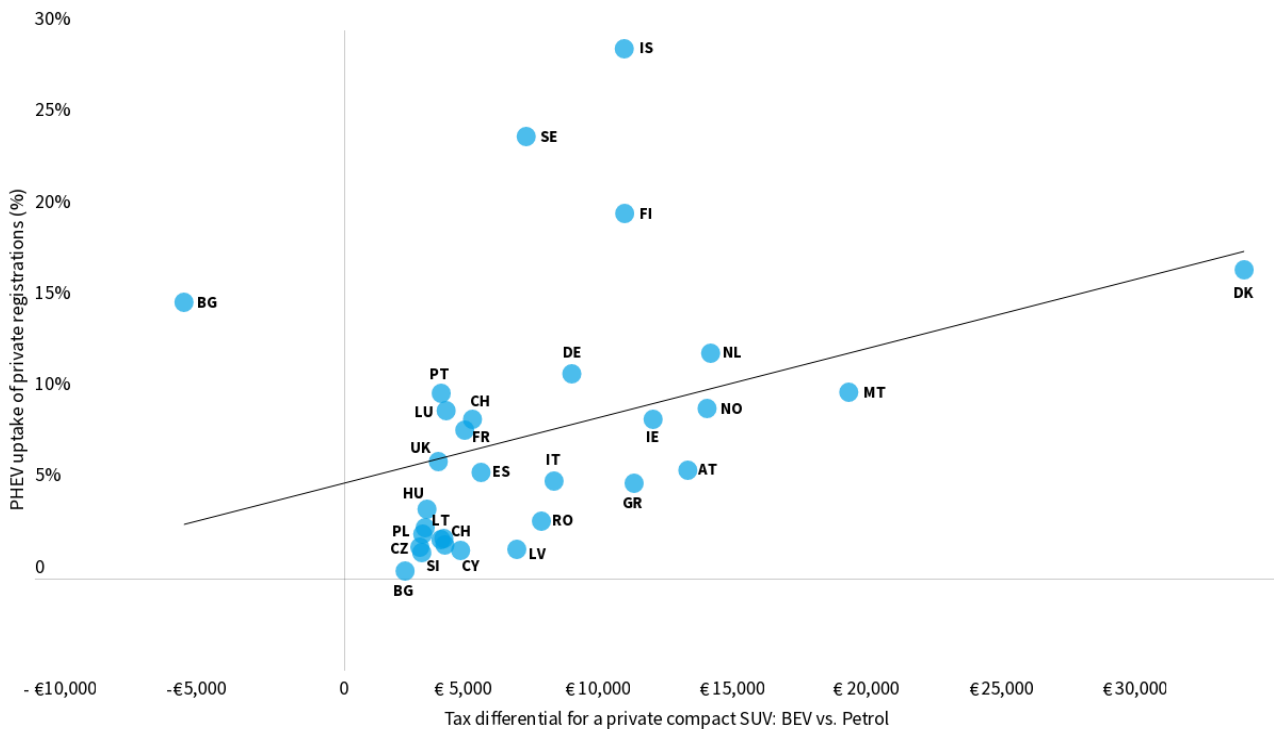


Figure 52c: Tax differential between a compact PHEV SUV and a compact petrol SUV over ten years of private ownership compared to PHEV uptake

Source: National sources as of 1 September 2022 and Dataforce (2022) New passenger car registrations H1 2022.

There is some variation as well, for example the high tax differential in Malta, Greece, and Romania and the low tax differential for Spain and Belgium, but importantly these countries (with the exception of Greece) still match the general differential and uptake relationship for their region (Figures 53a-53c).¹⁴

Malta and Romania have high BEV uptake compared to their neighbours while Spain and Belgium have low BEV uptake compared to theirs. This finding shows both the importance and the limitation of taxation and incentives. It appears that a high tax differential can incentivise uptake but it is not the only factor. Other factors that vary by region, for example the domestic car market, income, culture, information, and infrastructure, also play an important role.

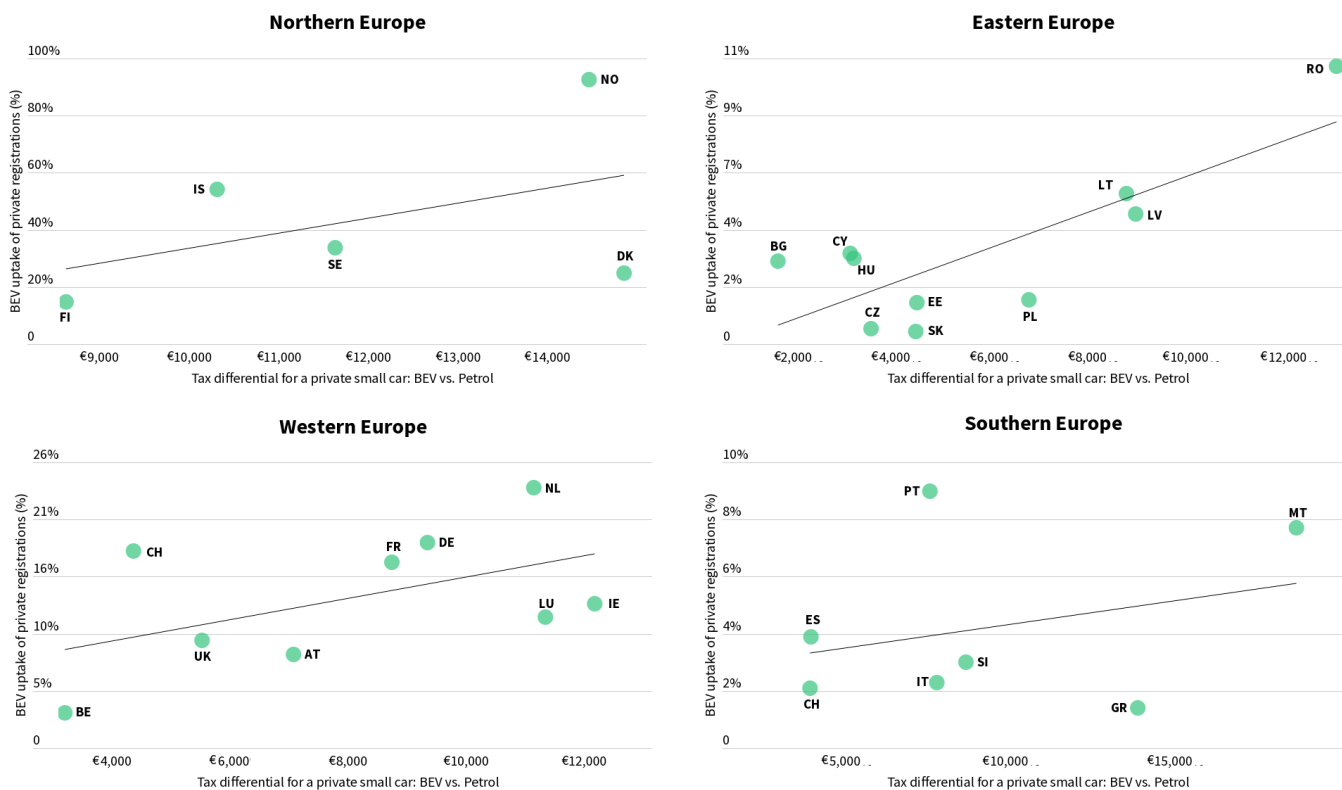


Figure 53a: Tax differential between a small BEV car and a small petrol car over ten years of private ownership compared to BEV uptake, by region

Source: National sources as of 1 September 2022 and Dataforce (2022) New passenger car registrations H1 2022.

¹⁴ There are no official regions for this purpose. The following classifications were used: Northern Europe: Denmark, Finland, Iceland, Norway, Sweden; Western Europe: Austria, Belgium, France, Germany, Ireland, Luxembourg, Netherlands, Switzerland, United Kingdom; Southern Europe: Croatia, Greece, Italy, Malta, Portugal, Slovenia, Spain; Eastern Europe: Bulgaria, Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia

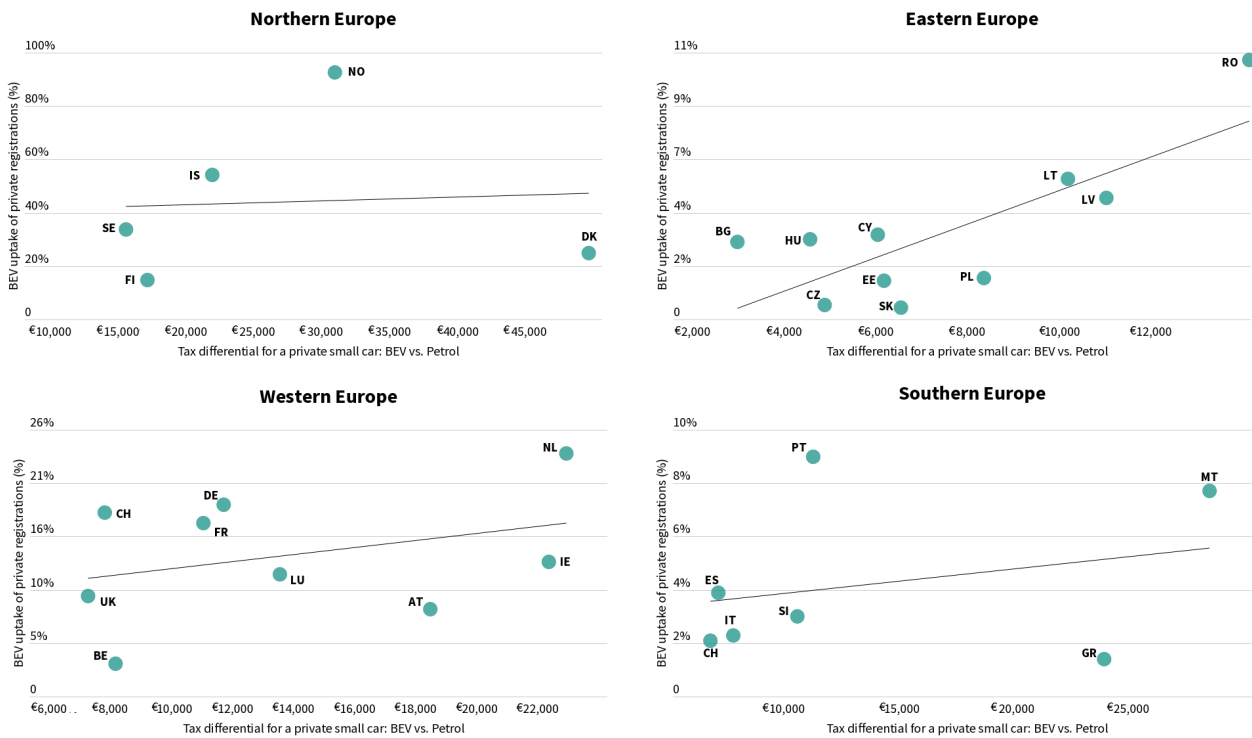


Figure 53b: Tax differential between a compact BEV SUV and a compact petrol SUV over ten years of private ownership compared to BEV uptake, by region

Source: National sources as of 1 September 2022 and Dataforce (2022) New passenger car registrations H1 2022.

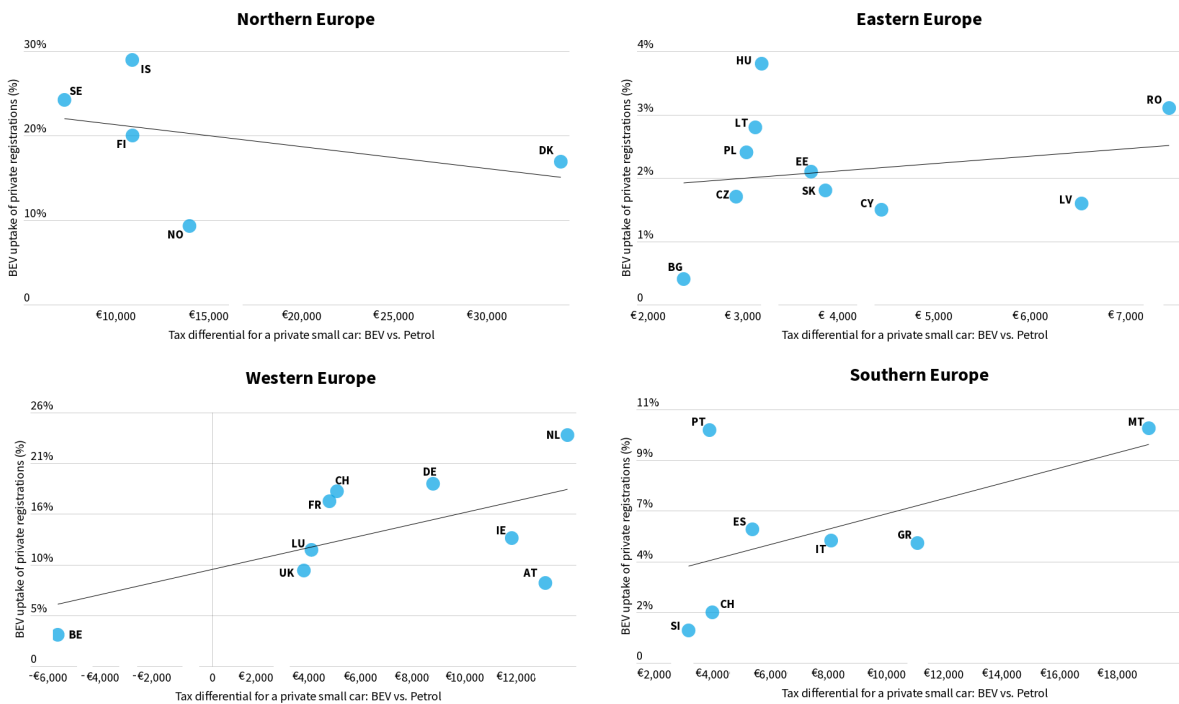


Figure 53c: Tax differential between a compact PHEV SUV and a compact petrol SUV over ten years of private ownership compared to PHEV uptake, by region

Source: National sources as of 1 September 2022 and Dataforce (2022) New passenger car registrations H1 2022.

Unlike the net tax differential for BEVs and PHEVs and their respective uptake, there does not appear to be a correlation between net tax differential and per capita GDP (Figure 54a) or income (Figure 54b). Expanding on the earlier caveat about regional results, Malta and Romania have high tax differentials (and high BEV uptake for their region) while Belgium and Spain are richer countries but have lower tax differentials. On this important metric, neither income nor geography is destiny.



Figure 54a: Tax differentials between fuel types compared to GDP per capita

Source: T&E analysis based on national sources as of 1 September 2022 and Eurostat.



Figure 54b: Tax differentials between fuel types compared to median earnings

Source: T&E analysis based on national sources as of 1 September 2022 and Eurostat.

As some countries have been partially successful in fostering a transition to a zero-emission, questions have been raised about how long tax benefits are required (Info box 3). The simple removal of tax benefits would shrink the tax differential, but it is not the only option for tax design.

Info box: Are subsidies for zero-emission cars required? For how long?

As documented in Section 2, purchase grants for low- and zero-emission cars are common to many European countries, currently present in 23 of 31 tax systems covered in this report. These purchase grants are not simply a European phenomenon either, with similar systems of support found in the United States, China, and other major automotive markets worldwide.

The idea behind purchase grants is to subsidise a new, beneficial, but more expensive technology in the early phase of adoption. The diffusion of new technologies generally follows a well-documented ‘s-curve’ where adoption is slow at first, as early adopters face a price premium, speeds up once a certain price point is reached, for example price parity with existing technology, and slows down once more for the late adopters who continue to resist the new technology.

Crucial to the s-curve of technological diffusion is the price point at which the new technology achieves mass market appeal. Rapidly falling costs for battery electric vehicles have resulted in the technology racing – and in many cases passing – a point of parity with conventional petrol and

diesel vehicles in terms of the total cost of ownership (TCO). This TCO finding has been documented for most size segments and in most markets.[38]

From an economic perspective, this TCO advantage, as opposed to purchase price alone, is the most relevant consideration. However TCO parity is unlikely to be enough to spur uptake. There are other non-financial factors, such as unfamiliarity with the technology or dislike of some feature. Car buyers may also discount operating costs and focus on purchase costs in a way that is not strictly 'rational' in terms of economic decision-making. T&E research with Bloomberg New Energy Finance has calculated that because of falling costs for BEVs, price parity is likely to be achieved by 2025 for some segments and 2027 for all segments.[39]

The impact of the purchase subsidies is hard to deny. Since 2001, Norway has implemented a system of support whereby zero-emission cars are exempt from VAT (25% of the purchase price) and avoid the country's high acquisition tax. Not only has this system rocketed Norway to the top of the world rankings for BEV uptake (65% for BEVs and over 86% including PHEVs in 2021), it essentially guaranteed a market for early BEV models from which learnings could be drawn (i.e. a subsidy for applied R&D). With this important role, the consequences of Norway's subsidisation extend well beyond its borders and into the global car market.

Norway is currently in the process of ending its subsidy for zero-emission cars. Similar changes are seen in other leading markets, with Germany recently announcing that subsidies will be reduced and the UK subsidies have already been phased-out completely. As BEVs have reached 65%, 14%, and 12%, respectively, there is a clear logic that zero-emission cars have exited the early adoption phase. Using purchase subsidies as the primary policy tool also has serious drawbacks (that increase the longer they are kept in place) including questions over the cross-border flow of subsidised BEVs, the suppression of BEV prices in the second-hand market, an increase in the number of cars on the road, a risk that an expectation of low taxes becomes ingrained, and value for public money. Where strong regulations are in place, for example CO₂ standards that specify an average CO₂ emission intensity of new sales, the uptake of zero-emission cars is a key strategy to meet mandatory regulation and thus the subsidies mostly aid carmakers. In some markets, but not all, the case for subsidy removal is strengthening.

However, subsidisation of new technologies is not the only argument for a tax differentiation between vehicle technologies. The difference in CO₂ emissions and other environmental impacts still remains, and thus if the subsidisation of zero-emission technologies ends, taxation of polluting vehicles – which is low or completely absent in many countries – is required.

As European countries – both EU and non-EU – have ambitious objectives to end the sale of polluting vehicles and transition to a zero-emission fleet, the lessons to be learned from taxation are crucial. These lessons are especially important as systems of taxation are dynamic and many countries have opportunities to reform their tax systems on an annual basis through finance laws. Several countries have recently removed purchase grants and/or implemented new taxes for PHEVs as their real-world emissions have become clear. The tax comparisons presented here point to more examples of peer learning that could be quickly implemented.

4. Developing principles for car taxation

The previous sections documented systems of car taxation across Europe. To move from documentation to guidance, this section develops principles for environmental taxation and then applies these principles to European systems of car taxation to highlight examples of good, bad and interesting practice.

4.1. Principles for environmental taxation

In developing principles of car taxation it is useful to consider principles of taxation in general, as the topic has been given significant consideration. As early as 1776, Adam Smith identified four principles of taxation in *The Wealth of Nations*: respective ability, certainty, convenience and efficiency.[40] These principles have proven remarkably resilient, with recent formulations, for example from the OECD, identifying similar principles of neutrality, efficiency, certainty/simplicity, effectiveness/fairness, flexibility, and equity.[41]

Environmental taxation differs from more general forms of taxation (e.g. corporate taxation, income taxation) in that the incentive-based component, rather than the revenue-generation component, is key to its design.

4.2. The good tax guide principles

The good tax guide principles have emerged from research and analysis on current European car taxation but are expressed in a generalised form. The principles can be applied to other environmental issues, other geographies, and other points in time. The twenty principles cover all aspects of tax design with recommendations on objectives, application, scope, fairness, finance, and process.

The principles do not advocate for particular environmental outcomes, but rather offer guidance on tax design. Neither do the principles offer recommendations on specific tax schedules, but rather offer guidance that is relevant to countries regardless of their specific and varying circumstances.

Recommendations on objectives

1) *Specific and ambitious objectives should be defined*

In order to define 'good' policy, an overall objective is required from which success can be defined. For car taxation, a clear ambition has been set in Europe – for both EU and non-EU countries – to phase-out polluting cars and transition to a zero-emission fleet. This objective is ambitious in scale and timing. Governments may have additional objectives for road transport (e.g. local air pollution, noise, safety, congestion).

Recommendations on application

2) *Taxation should be used to incentivise objectives*

Taxation is one of the most important tools to generate behavioural change. As people and businesses respond to prices, taxation achieves this change by adjusting relative prices. This can be done through increasing the tax burden on a product or activity, by decreasing the tax burden on a product or activity,

or both. For car taxation, incentivisation might entail increasing the tax burden on polluting vehicles, decreasing the tax burden on zero-emissions vehicles, or both.

3) Taxes should be applied directly and efficiently

To incentivise intended outcomes, and avoid distortions to unrelated outcomes, taxes should be applied directly to the harm they are trying to reduce or the benefit they are trying to encourage. However, environmental and social harms (or benefits) can rarely be taxed directly. Instead, there is a spectrum of directness. The more directly a tax is applied, the smaller the market distortion. For car taxation, this spectrum of directness ranges from taxes on CO₂ emissions themselves, fuel use, CO₂ emission intensity, fuel intensity, engine power and capacity, vehicle size, vehicle price, or to a fixed fee.

4) Taxes should be applied based on real-world impact

Directness is best achieved when taxation is linked to real-world impact. This can vary when the impacts of a product or activity depend on its usage. For car taxation, the issue of real-world impact has arisen with purchase subsidies for PHEVs, where the real-world usage of the vehicle differs from laboratory testing. The issue has also arisen for the ownership period of subsidised vehicles as there is a risk of the vehicles – and the associated benefits – leaving the country if the vehicle is exported through second-hand sale.

5) Taxes should be applied broadly

A broad tax base is a common tax principle for revenue generation, but it is also an important principle for incentivisation. When taxation is broadly applied, a large share of relevant purchasing decisions are influenced, thereby increasing the ability to reach a comprehensive policy objective. The tax must also be applied at a significant level. For car taxation, a broad taxation implies setting a tax schedule in such a way as to not only levy a higher tax burden on higher emitting cars, but also ensuring that there is still enough of a tax differential between polluting and zero-emission small cars to incentivise a shift in purchasing behaviour.

6) Taxes should be applied in a continuous, incremental manner

When taxation is applied in a continuous, incremental manner, there is a marginal financial incentive for behavioural change at each and every level point in the tax schedule. This tax approach contrasts with a flat tax, where there is no marginal financial incentive for behavioural change. A stepwise approach to taxation offers a marginal financial incentive for behavioural change at some point in the tax schedule, but creates threshold effects where the ‘steps’ in a tax schedule mean that there is no incentivisation at some points (i.e. movement across a step) and very high incentivisation at other points (i.e. movement up a step). This threshold effect results in market distortion and tax avoidance. For car taxation, applying taxation in a continuous, incremental manner might entail the use of a continuous tax curve with respect to CO₂ emissions (or other pollutants) where the tax burden changes with each additional unit of emissions.

7) Taxes should be applied to outcomes in a technology-neutral manner

Specifying a certain technology in tax policy harms the pursuit of an objective by either allowing, and indirectly incentivising, harmful but unspecified technologies to develop and avoid tax burden. It can also

disincentivise the development of beneficial but unspecified technologies to develop and receive a tax benefit. Technology neutrality is therefore a means of future proofing policy to technologies that may not be developed at the time of implementing a tax policy but could emerge in the future. For car taxation, a technology-neutral approach might entail linking purchase grants to a level of pollution (e.g. a zero-emission car) rather than a particular power source in the vehicle (e.g. a battery, hydrogen).

8) Taxes should be applied with clarity and simplicity

Behaviour change is only possible if individuals and businesses are aware of how different products or activities can yield a different cost (as a result of the associated tax burden). This does not necessarily imply that all the details of a tax policy are known, although that is helpful, but rather that the post-tax financial cost is clearly visible so that behaviour is guided. It is the price signal that should be clear. A lack of clarity and simplicity can also increase the administrative costs for governments and/or for individuals and businesses. For car taxation, a clear and simple tax application might entail applying taxes at the point of sale and on vehicle attributes with widely understood societal harms.

Recommendations on scope

9) Taxation should consider impacts beyond the direct objective(s)

Tax policies can achieve their objectives in an effective and efficient manner, but the negative impacts on other issues may outweigh the direct benefits. In these situations, a policy may deliver a perverse incentive with unintended consequences. For car taxation, there is a risk that focusing on one particular environmental outcome, or a limited geographic scope, could lead to these unintended outcomes. Several countries have changed their approach to fuel taxation in recognition that diesel has lower CO₂ emissions than petrol but higher local air pollutants.

10) Taxation should consider interaction with other policies

Tax policies exist in a complex policy environment and cannot be considered in isolation. While a tax policy may be perfectly designed in its own right, the existence of other policies may undermine – or enhance – its success. For car taxation, policy consideration could range from vehicle regulations and mandates, to taxation in relevant supply chains, to the progressiveness of broader social policy.

Recommendations on fairness

11) Taxes should be applied in a socially just and equitable manner

Applying taxes in a socially just manner means not discriminating against certain groups and, like considering the impacts beyond the direct objectives (#9), enhancing equity in society. This is an outcome for its own sake, and it can also generate buy-in for the policy. For car taxation, a fair approach to taxation might entail levying taxes as a share of car value, income-based policies, and/or tax benefits in the second-hand market.

12) Taxation should foster a just transition

In order for behavioural changes to take place, viable alternatives must be put in place. Applying a just transition means providing advance notice of policy change and/or ‘grandfathering’ policy changes so that future actions are influenced without unfairly punishing actions from the time before the policy was

in place. For car taxation, fostering a just transition might entail relying on acquisition over ownership taxation to influence new car sales rather than raising the tax burden on car sales that took place before the policy was enacted.

Recommendations on financing

13) Taxation should be applied in a cost-effective manner

Taxation can be excessively costly – either to the government in administration costs or to individuals and businesses in compliance costs – to meet a particular policy objective. These costs should not exceed the benefits of the policy. Policy targeting is one approach to lower costs, for example focusing tax benefits on additionality and avoiding deadweight losses that result from paying for behaviour that would have taken place without the tax benefit. Conversely, it is generally cost effective to levy taxes on a broad, untargeted tax base (#6) and in a simple manner (#4). For car taxation, a cost effective approach might entail using car price thresholds or income-based thresholds for purchase grants and other tax benefits as these benefits have a greater marginal impact on consumer decision-making for cheaper vehicles.

14) Taxation should be sustainably financed

Whether it is a tax burden on a shrinking tax base or a tax benefit on a growing tax base, the system of taxation should be financially sustainable to ensure longevity. It is thus important to consider if taxation is expected to make a product/activity increasingly popular or unpopular. For car taxation, financial sustainability is an important consideration for purchase grants which become untenable for public finances and potentially unnecessary as ownership increases. This is also the case for car taxation based on pollution as there is a transition towards a zero-emission fleet. Bonus-malus systems, where funding for purchase grants is balanced with revenues from (some) form of taxation on polluting cars offer a hypothesized approach to sustainable funding.

15) Financial contributors should come from polluters and most intensive users

Different individuals and businesses do not generate environmental harms equally, nor are benefits from public services shared equally. In this context, the ‘polluter pays principle’ and the ‘user pays principle’ suggest that financial contributions should be differentiated. For car taxation, it follows that taxation should be higher on higher emitting cars in recognition of environmental outcomes and societal fairness.

Recommendations on process

16) All available taxes should be considered

Taxation rarely, if ever, exists in a world of ‘first best’ solutions. Instead, political and technical feasibility often limit what would otherwise be the preferred tax policy. In such cases, tax policies that are used in the pursuit of policy objectives are second-best solutions (or beyond). For car taxation, if the most direct and efficient tax approaches like fuel taxes and acquisition taxes are not feasible, this might entail raising ownership taxation in the first year to mimic an acquisition tax, or targeting corporate car taxation.

17) Policy certainty should be provided

Uncertainty brings economic costs, whether that comes from households postponing consumption, firms delaying investments, or raised risk premia in financial markets. Uncertainty can undermine confidence

in the specific policy as well as the broader car taxation system. For car taxation, there is often uncertainty regarding the details of purchase grants, for example if the subsidy pot is limited by time or funding and/or if it will be renewed. This can prevent consumers factoring this into their car purchase decision-making.

18) Policy flexibility should be allowed

Policy flexibility allows for changes in response to a dynamic environment where new products and activities are created and new laws are passed. In some cases, there may be a trade-off between policy flexibility and policy certainty (#17). For car taxation, policy flexibility might entail the ability to reform car taxes through annual finance laws. This flexibility has proven important to tighten policies to provide greater incentives (#2) and to reform policies in light of new evidence, for example real-world emissions (#8).

19) Taxation outcomes should be monitored and evaluated

Policy outcomes may deviate from their original intent. With close monitoring and evaluation there are opportunities to implement learnings, particularly in systems that allow for policy flexibility (#18). For car taxation, this might entail monitoring the progress of new car sales towards a fully zero-emission fleet and intermediate targets on the trajectory towards this objective.

20) Taxation should continue to develop through peer-learning

To evaluate whether policies are meeting their intended outcomes, comparisons with other countries can prove illuminating. This approach is particularly useful in Europe where there are over thirty examples of tax systems that operate fairly independently, and in parallel, despite a highly integrated market. For car taxation, peer-learning includes findings from the *The good tax guide* and other research on comparative taxation.

4.3. Good, bad, and interesting practices

Applying the twenty *Good tax guide* principles to existing systems of European car taxation reveals many examples where the principles are being successfully applied, but also many examples where the principles are seemingly being overlooked. Part of the strength of European policy-making is that a large number of diverse countries produce a large number of policy approaches that can serve as inspiration – or as a warning.

The following tables catalogue examples in terms of good, bad, and interesting practice (Tables 15-17). It is a non-exhaustive account, and potentially a contentious one. There is more than one way to design a system of car taxation and different systems may be more or less suitable to different national contexts. This important context is reflected in the three-part classification, where, in simple terms, countries should do all the good, none of the bad, and consider the interesting as a policy option.

Examples of good policy practice tend to be straightforward and unnoteworthy. A functional tax system that follows *The good tax guide* principles does not set itself apart from its peers, there are six good policy

practices that apply an uncommon tax innovation that aligns with the tax principles (Table 15). Norway and France are the leaders here, applying three of the six good policy practices.

Table 15: Examples of good policy practice in European car taxation

Good policy practice	Application of tax principles	Country examples
Continuous tax curve rather than a small number of wide thresholds.	<i>Marginal incentives:</i> Creates marginal incentives across the spectrum of vehicles. Avoids threshold effects.	<i>Acquisition taxation:</i> AT, CY, FI, FR, HR, IS, IT, MT, NL, NO, PT <i>Ownership taxation:</i> CY, FR, IT, SE <i>Benefit-in-kind taxation:</i> UK
Calculation of benefit-in-kind reflects the real cost of provision, e.g. value of the vehicle is net purchase tax/subsidy.	<i>Real impact:</i> Reflects the real cost of provision. <i>Incentivisation:</i> Provides a further incentive between vehicles with higher and lower acquisition taxes. <i>Directness and efficiency:</i> Limits distortion between corporate and private markets, e.g. an oversupply of salary cars. <i>Just and equitable:</i> Addresses part of the undertax of salary cars, which are provided to employees with higher incomes, on average.	<i>Benefit-in-kind taxation:</i> IE, NL
Explicit use of multiple taxes to target multiple environmental harms.	<i>Incentivisation & Directness and efficiency & Wider impacts:</i> Levying taxes on the vehicle attributes most associated with environmental harms is the most direct manner to target multiple policy objectives. <i>Avoid unintended consequences:</i> By solely taxing one attribute.	<i>Acquisition taxation & CO₂ emission intensity & NOx emission intensity:</i> NO <i>Acquisition taxation & CO₂ emission intensity & weight:</i> FR
Clear schedule of anticipated changes to tax rates over time.	<i>Clarity and simplicity:</i> Advanced notice of tax changes. <i>Just transition:</i> Allows the planning of car purchases with full information and with time to react.	<i>Acquisition taxation:</i> AT, FR <i>Ownership taxation:</i> AT, FR
Higher tax burden from acquisition taxation than ownership taxation.	<i>Directness and efficiency:</i> Buyers respond more to incentivisation from upfront costs.	<i>Acquisition taxation & ownership taxation:</i> IE, MT, NL, NO, GR
An assessment of car taxation	<i>Monitoring and evaluation:</i> Considers	<i>Purchase incentives:</i> IE

by an arms-length government body.	whether existing policies are delivering on government objectives. <i>Peer learning:</i> Puts policies in the context of other countries.	
------------------------------------	--	--

Compared to good policy practice, the identified cases of bad policy practice constitutes a longer list of noteworthy examples (Table 16) that range from the complete lack of taxation in Czechia and Estonia, to attempts at taxation that border on the absurd, such as the subsidy pots for zero-emission cars being exhausted in eight days in the Netherlands[42] and two minutes in Estonia and Croatia[43].

In total, there are 12 bad policy practices that appear in 28 countries. Finland, Iceland, and Norway are the only countries that do not apply any of the bad policy practices, whereas Croatia applies the most with five examples.

Table 16: Examples of bad policy practice in European car taxation

Bad policy practice	Application of tax principles	Country examples
Contradictory policies by fuel type, e.g. lower fuel excise duty on diesel but higher acquisition or ownership taxation on diesel.	<i>Directness and efficiency:</i> More difficult for policies to meet their intended effect. <i>Clarity and simplicity:</i> Unclear signal to consumers.	<i>Excise duties & acquisition taxation:</i> HR, IE, LT, NL, PT <i>Excise duty & ownership taxation:</i> DE, DK, FR, LU, NL, PT, SE
Fuel tax reductions. Can target support, e.g. direct income transfer.[44]	<i>Just and equitable:</i> Highest income decile uses approximately 10x more fuel than the lowest.[45] <i>Cost effective:</i> Hides price signal. Poorly targets support.	<i>Fuel excise duty:</i> BE, BG, CY, CZ, DE, ES, FR, GR, HR, HU, IE, IT, LU, MT, NL, PT, SI, SE, UK <i>VAT on fuel:</i> PL
Severely limited pot for purchase subsidies.	<i>Just and equitable:</i> Rewards those who bought a car at a certain time. <i>Cost effective:</i> Time of purchase is not linked to emissions savings. <i>Provide certainty:</i> Undermines trust in the policy and the broader tax system.	<i>Purchase grants:</i> EE, HR, NL
Absence of taxation and therefore absence of any eco-incentivisation.	<i>Incentivisation:</i> Without policy, political objectives are left to fortune.	<i>Acquisition taxation:</i> BG, CH, CZ, DE, EE, LU, LV, RO, SE <i>Ownership taxation:</i> CZ, EE, LT, PL
Calculation of benefit-in-kind does not reflect car value, e.g.	<i>Directness and efficiency:</i> Creates a distortion between corporate and private	<i>Benefit-in-kind taxation:</i> EE, HU, LV, PL

a fixed amount independent of car price.	markets, e.g. an oversupply of salary cars. <i>Just and equitable:</i> Undertaxes more expensive salary cars, which are generally provided to employees with higher incomes.	
Use of engine power with no exemption for zero-emission cars.	<i>Directness and efficiency:</i> If engine power is a proxy for environmental harm, zero-emission cars should have lower, not higher, taxation.	<i>Ownership taxation:</i> HR
Purchase grants for ICE vehicles.	<i>Incentivisation:</i> Undermines policy support for low- and zero-emission cars. <i>Cost effectiveness:</i> Funding for ICE that could go towards zero-emission transition.	<i>Purchase grants:</i> FR, IT, RO
Purchase grants are taxed as income.	<i>Just and equitable:</i> Makes purchase grants progressive with respect to income. <i>Incentivisation:</i> Reduces the after-tax benefit for purchasing low- and zero-emission cars. <i>Cost effectiveness:</i> Lowers the cost of providing purchase grants while keeping a strong upfront incentive.	<i>Purchase grants:</i> ES
Use of WLTP emissions for the determination of PHEV taxation/subsidy.	<i>Real impact:</i> The real world emissions of PHEVs are much higher than their WLTP figure, meaning subsidisation yields little, if any, emission reduction.	<i>Purchase grants:</i> AT, DE, ES, FR, HR, IT, LV, MT, RO
No automatic renewal of policies.	<i>Certainty:</i> The delay of policy implementation generates uncertainty about the implementation and duration of the specific tax policy and the system of taxation more broadly.	<i>Purchase grants:</i> IT
Taxes are applied on a vehicle attribute using broad thresholds.	<i>Marginal incentives:</i> Broad thresholds provide no tax incentive under the ‘step’.	<i>Acquisition taxation:</i> ES <i>Ownership taxation:</i> SI, SK
Requirement to drive above a certain distance to receive a financial benefit.	<i>Incentivisation & Avoid unintended consequences:</i> Incentivises more driving, CO ₂ emissions, and other harms.	<i>Purchase grants:</i> PL <i>Benefit-in-kind:</i> IE

In addition to examples of good and bad policy practice, there are also those best classified as ‘interesting’ (Table 17). For systems of car taxation, these policies are not a ‘must’, nor are they a ‘must not’. Norway, for example, has achieved many of its objectives in car taxation but does not feature in these examples. The broader conclusion is that even with one set of principles, there are many recipes.

In total, there are 13 bad interesting policy practices with France serving as an example for five policies and Sweden for four policies. Many of the interesting policy practices refer to eligibility conditions for purchase grants.

Table 17: Examples of interesting policy practice in European car taxation

Interesting policy practice	Application of tax principles	Country examples
Revenue neutrality of purchase grants with acquisition and/or ownership taxation.	<i>Sustainably financed:</i> Links a funding stream to the provision of incentives. <i>Contributions from polluters and users:</i> Applies the polluter pays principle to the provision of purchase grants.	<i>Purchase grants and acquisition taxation:</i> FR <i>Purchase grants and ownership taxation (3 years):</i> SE
Obligation to scrap an old polluting car to receive a purchase grant.	<i>Real impact:</i> Not just zero-emissions, but the hope is negative emissions but removing a polluting car. <i>Just and equitable:</i> Challenge for first-time buyers.	<i>Purchase grants:</i> RO
Use of PHEV emissions in ICE mode for the determination of PHEV taxation/subsidy.	<i>Real impact:</i> Better reflects real-world emissions, but risks changing from an underestimate to an overestimate	<i>Purchase grants:</i> SE <i>Ownership taxation:</i> SE
Use tax levers that are available, such as corporate car taxation, to target CO ₂ emissions or other environmental harms.	<i>Available policy:</i> Using different policy levers might improve political feasibility.	<i>VAT deduction:</i> AT, IE, PT, SI <i>Depreciation write-off:</i> BE, FR, IE, PL, PT, SK, UK
VAT is applied after excise duties.	<i>Real impact:</i> Aligns with the adjusted cost of the product. <i>Incentivisation:</i> Provides a further incentive between vehicles with higher and lower acquisition taxes.	<i>VAT and energy taxes:</i> all countries <i>VAT and acquisition taxation:</i> NL
Simulating an acquisition tax through an adjusted ownership tax in the first year(s).	<i>Available policy:</i> Using existing tax policies might improve political feasibility. <i>Clarity and simplicity:</i> The car tax system is simplified with only one tax calculation (and its relevant vehicle attributes) for two taxes.	<i>Ownership taxation:</i> SE, UK
Use of car taxation to support social objectives.	<i>Incentivisation & Wider impacts:</i> There are policy objectives beyond raising revenue and targeting environmental harms from	<i>Purchase grants:</i> ES (business size); FR, IT (low income); GR

	transport.	(disabilities, young, large families); PL (large families)
Limiting benefits to luxury vehicles.	<p><i>Just and equitable:</i> Buyers of luxury cars are more able to pay for a low- or zero-emission car without a purchase grant.</p> <p><i>Cost effective:</i> Buyers of luxury cars are more likely to pay for a low- or zero-emission car without a purchase grant.</p>	<p><i>Purchase grants:</i> AT, DE, EE, ES, FI, FR, GR, HR, IS, IE, IT, LV, NL, PL, PT, SI, SE</p> <p><i>VAT deduction:</i> AT, LV, PT, SI</p> <p><i>Depreciation write-off:</i> AT, IT, LV, PL, PT, RO, SK</p>
Multiple price thresholds or a continuous curve to determine the size of purchase grants.	<p><i>Marginal incentives:</i> Creates marginal incentives across the spectrum of vehicles. Avoids threshold effects.</p> <p><i>Just and equitable:</i> Perverse effect whereby more expensive vehicles receive a larger purchase grant.</p>	<i>Purchase grants:</i> IE
Income-contingent purchase grants.	<p><i>Just and equitable:</i> Buyers of luxury cars are more able to pay for a low- or zero-emission car without a purchase grant.</p> <p><i>Cost effective:</i> More support is directed towards low-income individuals who are less likely to pay for a low- or zero-emission car without a purchase grant.</p>	<i>Purchase grants:</i> FR, IT
Purchase grants are included in income taxation.	<p><i>Just and equitable:</i> Is an alternative means of incorporating income-contingent purchase grants by using the progressive income tax system.</p> <p><i>Cost effective:</i> More support is directed towards low-income individuals who are less likely to pay for a low- or zero-emission car without a purchase grant.</p>	<i>Purchase grants:</i> ES
Grants for the purchase of second-hand zero-emission cars.	<i>Just and equitable:</i> These subsidies are intended to bring low-income populations into the ownership of zero-emission cars, while distorting the market by subsidising some zero-emission cars twice.	<i>Purchase grants:</i> FR, LV, LT, NL
Requiring a minimum ownership period and/or	<i>Cost effectiveness:</i> Funding is intended to subsidise zero-emission cars in the	<i>Purchase grants:</i> DE, EE, LV

<p>minimum driving distance to receive a purchase grant.</p>	<p>country, rather than vehicle export to the rest of Europe and beyond. <i>Real-world impact:</i> These subsidies are intended to promote emission reduction within the country.</p>	
--	---	--

The examples highlighted in these tables come from the 31 European countries covered in this report. Most also appear elsewhere in the report with more detail, for example in the comparison tables and graphs and the country summaries.

Inspiration can also be found globally. Purchase grants for zero-emission cars have been designed very differently on different continents. In the US, purchase grants have a long history of being income-based and at the federal level purchase grants have recently been overhauled to target the onshoring of supply chains.[46] A very different model is in place in New South Wales, Australia, where purchase grants for zero-emission cars are run through an auction system to deliver the lowest ‘willingness to accept’ in financial support.[47]

5. Conclusions

This report is the first time that systems of car taxation have been directly compared across European countries. The comparisons cover 31 countries, seven forms of taxation, and two registration types (private and corporate). Given the emissions challenge faced in road transport, the learnings from these comparisons are critical and timely. In transport, as in other areas of the economy, tax is one of the most important tools to generate behavioural change.

Wide variance in car taxation policy

In designing a system of car taxation, governments have multiple tax considerations. Which cars should be taxed? At what point in their lifecycle? And how much? There is no one single approach – a point made clear by the wide range in how car taxation is applied across Europe. While it is expected that tax rates between countries differ – as with income tax, corporate tax, or VAT – for car taxation even the tax base differs. Fourteen different vehicle attributes are used in tax calculations, with CO₂ emission intensity, engine power, business usage, and fuel type as the most common. Some countries levy tax as a fixed amount, while others levy tax as a percentage of car price. There are even examples where countries are completely void of a form of car taxation. What is unclear from this wide range of current practice, is whether this variation is the result of intentional design or a lack of consideration of best practices.

The incentivise properties of taxation are underutilised

Car taxation has underutilised potential to incentivise the zero-emission transition. Nine of the 31 countries do not have an acquisition tax on new cars, despite upfront taxes having an oversized influence on purchasing decisions. Ten countries do not have any form of car taxation (acquisition or ownership) directly linked to CO₂ emissions. And twenty countries recently cut fuel excise duties – a subsidy for fuel use that exceeds the purchase grant for zero-emission cars in many countries.

To incentivise the uptake of zero-emission cars, governments should levy car taxation to produce a net tax differential between a conventional polluting car and a zero-emission car. A high tax differential is achieved by levying a large tax burden on polluting cars and/or a small tax burden on zero-emission cars. The calculations in this report reveal that the tax differential for a typical BEV is correlated with the uptake of these cars at the country level.

Tax principles governments should use

Based on the learnings from the country comparisons and research on tax design, twenty principles of car taxation were developed. These principles cover the setting of objectives, the design of taxes to meet these objectives, and wider scope, in a fair way, for a long time, and using good process.

Recommendations on objectives

- 1) *Specific and ambitious objectives should be defined.*

Recommendations on tax application

- 2) *Taxation should be used to incentivise objectives.*
- 3) *Taxes should be applied directly and efficiently.*
- 4) *Taxes should be applied based on real-world impact.*

- 5) *Taxes should be applied broadly.*
- 6) *Taxes should be applied in a continuous, incremental manner.*
- 7) *Taxes should be applied to outcomes in a technology-neutral manner.*
- 8) *Taxes should be applied with clarity and simplicity.*

Recommendations on tax scope

- 9) *Taxation should consider impacts beyond the direct objective(s).*
- 10) *Taxation should consider interaction with other policies.*

Recommendations on fairness

- 11) *Taxation should be applied in a socially just and equitable manner.*
- 12) *Taxation should foster a just transition.*

Recommendations on financing

- 13) *Taxation should be applied in a cost effective manner.*
- 14) *Taxation should be sustainably financed.*
- 15) *Financial contributors should come from polluters and most intensive users.*

Recommendations on process

- 16) *All available policy levers should be considered.*
- 17) *Policy certainty should be provided.*
- 18) *Policy flexibility should be allowed.*
- 19) *Taxation outcomes should be monitored and evaluated.*
- 20) *Taxation should continue to develop through peer learning.*

Applying these tax principles to European car taxation identifies many examples to learn from: good practices that all countries should use, bad practices that no country should use, and interesting practices that all countries should consider. Many countries feature on all three lists.

Global crises add further pressure for tax reform

There are signs that governments are thinking more creatively about car taxation as record high fuel prices and the transition to a zero-emission fleet challenge existing tax systems. Social considerations are also increasingly being incorporated – or at least attempted. This includes attempts to target fuel excise duties and the commitment in France to offering zero-emission cars for €100 a month via a ‘social lease’. Disruptions to car supply chains have also prompted governments to reflect on their systems of car taxation. While action has yet to be taken in Europe, in the US, purchase grants have recently been overhauled to target the onshoring of supply chains. And some governments are looking beyond the immediate crises to what car taxation could look like for the fleet of the future. In the UK, proposals for road pricing are being discussed as part of a programme to replace declining tax revenues from car taxation as the fleet moves towards a zero-emission future.

Tax guidance provides multiple routes to an objective

The results of this report show that policy options are available. There are countries that have created a tax differential for zero-emission cars by levying low taxes or subsidising these vehicles, while other

countries have created a tax differential by levying high taxes on polluting vehicles. Each approach – or the combination of both – has its own advantages, disadvantages, and political constraints.

Furthermore, there is no relationship between a country's income level and the use of incentivisation in its tax system. There are countless examples in Europe to learn from. The whole idea of this report is to help.

Opportunities for immediate tax reform are available

Governments have several options to implement the learnings from this report. A tax overhaul is one option and is particularly relevant for countries with static tax systems that have not been updated in light of the zero-emission transition and other environmental challenges. For other countries, a tax overhaul may not be deemed necessary or even possible.

As introducing new tax policies is typically more complicated than adjusting existing tax policies, it may be more feasible to make innovative tweaks to existing policies. For example, countries without an acquisition tax can increase ownership taxation in the first year of ownership to mimic the same effect of an acquisition tax in increasing the upfront cost for polluting vehicles. Similarly, because many countries have tax benefits to registering a corporate car in the form of VAT deduction and depreciation write-off, countries can leverage these policies to incentivise environmental objectives. Regardless of the political situation and policy structure, opportunities for immediate tax reform are available.

What next for The good tax guide?

Tax systems are constantly undergoing changes. Sometimes the changes are significant, for example an overhaul of how a particular fuel type or drivetrain is taxed, more often, there are minor updates, for example adjusting tax rates with inflation.

Because of this, the figures and tables in this report are constantly in flux. This is why the calculations are compiled on an open platform, in Google Sheets, and accessible through the Transport & Environment website. Our aim, with the help of national experts, is to keep the calculations there as up-to-date as possible.

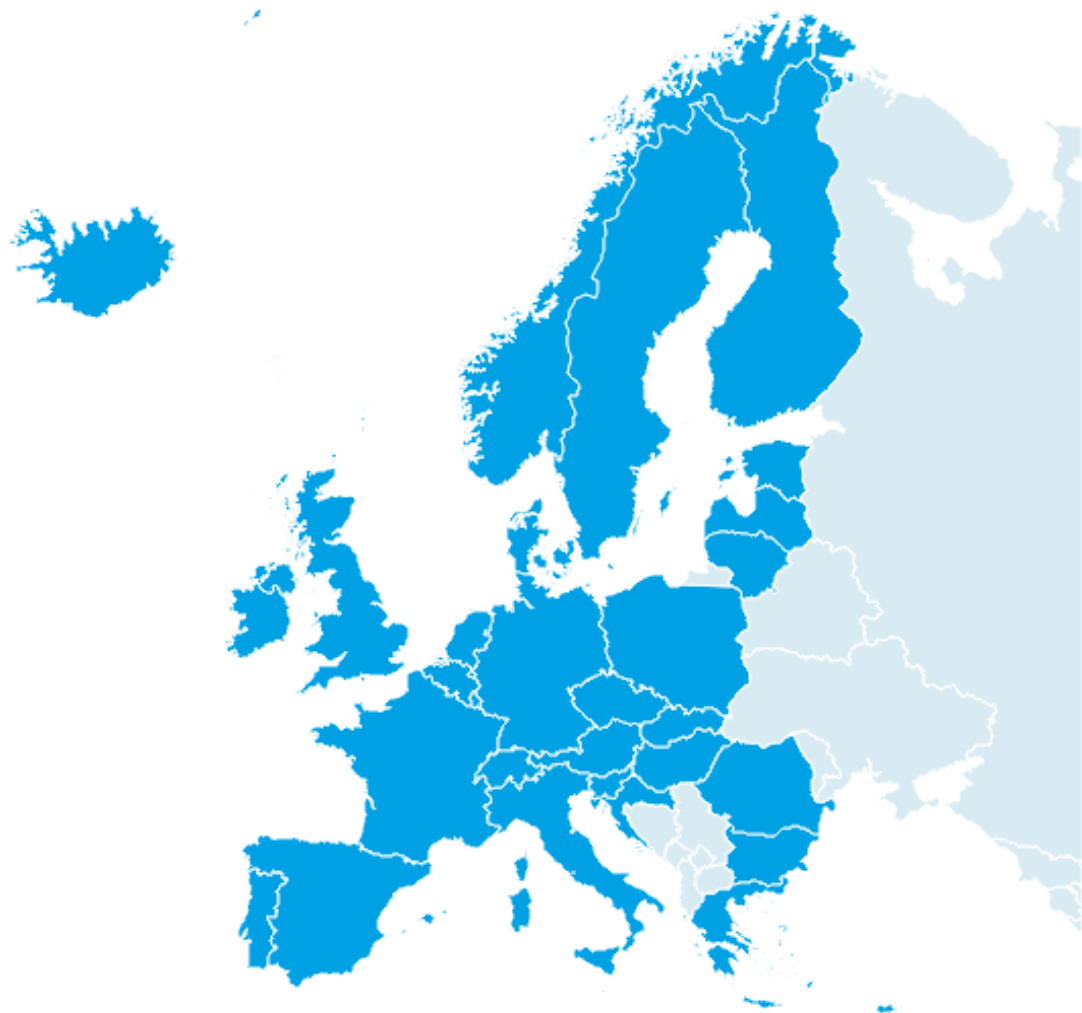
Beyond these updates, other outputs may emerge. One idea is for an online dashboard where specific car models could be selected and compared between countries. Another idea is to include light commercial vehicles (i.e. vans) in the tax calculations. There are also numerous research questions that could be explored using the tax information that has been compiled. Our ambition is to be as open and collaborative as possible to help make future exploration possible. In European car taxation, there is still much to learn, and much that can be improved.

Appendix: Country summaries

This section provides a two page summary of car taxation in each of the 31 countries covered in the report. The purpose is to provide a quick overview for readers interested in a specific country and also to serve as a reference to explain the policies behind some of the perhaps surprising outliers from the graphs in Section 2.

The descriptive overview for each country is based on Europe-wide rankings of countries and highlighting examples where a country is an outlier. Every country is an outlier on some metrics of car taxation and registrations.

Lastly, where possible, graphs indicate how a country's tax schedule compares to new registrations. This was only possible with countries that levy tax based on CO₂ emission intensity. For countries where this was not possible, an alternative graph was selected to inform on how a country's taxation relates to vehicle selection.



Car taxation in Austria

Austria is an electrification leader in Europe, with BEVs reaching 13.9% of new registrations.[48] Fiscal incentives have contributed to this success, as Austria strongly differentiates many taxes by CO₂ emission intensity, particularly for corporate cars which constitute two-thirds of new registrations. Zero-emission cars provided to employees as a salary perk are fully exempt from benefit-in-kind taxation, offering significant tax savings given Austria's high tax rate. Furthermore, while in most European countries VAT is recoverable on corporate cars, in Austria only BEVs are eligible for this tax benefit. These policies contribute to a leading role in electrification for the corporate fleet with BEVs reaching a 18.0% share with the private market lagging behind at 7.0%.

In addition to heavy differentiation by CO₂ emission intensity, Austria offers other lessons in tax design, for example setting out clear tax schedules that tighten overtime. Unlike other countries where corporate cars are leading on electrification, Austria has also avoided tax advantages to PHEVs – which have high real-world emissions – and these cars constitute just a 6.1% share.[48] These focused tax policies contribute to Austria third place position in rankings of 'EV readiness'.[49]

Opportunities for the reform of car taxation remain. The diesel excise duty in Austria is still well below the petrol excise duty (39.7 vs 48.2 c/l), thus providing an incentive for diesel usage. Austria continues to have one of the largest diesel shares in Europe (24%), ranking 4th overall.

Acquisition taxation and subsidisation

The Austrian acquisition tax (*Normverbrauchsabgabe*) has two components: a tax on car value that increases with CO₂ emission intensity (Figure 55) and an additional €60/g above 185g CO₂/km.

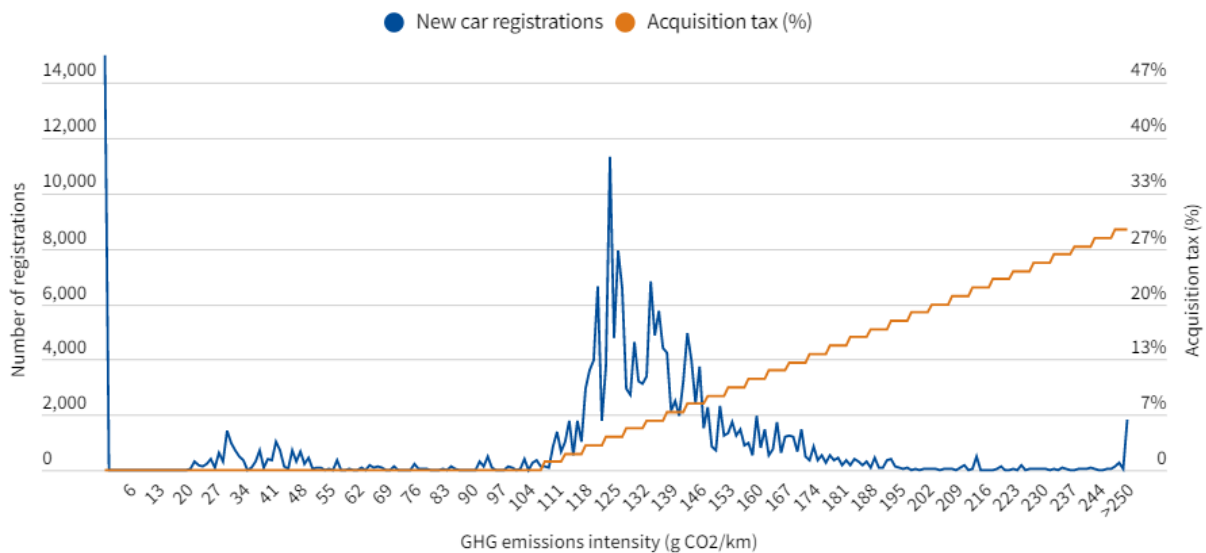


Figure 55: New passenger car registrations vs the percentage-based acquisition tax

Source: Dataforce (2022) New passenger car registrations 2021

Each year the NovA tightens with the CO₂ threshold reducing and therefore the tax burden per gram of emission increasing. The resulting tax burden in 2022 is around the European average for BEVs and large ICE cars, but below the European average for PHEVs and small ICE cars as there is no tax burden on cars below 120 g CO₂/km (Figure 17).

For the purchase of new BEVs there is a grant for individuals of €3,000 and €1,000 for companies provided the car is below €60,000. In the case of PHEVs, the subsidy for individuals is €1,250 and €500 for companies with the same car's price limit.

Ownership taxation

The ownership tax (*Kraftfahrzeugsteuer*) is calculated based on engine power (measured in kW) and CO₂ emission intensity (measured in g CO₂/km WLTP). As with the acquisition tax, both CO₂ emission intensity and engine power thresholds are subject to annual reductions, making the policy more stringent over time. BEVs are exempt from the engine power component.

Benefit-in-kind taxation

There are three benefit-in-kind tax rates in Austria: 0% for zero-emission cars, 1.5% per month (18% annually) up to €720 for cars emitting less than 135g CO₂/km, and 2% per month (24% annually) up to €960 for cars polluting more than this threshold. As with the previous taxes, each year from 2022 onwards the CO₂ emission threshold will be reduced. The resulting tax burden is higher than the average in European countries for non-electric cars (Figure 22).

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a period of 8 years if the vehicle is used for business purposes. The depreciation value can include acquisition tax and VAT (if not deductible) but is capped at €40,000.

Value added taxation and business deductions

The value added tax in Austria (20%) cannot be deducted from corporate cars with combustion engines. Zero-emission cars can deduct VAT up to a limit of €40,000. Austria is the only country in Europe with such a heavily differentiated VAT deduction policy by CO₂ emission intensity (Table 11). There is no distinction in the policy between cars for business and mixed use.

Fuel taxation

Fuel excise duties in Austria are 48.2 c/l for petrol and 39.7 c/l for diesel. Both rates are slightly above the European average (Figure 14). Unlike many European countries, Austria did not reduce fuel excise duties in early 2022 in response to rising fuel prices.[13]



Car taxation in Belgium

Belgium is a special case, as taxes vary between the three regions. In this analysis, the Brussels region (the capital) will be used as a reference for the Belgian model. Car taxation in Belgium is high, complex, and with a focus on incentives for corporate cars. Combining all car taxes (VAT, acquisition taxes, ownership taxes, fuel duty, and other taxes) shows that a vehicle registered in Belgium pays more annually in tax (€2,892) than any other of the major EU market.[32] This high tax status is present in fiscal policy in Belgium more broadly.[50]

However cars are also subsidised in many ways. In the case of Belgium, subsidies for company cars - in the form of depreciation write-offs, VAT deductions, and benefit-in-kind - are also quite high and Belgium also tops rankings of major EU markets in terms of how corporate cars are subsidised compared to private cars (+€6,542 over a four year ownership period).[51] Recognising this, the Belgian government has oriented company car fiscal policy to encourage low-emission transport. Whereas the BEV share of new registrations in 2021 was just 1.8% for private cars, the share was 8.8% for corporate cars (4 times higher) (Figure 56). For PHEVs the difference is even more extreme, with a 3.1% share in private cars and a 19.3% in corporate cars (5 times higher).

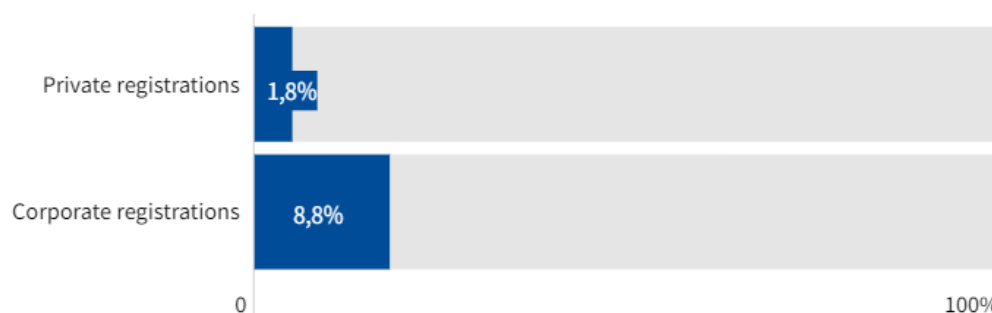


Figure 56: BEV uptake in corporate and private registrations in Belgium

Source: Dataforce (2022) New passenger car registrations 2021

In May 2021, the Belgian government announced that from 2026 only zero-emission cars can benefit from depreciation write-offs. This ambitious policy will only further this trend, with the corporate fleet in Belgium rapidly electrifying and the private fleet following behind. Focusing on the corporate fleet to lead on electrification is explored in section 2.4.

There are also significant differences in car taxation between the three regions of Brussels, Flanders, and Wallonia, adding to the complexity of car taxation in Belgium. Whereas the Brussels region bases its acquisition tax on kW, the regions of Flanders and Wallonia base it on CO₂ emission intensity with a different formula used in each region. For ownership taxation, the three regions base the tax on fiscal HP with different tax rates. Following the methodology used for other countries, the international comparisons are made using a vehicle registered in the capital region (methodological details in section 1.4).

Acquisition taxation and subsidisation

The acquisition tax in Belgium is based on engine power (measured in cylinder litres, horsepower, or kW). The tax rate is reduced as the age of the vehicle increases. The resulting tax burden is around the European average for acquisition taxes on ICE vehicles, but above the average for PHEVs (Figure 17). Unlike many other countries, especially those in northern and western Europe, Belgium has never introduced purchase grants for low- or zero-emission cars (these subsidies did exist in the region of Flanders).

Ownership taxation

The ownership tax in Belgium, like the acquisition tax, is based on engine power (measured in cylinder litres, horsepower, or kW). There is no reduction based on vehicle age. Like the acquisition tax in Belgium, the resulting tax burden from the ownership tax is around the European average for ICE vehicles, but above average for PHEVs and to a lesser extent for BEVs. This contributes to the low BEV and PHEV uptake among private registrations and the corporate car fiscal incentives drive the uptake of these fuel types.

Benefit-in-kind taxation

The calculation of benefit-in-kind (BiK) taxation in Belgium is a formula based on list price, CO₂ emission intensity (g CO₂/km WLTP), fuel type (diesel taxed more than petrol), and vehicle age. There is a minimum annual BiK of €1,400. This provides little differentiation between fuel types for smaller, less polluting vehicles (Figure 22 and 23).

Depreciation taxation

The available depreciation in Belgium is calculated based on fuel type and CO₂ emission intensity from a maximum of 100% (BEV) to a minimum of 50% (high emission diesel). From 2026, only zero-emission cars can benefit from depreciation write-offs. For combustion engine vehicles registered between July 1, 2023 and December 31, 2025, this policy will be phased-in, with 75% of the vehicle cost still tax deductible in 2025, 50% in 2026, 25% in 2027, 0% from 2028 onwards. This phase-out applies to all cars with a combustion engine, including PHEVs. Depreciation write-offs for BEVs will also be reduced, but to a lesser degree, stopping at 67.5% in 2031.

Value added taxation and business deductions

The value added tax on cars sold in Belgium (21%) is partially recoverable with three different methods for the calculation: a formula based on real use, a formula based on working days and commuting distance, and a lump sum figure of 35%. None of the three methods integrate emissions, fuel type, or other factors.

Fuel taxation

Belgium recently cut fuel excise duties to 42.5 c/l for petrol and diesel (from 60 c/l).[13] The new rates are below the European average for petrol and above the European average for diesel (Figure 14).



Car taxation in Bulgaria

While most countries in Europe have oriented their systems of car taxation towards incentivising low- and zero-emission cars, Bulgaria is the only system in Europe completely void of incentives for low- and zero-emission cars across all car taxes. There is no acquisition tax, no purchase grants for BEVs or PHEVs, and no consideration of fuel type or CO₂ emission intensity in the depreciation write-offs or VAT deduction for corporate cars, or benefit-in-kind for salary cars. The resulting tax burden is the lowest among all European countries in terms of passenger car taxes for individuals in all model types analysed (see section 2.3.8).

Failing to provide any fiscal incentives for low- and zero-emission cars has produced the expected result with only 1.3% BEVs and 0.4% PHEVs in all 2021 (Figure 57). This is the second lowest BEV share in all of Europe (after Cyprus).[48] This outcome contrasts with neighbouring countries like Romania which, led by high purchase grants (Section 2.2.2. and Section 2.3.2.), has reached a EV shares four times as high (5.2% BEV and 2.2% PHEV).[48]

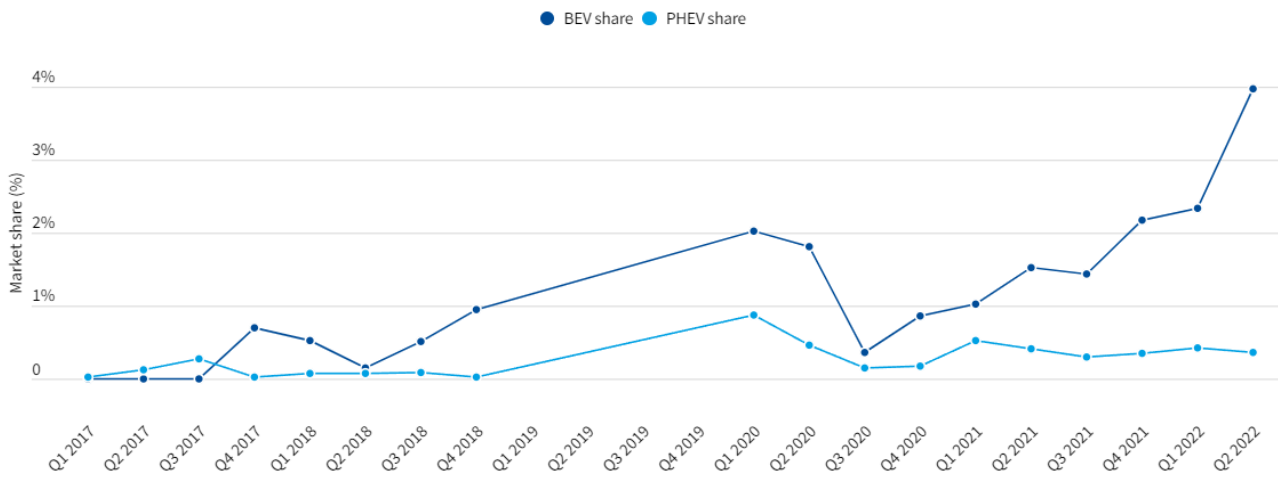


Figure 57: Electric car market share of new registrations in Bulgaria

Source: T&E calculations based on quarterly registration data from ACEA

Acquisition taxation and subsidisation

There is no acquisition tax in Bulgaria. This is relatively uncommon, with only nine countries in Europe taking this approach (Figure 17). There is also no purchase grant for low- or zero-emission cars. Taken together, there is very little fiscal incentive to purchase a BEV or PHEV.

Ownership taxation

The ownership tax in Bulgaria is based on engine power (measured in kW) with several thresholds. BEVs and PHEVs are exempt from the tax. Many other European countries base their taxation on kW, but often with higher rates for ICE vehicles.

Benefit-in-kind taxation

The benefit-in-kind tax in Bulgaria is a complex calculation with three different options for application. Based on the total car expenses, there is a simple option of 50%, an option based on distance (kilometres of usage), and an option based on time (hours of usage). Bulgaria is the only European country to consider time in its BiK calculation and one of the only countries to consider distance (Table 4).

Depreciation taxation

The depreciation of new corporate cars can be written off over a four year period using the straight line depreciation method. Corporate cars that are used for private purposes have a 50% depreciation write-off or an amount equivalent to their corporate usage. This tax application differs from how the private use of corporate cars is treated for VAT deductions.

Value added taxation and business deductions

The value added tax on cars sold in Bulgaria (20%) can not be deducted from corporate cars that are used exclusively for business purposes, neither for cars that are also used for private purposes. This tax application differs from how the private use of corporate cars is treated for depreciation write-offs (and in most other European countries).

Fuel taxation

Fuel excise duties in Bulgaria are 36 c/l for petrol and 33 c/l for diesel. Both rates are well below the European average (Figure 14) and sit at the minimum allowable level under the European Tax Directive (ETD). A proposal from the Bulgarian government in early 2022 to cut fuel excise duties in half (well below the ETD) did not come to fruition.[13]



Car taxation in Croatia

Croatia is still in the early stages of the transition to a zero-emission fleet with a BEV share of 3.2% and a PHEV share of 0.9% (Figure 58).[48] In recent years, the share of PHEVs in comparison with BEVs market share has increased. While purchase grants for both BEVs and PHEVs are high, there are few tax incentives - and even some tax disincentives in other parts of the Croatian car taxation.

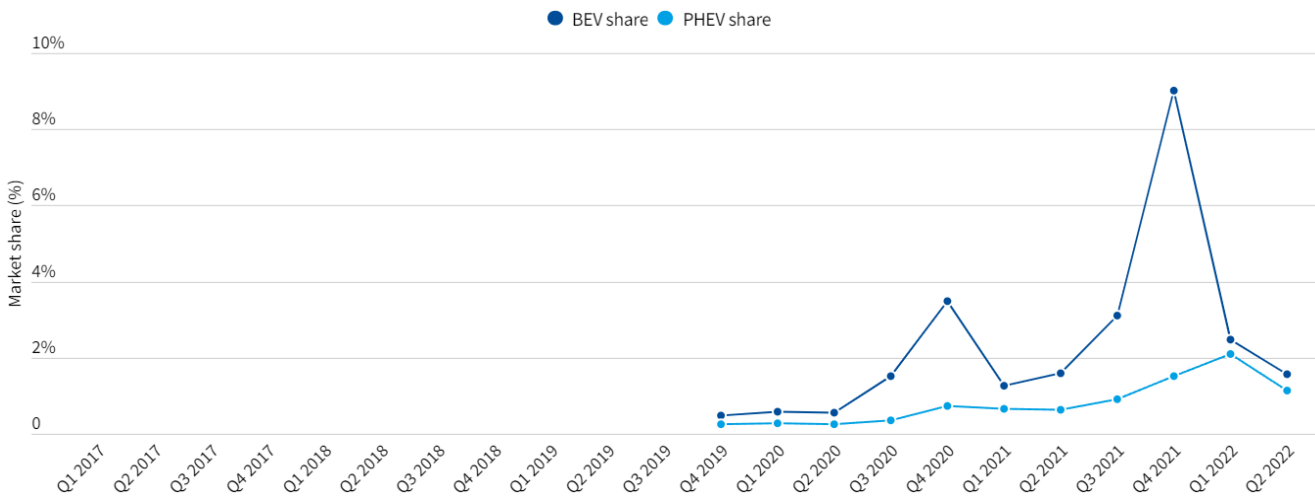


Figure 58: Electric car market share of new registrations in Croatia

Source: T&E calculations based on quarterly registration data from ACEA

Croatia’s ownership tax is based on engine power with no exemption for zero-emission cars, disincentivising EVs which have high engine power but no exhaust emissions. Taxes on corporate cars also disincentivise EVs as the benefit-in-kind tax is based on purchase price and usage but not on CO₂ emission intensity or fuel type. Taken together, the result is small that the purchase and use of a BEV face a higher tax burden than an equivalent ICE. If Croatia is going to transition to a zero-emission fleet these tax incentives will need to be reformed.

Acquisition taxation and subsidisation

The acquisition tax in Croatia is a complex calculation based on the purchase value of the vehicle, vehicle CO₂ emission intensity (measured in g CO₂/km WLTP), an adjustment to PHEV CO₂ emission intensity depending on the electric driving range, and a diesel surcharge (despite a higher excise duty tax on petrol fuel). The net effect of these tax rules is a high fiscal incentive for low emitting ICE vehicles compared to high emitting vehicles, but a small fiscal incentive for a zero-emission car compared to a low emitting ICE vehicle (Figure 17).

A €9,283 purchase grant is available for BEVs and a €5,304 purchase grant for PHEVs providing Croatia with some of the largest EV purchase grants in Europe. Both private households and corporations are eligible to receive the grant provided that the grant does not exceed 40% of the purchase value.

Ownership taxation

The ownership tax in Croatia is based on engine power (measured kW) and applied at a fixed rate in five tax bands. Several other European countries base their taxation on kW, but often with exemptions for EVs as their engines do not emit pollutants. The result in Croatia is that EVs (both BEV and PHEVs) pay more in ownership tax than their ICE equivalents (Figure 21) and there is thus a fiscal disincentive to purchase a BEV or PHEV.

Benefit-in-kind taxation

The benefit-in-kind tax in Croatia has three different options for application. The first is 1% per month of the purchase value of the vehicle (12% annually), the second is 20% of the monthly lease price, and the third is based on usage, applying €0.27 (2 HRK) per km of private usage. As the BiK tax is applied on the purchase value of the vehicle, low- or zero-emission cars face a higher tax burden due to their higher purchase price (Figure 22). This contrasts with many European countries that incorporate fuel type or CO₂ emission intensity in their BiK taxation (Table 4).

Depreciation taxation

The depreciation of new corporate cars can be written off over a five year period using the straight line depreciation method (or another method chosen by the company). This only applies to the value of the asset associated with business use.

Value added taxation and business deductions

The value added tax on cars sold in Croatia (25%) can be deducted by 50% for corporate cars. There is no distinction between cars used exclusively for business purposes or cars used privately, as is the case in most European countries.

Fuel taxation

Croatia recently cut fuel excise duties to 39 c/l for petrol and 38 c/l for diesel (from 51 c/l and 41 c/l respectively).[13] This reduced fuel excise duty for petrol is among the lowest in Europe (Figure 14).



Car taxation in Cyprus

Cyprus has relatively low car taxation and weak differentiation with respect to fuel type, emissions, or other environmental factors. This is reflected in a low level of BEV uptake, which at just 0.8% of new registrations (and 0.9% for PHEVs) is the lowest level among European country.[48] It is also reflected in high average CO₂ emission intensity of both the existing and new registrations, which at 135 g CO₂/km for new registrations is the fourth highest among European countries.

Taxes on vehicle acquisition and ownership, while levied on CO₂ emission intensity, are applied at low tax rates and thus provide little fiscal incentive for low- and zero-emission cars (Figure 39). This is compounded by the fact that no purchase grants are offered for these vehicles. Tax policies on corporate cars are also underused as potential fiscal incentives. Cyprus is one of only four countries without VAT deductions for the purchase of corporate cars. This contributes to the outcome that Cyprus has the lowest share of corporate cars among new registrations (16%). There are many examples from other countries about how these taxes could be leveraged to incentivise the transition to a zero-emission fleet.

Acquisition taxation and subsidisation

The acquisition tax in Cyprus is based on CO₂ emission intensity (measured in g CO₂/km WLTP), similar to the bonus-malus approach common to many other European countries. However in Cyprus the malus curve begins above 120 g CO₂/km and only ramps up above 180 g CO₂/km thus fails to provide financial incentives for small vehicle classes (Figure 59). The average tax burden and the differentiation by fuel type are relatively low compared to other European countries (Figure 17). There are no purchase grants for low- or zero-emission cars in Cyprus.

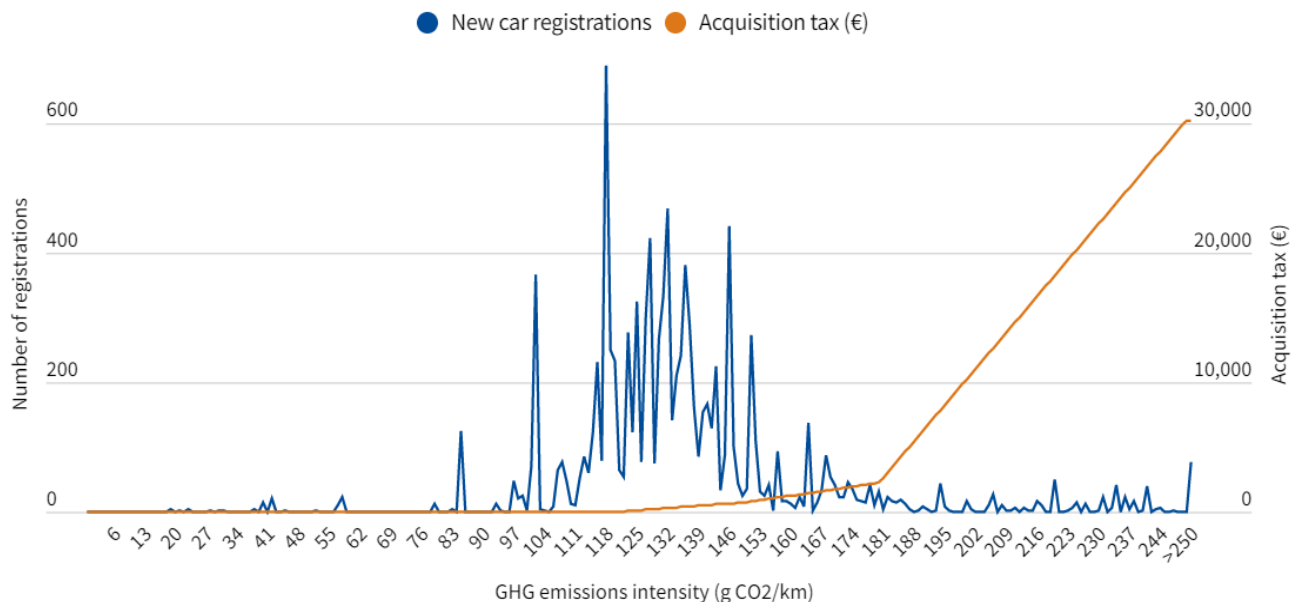


Figure 59: New passenger car registration vs acquisition tax rates

Source: Dataforce (2022) New passenger car registrations 2021

Ownership taxation

The ownership tax in Cyprus is based on vehicle CO₂ emission intensity (measured in g CO₂/km WLTP). As the tax levied per gram of CO₂ is quite low (similar to the acquisition tax), the average tax burden and the differentiation between high and low-emission cars are relatively low compared to other European countries, particularly for PHEVs (Figure 21).

Benefit-in-kind taxation

Benefit-in-kind taxation is a complex calculation including the age of the vehicle, the value for repairs and maintenance, the value of fuel, and the value of the private use of the car. However, unlike many other European countries (Table 4), neither fuel type nor CO₂ emission intensity are included in the calculation with the result that a BEV or a PHEV pays more in BiK than an ICE of the same vehicle class (Figure 22).

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a five year period using the straight line method. This tax benefit is relatively small as Cyprus has a relatively low corporate tax rate at 13% (Figure 26). There is no consideration of fuel type, emissions, or vehicle usage.

Value added taxation and business deductions

Cyprus is one of the ten European countries where the value added tax (19%) cannot be recovered on corporate car purchases. This approach to VAT deductions contrasts with many European countries where VAT on cars used exclusively for business purposes is often fully recoverable and the VAT on cars used for both business and private purposes is often partially recoverable. The lack of VAT deductibility contributes to the low share of corporate cars in new registrations, which, at just 16%, is the lowest in Europe.

Fuel taxation

Cyprus recently cut fuel excise duties to 37 c/l for petrol and 34 c/l for diesel (from 44 c/l and 41 c/l respectively).[13] These reduced fuel excise duties are well below the European average for both petrol and diesel fuels (Figure 14).



Car taxation in Czechia

Czechia has very few car taxes and as a result has a small tax burden across fuel types and vehicle classes. It is one of only nine countries in Europe without an acquisition tax, one of only four countries without an ownership tax, and one of only two countries with neither of the two taxes (along with Estonia). Car taxation in Czechia thus remains a ‘blank canvas’ and there is an opportunity to apply best practices from other European countries. Such a tax reform would also present an opportunity to renew the Czech car fleet. With an average age just over 15 years, the Czech car fleet is the fifth oldest in Europe.[52]

The small tax burden in Czechia for polluting cars is also reflected in the low level of EV uptake in new registrations: 1.3% BEVs and 1.9% PHEVs in 2021.[48] It is also reflected in high average emissions of both the existing and new registrations, where Czechia which at 137 g CO₂/km for new registrations is the fourth highest among European countries (Figure 60). Czechia also performs poorly across other measures of electrification such as charging infrastructure and government policies - ranking second last in Europe for ‘EV readiness’.[49, 53]

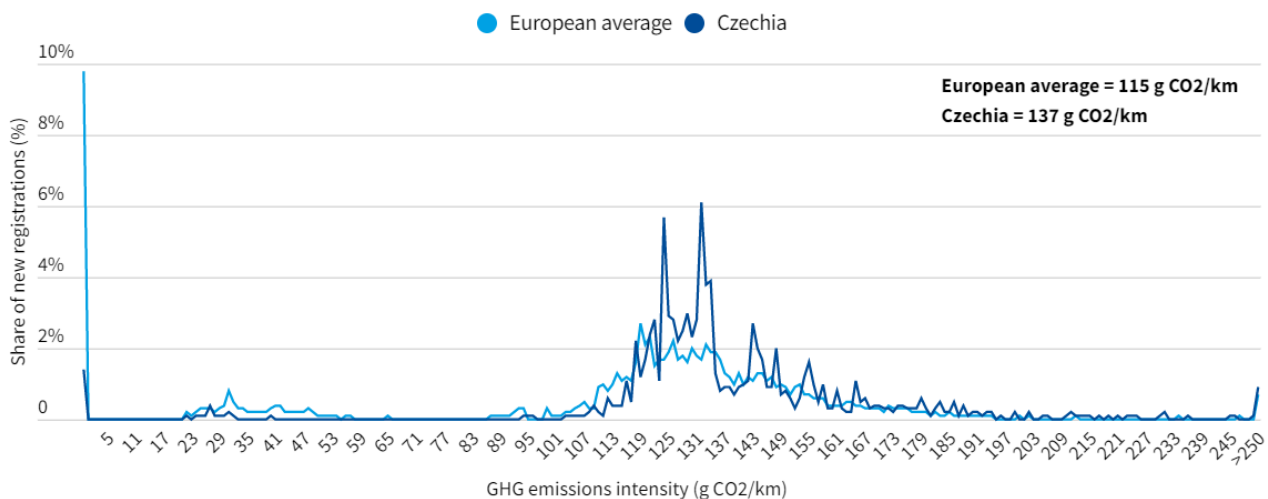


Figure 60: Czechia vs EU share of new registrations based on CO₂ emission intensity

Source: Dataforce (2022) New passenger car registrations 2021

Acquisition taxation and subsidisation

There is no acquisition tax (above Euro 3 standard) in Czechia. This is relatively uncommon, with only nine countries in Europe taking this approach (Table 1).

There is also no purchase grant for low- or zero-emission cars for individuals. A grant of 300,000 CZK (€12,175) is available to municipalities, regions, state organisations, schools, non-profit organisations and other entities for the purchase of an electric car. Taken together, there is very little fiscal incentive to purchase a BEV or PHEV for individuals.

Ownership taxation

Czechia is one of only four European countries (along with Estonia, Lithuania, and Poland) without an ownership tax (Table 3).

Benefit-in-kind taxation

Benefit-in-kind tax is applied using a 1% monthly rule (12% annually), which is common for European countries (Table 4). However, unlike many other countries that apply a discount for low- or zero-emission cars, in Czechia there is only one BiK rate. Czechia is also unique in the application of a minimum monthly BiK of €41 (1000 CZK).

Depreciation taxation

The depreciation of new corporate cars can be written off over a five year period (either straight line or accelerated). There is no differentiation by fuel type, price, or any other factor. In response to the COVID-19 pandemic, the write-off period was shortened to two years.

Value added taxation and business deductions

The value added tax on cars sold in Czechia (21%) can be deducted from corporate cars that are used exclusively for business purposes. For cars that are also used for private purposes, the share of VAT deductibility is set equal to the share of business use.

Fuel taxation

Czechia recently cut fuel excise duties to 44 c/l for petrol and 27 c/l for diesel (from 50 c/l and 33 c/l).[13] This diesel excise duty is among the lowest in Europe (Figure 14) and is below the minimum level set in the EU's European Tax Directive (33 c/l).



Car taxation in Denmark

Denmark has one of the highest tax burdens for car taxation in Europe. This is true not just for the total tax burden (Figures 26-35), but also for nearly all individual taxes as Denmark's acquisition tax (Figure 17), benefit-in-kind tax (Figures 21-22), and fuel excise duty (Figure 27) are the highest or near the highest in Europe. Tax benefits for car ownership are also low, for example the lack of VAT deductibility for corporate cars (Figure 23). This high tax status is present in fiscal policy in Denmark more broadly.[54]

Through its tax policy, Denmark has created many fiscal incentives for low- and zero-emission cars. BEV uptake is correspondingly high - 13% in 2021 - but Denmark still follows electrification leaders like Norway, Sweden, and the Netherlands.[48] Part of the issue is likely beyond Denmark's fiscal policy, as indicated by its mediocre assessment for 'EV Readiness' (11th) compared to other European countries.[55] However there are also remaining fiscal issues. Tax incentives based on WLTP emission intensity have oriented the Danish market to PHEVs (22% in 2021[48]) instead of BEVs despite the real world CO₂ emissions of PHEVs. Denmark will need to decide if it will follow the lead of electrification leaders and reform its PHEV incentives, like Sweden's tax overhaul in July 2022.

Acquisition taxation and subsidisation

The acquisition tax in Denmark is a complex calculation involving vehicle price thresholds, CO₂ emission intensity, battery capacity (for electric cars), and a purchase grant for zero-emission cars. The resulting tax burden is the highest in Europe for PHEVs and ICE vehicles across multiple vehicle classes (Figure 17).

Ownership taxation

The ownership tax in Denmark is calculated based on CO₂ emission intensity with a flat rate from 0-58 g CO₂/km WLTP, thus taxing PHEVs and BEVs at the same rate (680DKK or 91€) in stark contrast to the acquisition tax. There is also a surcharge for diesel vehicles. The vast majority of new registrations are in the lower third of the tax brackets (Figure 61), although the tax schedule does not increase as steeply as in some other European countries (Figure 8). The resulting tax burden is around the European average across multiple fuel types and vehicle classes (Figure 21).

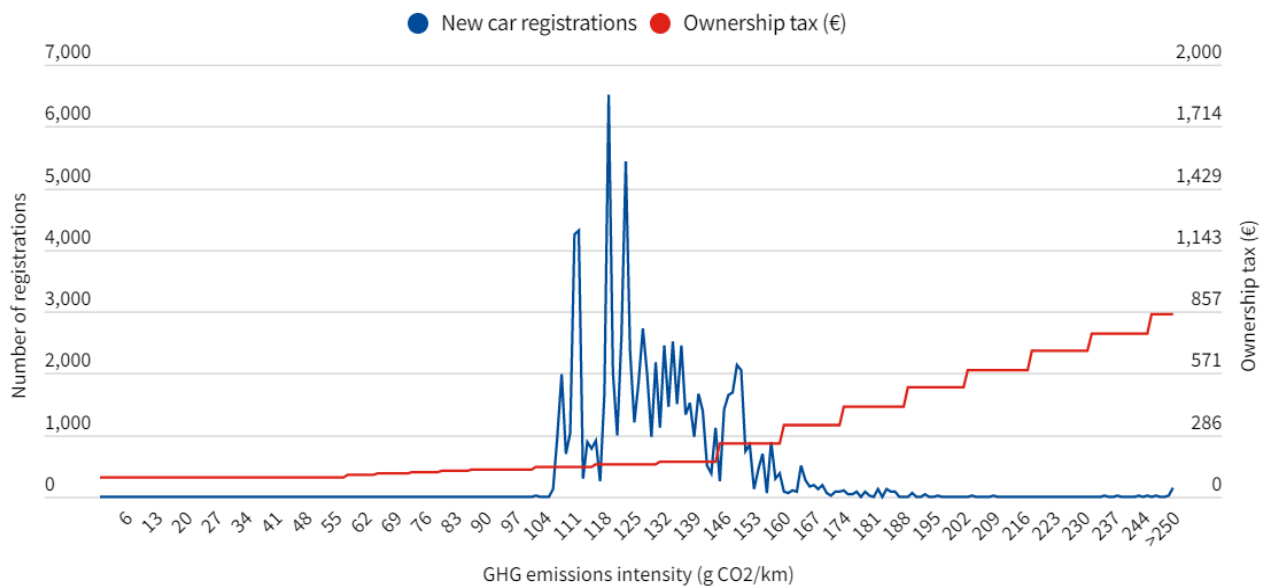


Figure 61: New passenger car registration vs ownership tax rates

Source: Dataforce (2022) New passenger car registrations 2021

Benefit-in-kind taxation

Benefit-in-kind taxation in Denmark is based on the list price of the vehicle with an additional ‘green vehicle tax’ based on CO₂ emission intensity (measured in g CO₂/km WLTP). As the BiK tax rates are high across all emissions levels, Denmark has the highest BiK tax burden for all fuel types (especially BEVs) and vehicle classes. There is also little differentiation between fuel types. This high taxation approach for BEV salary cars contributes to a BEV share among corporate registrations (9.6%) that is twice as low as the BEV share among private registrations (18.4%).

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a four year period using the straight-line or declining-balance method using the share of the vehicle cost attributable to business use.

Value added taxation and business deductions

The value added tax on cars sold in Denmark (25%) is not recoverable if the car is owned outright. If the car is leased, then the VAT is partially reduced (by 6%). This distinction based on vehicle ownership but not on business/private usage is relatively uncommon among European countries.

Fuel taxation

Fuel excise duties in Denmark are 63 c/l for petrol and 44 c/l for diesel. Both rates are above the European average (Figure 14). Unlike many European countries, Denmark did not reduce fuel excise duties in early 2022 in response to rising fuel prices.[13]

Car taxation in Estonia



Estonia has very few car taxes and as a result has a small tax burden. It is one of only nine countries in Europe without an acquisition tax (Table 1), one of only four countries without an ownership tax (Table 3), and one of only two countries with neither of the two taxes (along with Czechia). Car taxation in Estonia thus remains a ‘blank canvas’ and there is an opportunity to apply some of the best policies from other European countries. Such a tax reform would also present an opportunity to renew the Estonian car fleet. With an average age of nearly 17 years, the Estonian car fleet is the third oldest in Europe.[52]

The small tax burden in Estonia for polluting cars is also reflected in the high CO₂ emission intensity of new car registrations, which at 143 g CO₂/km ranks second highest in Europe (after Slovakia) (Figure 62). There is also little incentive to purchase zero-emission cars. In 2021, the new car registrations in Estonia included a BEV share of just 2.2% and a PHEV share of 0.7%.[48]

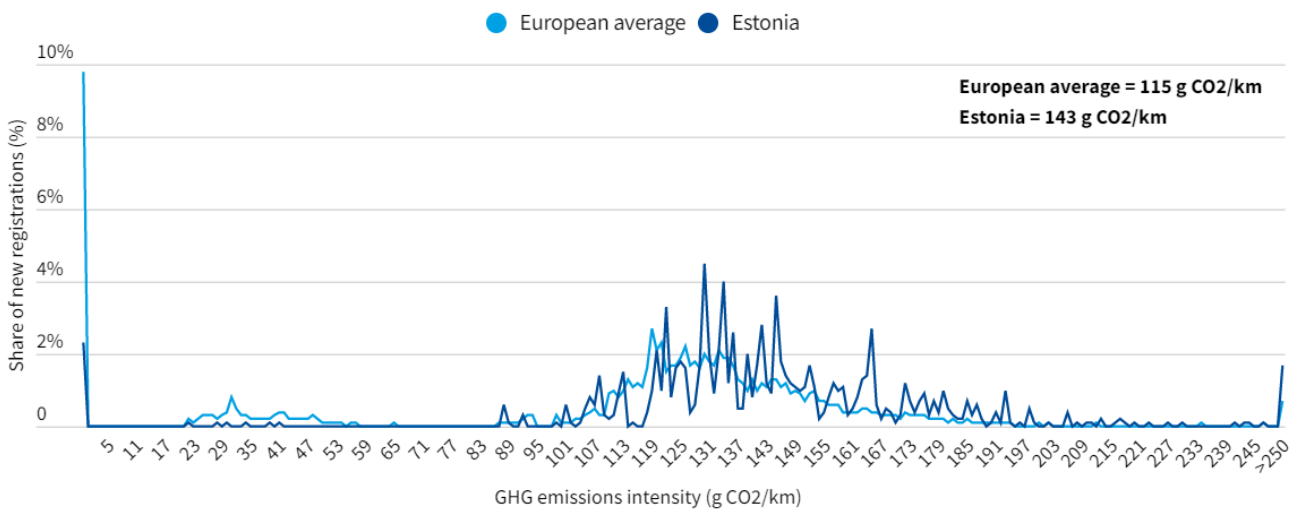


Figure 62: Estonia vs EU share of new registrations based on CO₂ emission intensity

Source: Dataforce (2022) New passenger car registrations 2021

Acquisition taxation and subsidisation

There is no acquisition tax in Estonia. This is relatively uncommon, with only nine countries in Europe taking this approach (Table 1).

The last purchase grant package was launched in early 2021 and was exhausted within minutes. The grant was €5,000 for BEVs whether registered by private households or corporations but subject to complex conditions including a list price below €50,000 and over 80,000 km driven in the first four years of ownership with over 80% of that distance taking place in Estonia. For this 2022, the subsidy scheme will

come with new conditions that are still not known yet, which could be described at the beginning of the next year.

Ownership taxation

Estonia is one of only four European countries (along with Czechia, Lithuania, and Poland) without an ownership tax (Table 3).

Benefit-in-kind taxation

Estonia is one of only three European countries to levy benefit-in-kind taxation based on engine power (measured in kW), with most European countries basing BiK on vehicle CO₂ emission intensity (16) and/or vehicle price (27). BiK in Estonia also has an age component, where cars older than five years pay a lower rate per kW. The resulting tax burden is lower than the European average, particularly for large ICE vehicles (Figure 22).

Depreciation taxation

The depreciation of new corporate cars can be written off using the straight line depreciation method. The length of time, and thus the depreciation rate, are flexible and can be determined by the company. There is no differentiation by fuel type, price, or any other factor.

Value added taxation and business deductions

The value added tax on cars sold in Estonia (20%) can be deducted from corporate cars that are used exclusively for business purposes and 50% of the VAT payment can be deducted if the car is also used privately.

Fuel taxation

Fuel excise duties in Estonia are 56 c/l for petrol and 37 c/l for diesel. The petrol excise duty is above the European average and the diesel excise duty is just below the European average (Figure 14). Unlike many European countries, Estonia did not reduce fuel excise duties in early 2022 in response to rising fuel prices.[13]



Car taxation in Finland

Car taxation in Finland is similar to its Nordic peers in many ways, for example basing taxes mainly on vehicle CO₂ emission intensity with an additional weight component, but there are several key differences. First, the Finnish acquisition tax is levied as a percentage value of the car price, thus incentivising cheaper registrations over more expensive registrations.

Second, the overall car tax burden is lower in Finland than its Nordic peers, which contributes to a lower tax differentiation for low- and zero-emission cars. One exception to this is fuel excise duty where Finland has the second highest rate for petrol and the fourth highest for diesel.

Third, by basing its taxes on WLTP emissions, Finland has incentivised PHEVs. The result is that while Finland has a lower BEV uptake than its Nordic peers at 10%, it has a comparable PHEV uptake at 20%.[48] The resulting ratio of two PHEVs registered for every BEV is the third highest in Europe (after Belgium and Greece).[48] Policy incentives for PHEVs are increasingly being called into question as the real world emissions of PHEVs become clear.[15] Neighbouring Sweden recently overhauled its PHEV incentives in July 2022.

Acquisition taxation and subsidisation

The acquisition tax in Finland is based on CO₂ emission intensity (measured in g CO₂/km WLTP) and levied as a percentage value of the car price – penalising more expensive registrations. The resulting tax burden in Finland is higher than the European average across multiple fuel types and vehicle classes (Figure 63).

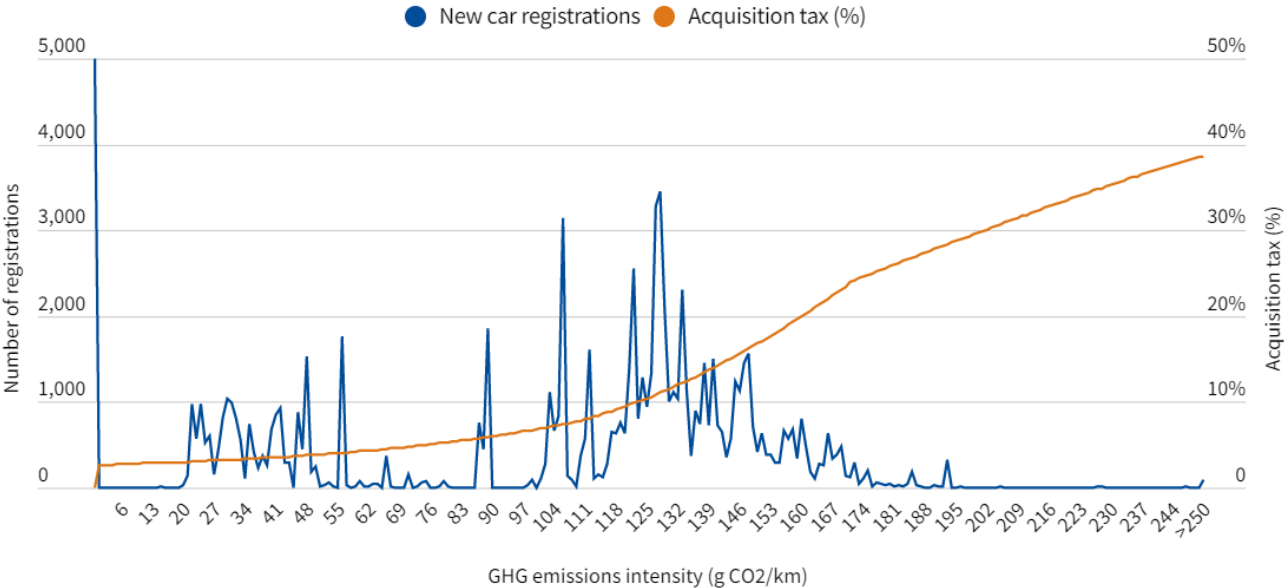


Figure 63: New passenger car registration vs acquisition tax rates

Source: Dataforce (2022) New passenger car registrations 2021

For the purchase of new BEVs, there is a grant for individuals of €2,000 provided the car is below €50,000. There are no purchase grants for PHEVs, nor are there purchase grants for corporate entities of any fuel type.

Ownership taxation

The ownership tax in Finland is made up of two parts: the basic part based on CO₂ emission intensity (measured in g CO₂/km WLTP) and on top of this basic tax, there is a tax on driving power based on weight (measured in kg) if it is other than petrol. The resulting tax burden is below the European average for PHEV and petrol, but above the European average for BEVs (Figure 21). This generates a lower tax differential for BEVs than many other European countries.

Benefit-in-kind taxation

BiK taxation in Finland is a complex calculation that incorporates the replacement price of the vehicle, a fixed fee, and deductions for BEVs and PHEVs. There are separate rates depending on whether the car is a limited or unlimited benefit. The resulting tax burden is higher than the European average across multiple fuel types and vehicle classes (Figure 22). There is also an alternative BiK calculation based on a price per km for limited (€0.07) or unlimited (€0.18) usage.

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a four year period using the straight-line or accelerated method.

Value added taxation and business deductions

The value added tax on cars sold in Finland (24%) is fully recoverable if the car is used exclusively for business purposes. If the car is used partially for private purposes then the VAT is not recoverable. This stark difference between taxes on business and private use contrasts with many European countries where VAT on cars used for private purposes is often partially recoverable.

Fuel taxation

Fuel excise duties in Finland are 72 c/l for petrol and 52 c/l for diesel. This is the second highest petrol excise duty (after Switzerland) and the third highest diesel excise duty of any European country (after Switzerland, the UK, and Iceland) (Figure 14) and due in part to the fact that, unlike many European countries, Finland did not reduce fuel excise duties in early 2022 in response to rising fuel prices (previously Italy, Ireland, the Netherlands and Belgium had higher petrol excise duties).[13]

Car taxation in France



France was one of the first countries to commercialise low-emission cars in Europe thanks in part to early electric models from French car manufacturers like the Renault Zoe in 2012. In recent years this leadership has faded, with many countries in Northern and Western Europe passing France while the other large European markets - Germany and the UK - race ahead.[48]

Much like the electrification transition, France’s car taxation system has been lauded as ambitious but now lags behind other countries. France’s bonus-malus system, introduced in 2008, is credited with lowering emissions of the fleet [56] and is a model now used in many other countries. However, with most car registrations in France present at lower levels of the malus curve, the malus curve largely functions to discourage the registering of larger, foreign cars, rather than incentivising lower-emission cars in the French fleet. This trend is also present with France’s ownership tax on corporate registrations.[57]

Acquisition taxation and subsidisation

The acquisition tax in France (*bonus-malus*) is often promoted as a key component of France’s car tax system and is widely cited as a policy approach for other countries to follow. However, the tax differential between zero-emission and emitting cars in France is lower than in many other countries. As the malus curve begins at 128 g CO₂/km, a typical small car pays no tax at all . There is also a regional acquisition tax (*Coût de la carte grise*) that is based on engine power (fiscal HP) with a fixed rate per fiscal HP. BEVs and PHEVs are exempt from this regional tax. Additionally, from 2022 France has introduced a surcharge of 10 €/kg on vehicle weight above 1,800 kg (*malus poids*). This weight component makes France one of only two countries (alongside Norway) that levies an acquisition tax based on weight, however the high weight threshold, exemptions for EVs, and other derogations mean that only 0.5% of new registrations are likely to be affected.

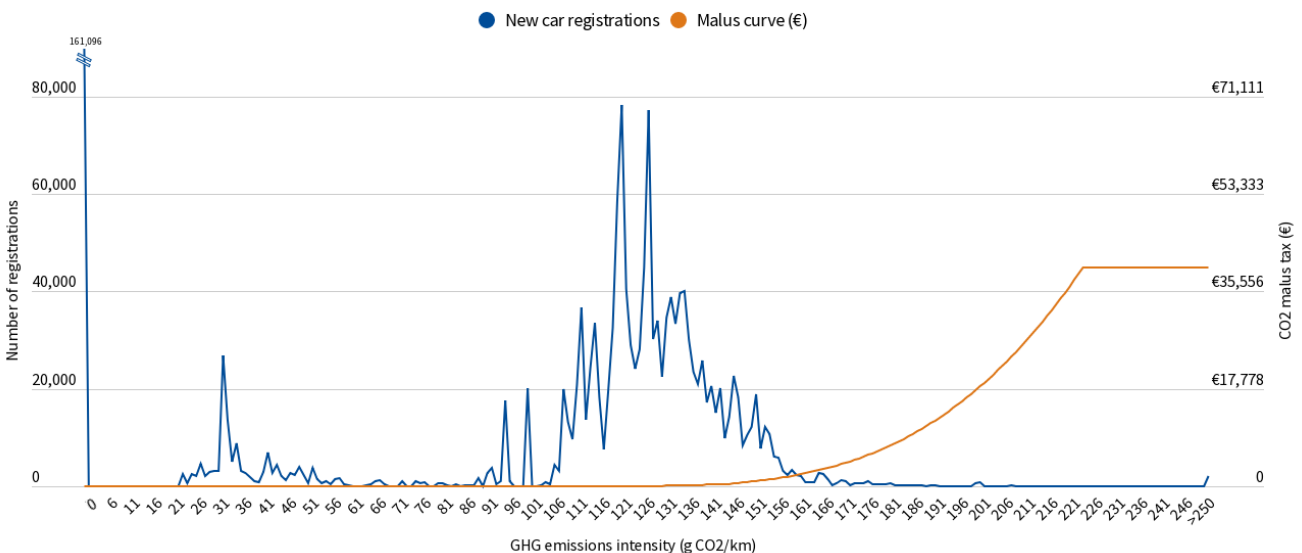


Figure 64: New passenger car registration and acquisition tax rates in France

Source: Dataforce (2022) New passenger car registrations 2021

In recent years, France has begun to reduce purchase grants for low- and zero-emission cars. For zero-emission cars (cars <€45,000), individuals receive €6,000 and companies receive €4,000. For low-emission cars (cars <€50,000), both individuals and companies receive €1,000. Purchase grants can be increased by up to €3,000 under conditions for low-income households. On 1 January 2023, the purchase grant for zero-emission cars will decrease to €5,000 while the grant for low-emission cars has yet to be decided.

Ownership taxation

The only ownership taxation in France is levied on corporate cars (*Taxe sur les véhicules de société* or TVS). Like the malus, the TVS tax curve only impacts the most polluting cars and thus offers little financial incentive for smaller models. While specifically taxing corporate cars is an interesting policy approach, in terms of incentivising the zero-emission transition this policy is somewhat offset by the fact that corporate BEVs receive a lower purchase grant (see previous section).

Benefit-in-kind taxation

There are two methods to calculate the benefit-in-kind taxation on the private use of a company car: one based on default rates and one based on real expenses. Using the default rate method, the BiK rate is a fixed percentage of the car's list price. If the employer pays for fuel for private use, the BiK rate is 12% of the car's list price and 9% if the employee pays for the fuel. France is the only country in Europe to have a separate BiK calculation for leased cars – 40% if fuel is covered and 30% if not. This differentiation strongly encourages the use of rental vehicles. Using the real expense method, all car expenses including annual depreciation are included. For low-emission cars (<20 g CO₂/km), the BiK tax rates are reduced by 50% compared to the standard tax rates previously described. This low emission tax advantage is capped at €1,800 per year in an attempt to reduce the price premium for zero-emission cars compared to a conventional ICE car but not necessarily to exceed it.

Depreciation taxation

The depreciation of new corporate cars can be fully depreciated over a four to five years period. There are maximum allowances for depreciation write-offs using four emission thresholds (≤20, 21-50, 50-160, >160 g CO₂/km). To phase-out depreciation write-offs like in Belgium, these emission thresholds for polluting cars could be reduced to zero, or, alternatively, the allowances lowered.

Value added taxation and business deductions

The value added tax (20%) on cars sold in France is not deductible for cars used exclusively for business use nor for cars used privately.

Fuel taxation

France recently introduced a fuel rebate at the pump that effectively cuts fuel excise duties to 54 c/l for petrol and 46 c/l for diesel (from 69 c/l and 61 c/l).[58] There were indications that the government would like to better target its approach to reach only those in need (e.g. high fuel usage, low incomes) but instead the decision was made to double the fuel rebate from 15 c/l to 30 c/l for September and October.[13]



Car taxation in Germany

Germany is a low taxation country for cars, particularly compared to many of its neighbours including the Netherlands, France, and Denmark. At the same time, Germany also offers one of the highest EV purchase grants in Europe and the world and corporate cars benefit from several tax advantages in the form of depreciation write-offs, VAT deductions, and light benefit-in-kind taxation. As opposed to the bonus-malus systems found in many of its neighbours, Germany is ‘all bonus, no malus’.

This model of car taxation has set Germany on a pathway to electromobility but at a high fiscal cost and the remaining ICE are highly polluting. Alternatively, taxes can be used to significantly boost electrification while also raising tax revenues, such as the model employed in the Netherlands and proposed for Germany.[59] Furthermore, as Germany is one of the few countries where BEV uptake is lower in the corporate channel (Figure 65), tax policies benefiting corporate cars are holding back electromobility.

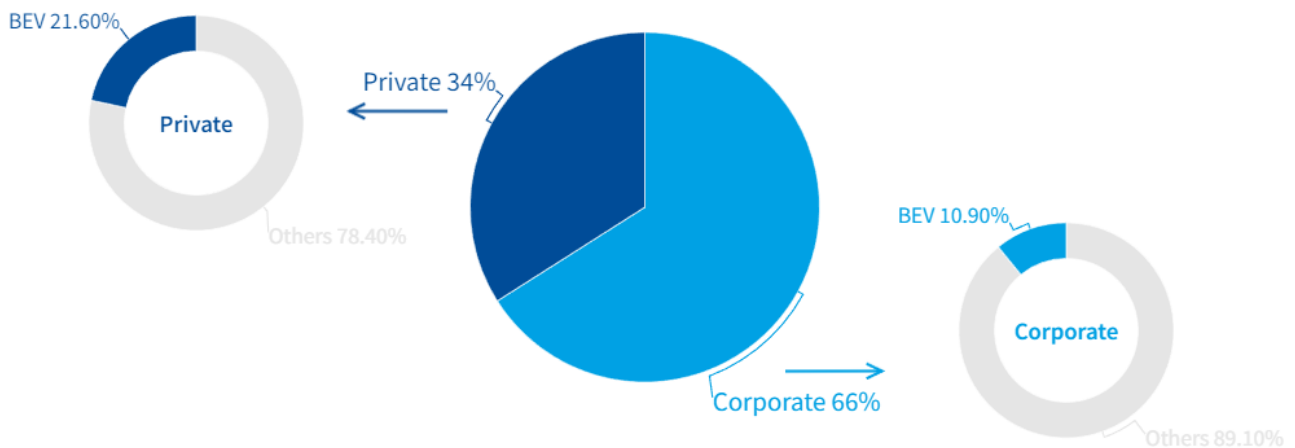


Figure 65: New passenger car registration by channel and BEV share

Source: Dataforce (2022) New passenger car registrations 2021.

Reforms to car taxation are on the horizon. The recent coalition agreement pointed to super-depreciation for EVs (which may help small businesses suffering from cash flow), and electric usage conditions (50%) to receive PHEV incentives.[60] High purchase grants have also led to questions over the cross-border flow of subsidised BEVs,[61] the suppression of BEV prices in the second-hand market,[62, 63] and value for public money.[64]

Acquisition taxation and subsidisation

Germany is one of the nine European countries that does not have an acquisition tax (Table 1, Figure 17). Registration fees are also relatively small and average €26.30.[65] In contrast to the lack of acquisition taxes on cars, at €6,750, Germany has the second highest purchase grant for PHEVs (<€40,000 net list price) in Europe and at €9,000, the fourth highest purchase grants for BEVs (cars <€40,000 net list price)

(Tables 10-11, Figures 18-20). These purchase grants are applied in a unique manner with an obligation on OEMs to provide up to €3,000 for BEVs and €2,250 for PHEVs as a discount (the rest covered by government). The purchase grants are delivered after six months in effort to prevent resale and arbitrage. Over the course of 2023 the German purchase grants will be overhauled so that a subsidy of €3,000 is only available to zero-emission cars, that are less than €45,000 net list price, and are registered by a private individual.[66]

Specifically, the purchase of pure electric cars (battery or fuel cell powered) will be subsidised from January 2023, depending on the purchase price, with €3,000 to €4,500. From September 1st, 2023, the group of persons entitled to apply will also be limited to private individuals. For e-cars with a net list price of EUR 45,000 or more, the environmental bonus will no longer apply from January 1, 2024. The subsidy for plug-in hybrids will expire at the end of 2022.

Ownership taxation

The annual ownership tax in Germany (*Kraftfahrzeugsteuer*) is based on a small component based on cylinder capacity and CO₂ emission intensity (paid per gram >95 g CO₂/km WLTP). The resulting tax burden is similar compared to other European countries (Figure 21), but when combined with national acquisition taxes results in a small tax burden for cars in Germany (Figures 29-38).

Benefit-in-kind taxation

The standard rate of benefit-in-kind taxation in Germany is relatively low at 1% of the gross list price of a car per month (*1-Prozent-Regelung*). This rate is reduced by 50% for PHEVs (<50 g CO₂/km or >60km electric range) and 75% for BEVs (<€60,000), leading to a differentiation at low levels of CO₂ emissions (e.g. for BEVs and PHEVs) but not at higher levels of CO₂ emissions (as all ICE are taxed at the same rate regardless of emissions).

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a six year period.

Value added taxation and business deductions

The value added tax on cars sold in Germany (19%) is fully recoverable unless the car is used less than 10% for business purposes, in which case VAT is not recoverable. If the car is registered as a business asset but used privately, then the proportion of private use is subject to VAT.

Fuel taxation

Germany, like many European countries, reduced fuel excise duty in early 2022 in response to rising fuel prices.[67] The reduction to the EU's minimum levels: 35.9 c/l for petrol and 33 c/l for diesel (from 65.45 and 47) was one of the largest in Europe [13], but the reduction lasted for three months while the reduced rates have continued in many other countries. There is also a national CO₂ price (*Brennstoffemissionshandelsgesetz*) of €30 that applies to automotive fuels.[68]

Car taxation in Greece

The system of car taxation in Greece offers strong financial incentives for low-emission cars. This is accomplished through a high acquisition tax and an ownership tax on the most polluting cars, as well as high fuel excise duties, particularly for petrol fuel. For salary cars, there is also a steep benefit-in-kind tax based on vehicle emissions. The result of these financial incentives is that new registrations of ICE vehicles are oriented towards models with lower emissions. At 125 CO₂/km, Greece ranks third in Europe for the lowest average emissions of new ICE vehicles. The financial incentives have not, however, resulted in a strong uptake of zero-emission cars as BEVs account for just 2.2% of new registrations.[48] PHEVs have achieved a higher share, at 4.7% of new registrations.[48] With over twice as many PHEVs as BEVs, Greece's EV uptake is more oriented towards PHEVs than any other country in Europe. As CO₂ emission intensity is measured by WLTP, the real-world emissions of PHEVs are undercounted and the orientation of the Greek incentives and the EV market towards PHEVs risks undermining the transition to zero-emission.

While the purchase grants for BEVs provide a strong financial incentive, a larger tax burden on small ICE cars and PHEVs will be required if Greece is to shift from lower emission cars to zero-emission cars. As the Greek fleet is one of the oldest in Europe (16.6 years, ranking fourth[69]), there is also a need to incentivise the retirement of older, often more polluting vehicles, from the fleet. Tax reform therefore complements an infrastructure challenge in Greece with long distances between urban areas.[70]

Acquisition taxation and subsidisation

The acquisition tax in Greece is based on two components. The first is levied on the net retail price of the car with several increasing thresholds so that the tax increases progressively at higher prices. The second component applies a CO₂ emissions coefficient that incentivises emissions below 130 g CO₂/km and disincentivises those above 156 g CO₂/km. BEVs are exempt from the tax, and PHEVs have a 75% discount if emit less than 50 g CO₂/km and 50% otherwise. Despite the fact that the starting threshold of emissions is high, the resulting tax burden for polluting cars (normally with higher prices) is one of the highest among European countries (Figure 17).

Purchase grants for zero-emission cars (<€50,000) are calculated as a 30% discount on the pre-tax retail price up to a maximum subsidy of €8,000 - the fifth highest zero-emission purchase grant among European countries, with an extra €1,000 under the vehicle retirement programme. Additionally, Greece is one of the few countries that offers an additional purchase grant for particular social groups (an additional €1,000 for people with disabilities, under 30 years old, and families with three or more dependent children).

Ownership taxation

In Greece, as in most European countries, the ownership tax is based on CO₂ emission intensity with different thresholds, starting from 122 g CO₂/km (Figure 66). The resulting tax burden is below the European average for ownership taxes (Figure 21).

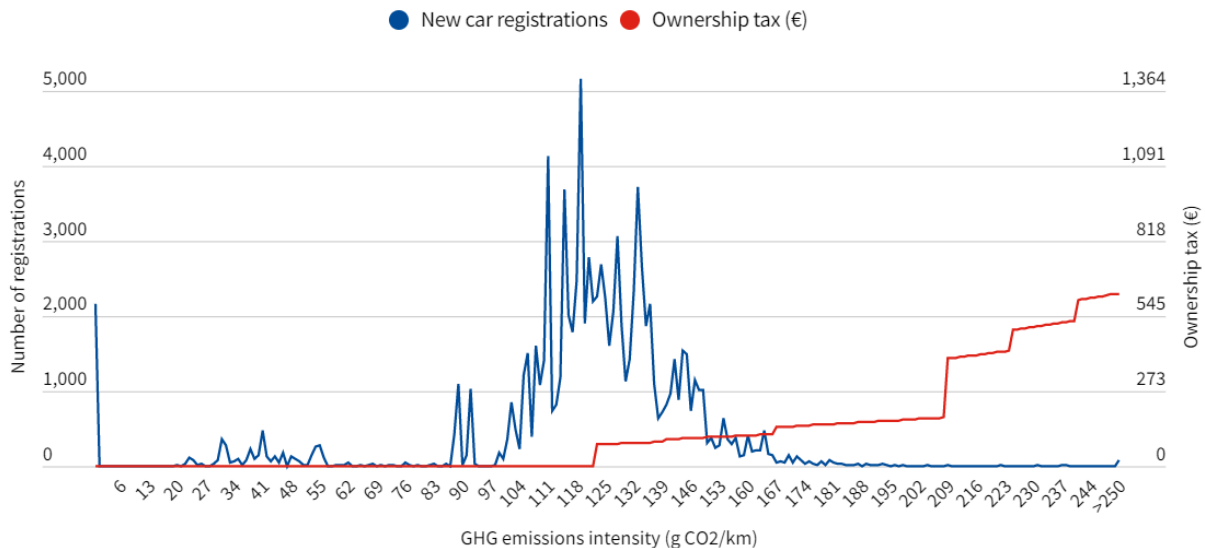


Figure 66: New passenger car registration vs ownership tax rates

Source: Dataforce (2022) New passenger car registrations 2021

Benefit-in-kind taxation

Benefit-in-kind taxation in Greece is based on the retail price of the car without VAT and has different thresholds with high rates. For cars emitting less than 50 g CO₂/km and with a net price (without VAT) lower than €40,000 there is a zero tax rate. For those with low emissions (<50 g CO₂/km) but with a higher price than €40,000 there is a deduction of €40,000 to the tax base. Greece is one of only two countries (along with Hungary) with a zero BiK rate for PHEVs. As VAT is not included in the tax base, the resulting tax burden for polluting cars is lower than the European average (Figure 22).

Depreciation taxation

The depreciation of new corporate cars in Greece is unique among European countries by basing depreciation rates on vehicle emissions. If the car emits less than 20 g CO₂/km the period is two years, if it emits between 20g and 50 g CO₂/km the period is four years, and if it emits more than 50 g CO₂/km the period is eight years.

Value added taxation and business deductions

Greece is one of the ten European countries where the value added tax (24%) cannot be deducted on the purchase of a car regardless of its use, whether for business or private purposes.

Fuel taxation

Fuel excise duties in Greece stand at 71 c/l for petrol and 42 c/l for diesel. The petrol excise duty is among the highest in Europe while the diesel excise duty is lower than the European average (Figure 14). The difference in taxation between the two fuels, where diesel excise duty reaches only 59% of the petrol excise duty, is the largest in Europe. In March 2022, the government announced a three month direct fuel subsidy of 60 litres per month at 22 c/l for petrol and 15 c/l for diesel to individuals with a family income up to 30,000 euros.[13] Greece was the only country to make the fuel excise reductions income-contingent.

Car taxation in Hungary

Among European countries, Hungary frequently appears as an outlier with respect to many aspects of car taxation, often ranking first or last for different tax rates. This is particularly noticeable for fuel taxes, where Hungary's fuel excise duties were reduced in early 2022 to the lowest rates in Europe and well below the minimum rates allowable under the European Tax Directive. Hungary also has the lowest benefit-in-kind rates for most fuel types and vehicle classes as well as the lowest corporate tax rates in Europe (9%, providing minimal benefit in the form of depreciation write-offs for corporate car purchases). While some European countries tax diesel engines at a higher rate than petrol, Hungary is the only country to tax diesels at a lower rate.

Hungary tops the European tax rates for value added tax (27%), however this tax can be fully deducted on leased vehicles - a policy unique to Hungary. This VAT deduction on leased vehicles, together with the low rates of BiK taxation, contribute to the high share of corporate cars in new registrations – 80%, the highest in Europe (Figure 67). The existing Hungarian fleet also is relatively small (403 cars per 1000 inhabitants, the third lowest in Europe). Tax policy that influences new corporate registrations (e.g. benefit-in-kind, VAT deductions, depreciation write-offs) therefore has a large influence on the Hungarian fleet, particularly as corporate registrations are also often very responsive to financial incentives. Corporate car taxes could be differentiated by vehicle emissions, for example, as currently no Hungarian car tax is levied on this attribute.

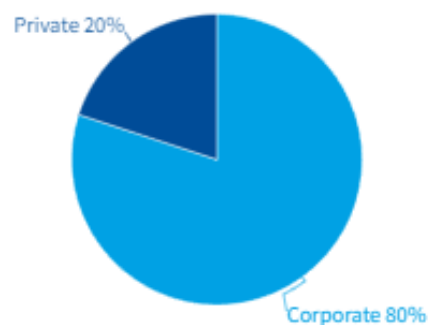


Figure 67: New passenger car registration by channel in Hungary

Source: Dataforce (2022) New passenger car registrations 2021

Acquisition taxation and subsidisation

Acquisition taxation in Hungary is based on engine cylinder capacity (measured in cubic centimetres) and the environmental euro standards with exemptions for both BEVs and PHEVs. However, these exemptions do not provide large fiscal incentives for electric vehicles as the tax burden on ICE vehicles is also quite small (Figure 17). As the tax rates are partly lower for diesel engines than petrol engines of the same capacity, there is a fiscal incentive for diesel registrations. While some European countries tax diesel engines at a higher rate, Hungary is the only country to tax diesels at a lower rate.

Until June 2022, private individuals were eligible for purchase grants depending on the purchase price of the car. Purchase grants were not available for corporate cars, with the exception of taxi operators. Currently, there is no additional subsidy package from the government.

Ownership taxation

Ownership taxation in Hungary is based on engine power (measured in kW) and age ranges with exemptions for both BEVs and PHEVs. However, these exemptions do not provide large fiscal incentives for electric cars as the tax burden on ICE vehicles is also quite small (Figure 21).

Benefit-in-kind taxation

Hungary's benefit-in-kind taxation is based on engine power (measured in kW) with exemptions for both BEVs and PHEVs. Hungary is one of six European countries with a zero BiK rate for BEVs and one of only two countries (along with Greece) with a zero BiK rate for PHEVs. However, these exemptions do not provide large fiscal incentives for electric cars as the BiK tax burden on ICE vehicles is quite small - second lowest in Europe for a small ICE (€173 a year) and for a large ICE (€217) (Figure 22).

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a five year period using the straight line depreciation method. This tax benefit is relatively small as Hungary has the lowest corporate tax rate in Europe at 9% (Figure 26). There is no consideration of fuel type, emissions, or vehicle usage.

Value added taxation and business deductions

Hungary's high value added tax, the highest in Europe at 27%, is not deductible for cars purchased outright nor for leased cars used exclusively for business purposes. But it is partially deductible for leased cars used for private purposes (in proportion to their business usage). VAT connected to the operation of passenger cars (e.g. services, repair, maintenance) is 50% deductible.

Fuel taxation

At 26 c/l for petrol and 23 c/l for diesel, Hungary has the lowest excise duty on petrol and the second lowest excise duty (after Spain) in the EU. These rates, which were lowered in early 2022 (from 32 c/l and 30 c/l respectively) in response to rising fuel prices,[13] are well below the legal minimum in the European Tax Directive. The new excise duties are applied on a sliding scale that responds in an inverse manner to the oil price. The low fuel prices have also created administrative challenges as the Hungarian government has attempted to combat fuel tourism by limiting eligibility to cars with Hungarian registration plates - thus excluding other EU vehicles.[71]



Car taxation in Iceland

Iceland has the highest share of PHEVs in Europe (27% in 2021) and the second highest share of BEVs (28%) (Figure 68), following world leader Norway (65%).[48] Several reasons have been cited for this high EV share including high fossil fuel prices (from high import costs), cheap electricity (from hydro and geothermal sources), a high urbanisation rate, and ambitious government fiscal policies.[72, 73] Car rentals – which are focused on budget models for tourists that can travel long distances – remain a challenge.

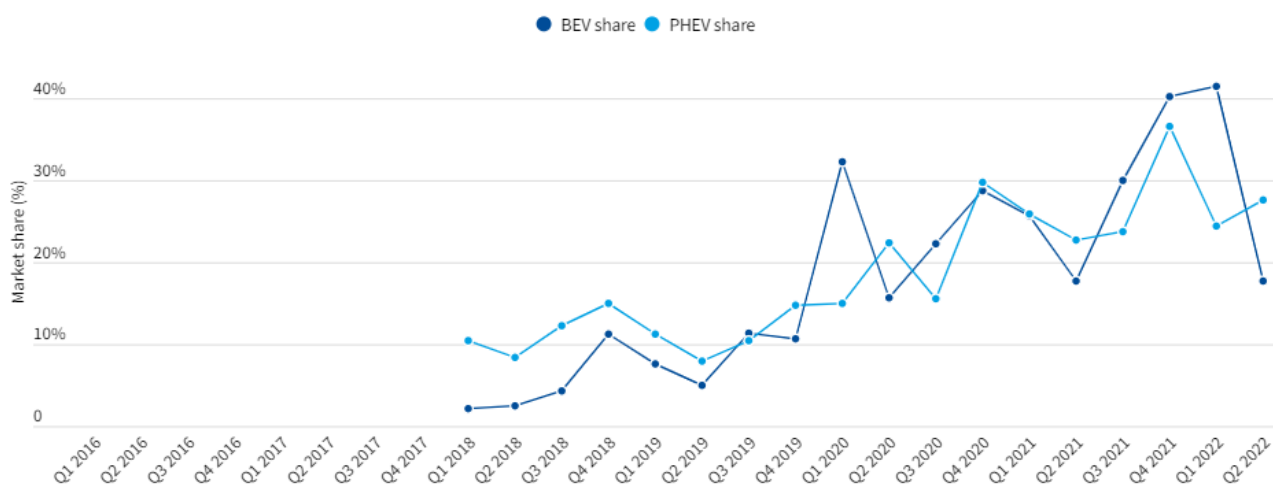


Figure 68: Electric car market share of new registrations in Iceland

Source: T&E calculations based on quarterly registration data from ACEA

Among these supportive fiscal policies is a VAT exemption for EVs (BEVs and PHEVs until May 2022) that has been in place since 2012 and exceeds the value of purchase grants in almost all other European countries. This previously VAT exemption for PHEVs, as well as the current ownership tax based on WLTP emissions and an acquisition tax beginning at 90 g CO₂/km WLTP, have greatly incentivised PHEVs (and to the likely detriment of BEVs). This policy approach has been partially modified with the cancellation of the VAT exemption for PHEVs, but the other policy advantages still in place make it difficult to change this growing trend of more PHEVs on the road, knowing that PHEVs have been called into question as the real-world emissions of PHEVs become evident.[15]

Acquisition taxation and subsidisation

The acquisition tax in Iceland is based on CO₂ emission intensity (measured in g CO₂/km WLTP) common to many European systems. However, unlike most other European acquisition taxes, in Iceland the tax is levied as a percentage value of the car price – including zero-emissions vehicles. The result is that the Icelandic acquisition tax penalises more expensive registrations more than cheaper registrations. The resulting tax burden is higher than the European average across multiple fuel types and vehicle classes, with the exception of PHEVs as the Icelandic acquisition tax starts at 90 g CO₂/km WLTP (Figure 17).

Although Iceland does not have purchase grants for low-emission cars that are commonplace in other European countries, BEVs (and PHEVs until May 2022) do not pay value added tax (VAT), with a maximum of ~€11,000 (1,560,000 ISK).

Ownership taxation

The ownership tax in Iceland is calculated based on CO₂ emission intensity. There is a tax base of €119 (16,880 ISK) for all the vehicles and the ones exceeding 145 g CO₂/km WLTP pays an extra 0.91€ (130 ISK) for each gram above this threshold. The resulting tax burden is above the European average for BEVs and below the average for PHEV and petrol models (Figure 21).

Benefit-in-kind taxation

The benefit-in-kind tax in Iceland distinguishes between zero-emission cars and the rest. For zero-emission cars, a rate of 27% is applied, or 22% if the user covers the running costs (e.g. energy, maintenance). For all other vehicles, the rate applied is 28%. The taxable base (price of the vehicle) is reduced by 10% per year (with a maximum of 50% of its price).

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a five to ten year period using the straight-line method.

Value added taxation and business deductions

The value added tax on cars sold in Iceland (24%) is fully recoverable if the car is used exclusively for business purposes. If the car is used partially for private purposes then the VAT is not recoverable. This stark difference between taxes on business and private use contrasts with many European countries where VAT on cars used for private purposes is often partially recoverable.

Fuel taxation

Fuel excise duties in Iceland have two components: an excise duty and a CO₂ tax (levied on processing and distribution companies). Taken together, the excise duties total 41.6 c/l (0.5920 ISK) for petrol and 60.0 c/l (0.7970 ISK) for diesel. The diesel excise duty is well above the European average (Figure 14), ranking third highest (after Switzerland and the UK).



To incentivise the uptake of zero-emission cars, Ireland offers purchase subsidies as well lower rates for many car taxes (acquisition, ownership). For corporate cars, there is accelerated depreciation where zero-emission cars can be written-off in the first year and a large decrease (€35,000) in car value for benefit-in-kind taxation. However the share of corporate cars is small (34%), second lowest in Europe, so this considerable advantage for salary cars is underutilised.

The result of these incentives is reflected in Ireland's EV uptake. With a BEV uptake of 8.2% and a PHEV uptake of 7.5%, Ireland's transition to a zero-emission fleet remains behind many European peers.[48] In their review of EV incentives,[74] Ireland's Parliamentary Budget Office concluded that while the BEV purchases are trending upwards, Ireland would need a twenty-fold increase in BEVs to reach the country's 2030 phase-out of polluting vehicles (i.e. 845,000 electric passenger cars) as set out in the Climate Action Plan.[75] Furthermore, if these incentives are intended to lower transport emissions, Ireland's policy of reducing the benefit-in-kind tax rate based on kilometres driven (the only European country to do so) counteracts this intent by incentivising more driving (although improved starting in 2023 with the addition of a CO₂-based component).

Ireland is one of only two European countries to levy a tax based on NO_x emissions (the VRT acquisition tax), although new registrations in Ireland continue to be oriented towards diesel (33.3%). The difference in fuel excise duties, with lower duties for diesel fuel than petrol (46 vs 41 c/l) likely contributes to this continued high share of diesel registrations.

Acquisition taxation and subsidisation

The acquisition tax in Ireland, the Vehicle Registration Tax (VRT), is levied as a percentage price of the vehicle and is based on CO emission intensity (starting from 0 g CO₂/km), so that cars with higher emissions face a higher tax liability. BEVs are eligible for relief from VRT up to a maximum amount of €5,000 (price of the car is less than €50,000). In January 2020, the Irish government introduced a surcharge based on car nitrogen oxide (NO_x) emissions, making Ireland only the second country in Europe (in addition to Norway) to levy any car based on NO_x emissions. The resulting tax burden for BEVs is around the European average and above PHEV and ICE models (Figures 29-38).

Purchase subsidies for BEVs in Ireland depend on the list price of the vehicle and ranges from €2,000 to a maximum of €5,000. To be eligible for this grant support vehicles must have a list price of at least €14,000. Grant support for PHEVs is no longer available from 1st January 2022.

Ownership taxation

The ownership tax in Ireland (*motor tax*) is an annual tax levied on motor vehicles based on car CO₂ emission intensity (starting from 0 g CO₂/km). BEVs and PHEVs pay a lower rate of annual motor tax than vehicles which rely on an internal combustion engine. The resulting tax burden is higher than the European average for all fuel types and for BEVs in particular (Figure 21).

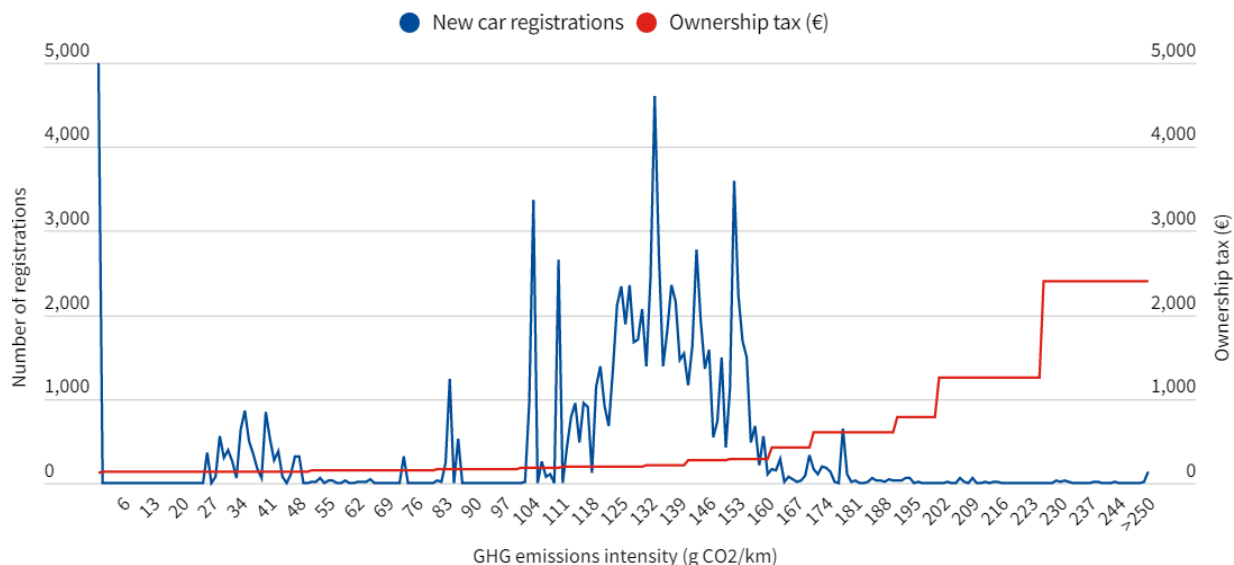


Figure 69: New passenger car registration vs ownership tax rates

Source: Dataforce (2022) New passenger car registrations 2021

Benefit-in-kind taxation

Ireland is the only country where benefit-in-kind taxation is based on km driven. The BiK rate, which is levied as a percentage of car value plus acquisition tax (VRT), decreases with km driven, meaning that it incentivises employees who have to travel more for work, but in doing so incentivises more driving and the associated environmental and social harms. BEVs benefit from a €35,000 reduction of the tax base - the only European country to implement such a large reduction. The resulting tax burden is lower than the European countries average (Figure 22 and 23). From January 2023, an emissions-based BIK structure will be added to the existing BiK tax regime with higher BiK rates for polluting cars.

Depreciation taxation

The depreciation system of new corporate cars in Ireland is unique among European countries in its incorporation of CO₂ emission intensity. Corporate cars can be partially depreciated over an eight year period depending on CO₂ emission intensity, with an accelerated depreciation for BEV in one year. If the car emits less than 140 g CO₂/km €24,000 can be depreciated, if it emits between 140 g and 155 g CO₂/km €12,000 can be depreciated and 0€ if it emits more than 155 g CO₂/km.

Value added taxation and business deductions

Ireland is one of the five European countries where the value added tax (23%) deduction is linked with the emissions of the car. For corporate cars that are used exclusively for business purposes VAT is 20% deductible and for private use is 14% deductible if the car is used at least 60% of the time for business purposes and the car emits less than 140 g CO₂/km.

Fuel taxation

Ireland recently cut fuel excise duties to 46 c/l for petrol and 41 c/l for diesel (from 66 c/l and 56 c/l) in response to rising fuel prices[13]. The fuel excise duty for diesel is slightly above the European average, and the petrol excise duty is slightly below (Figure 14).

Car taxation in Italy



Italy stands in sharp contrast to many of its European peers with its approach to car taxation. Whereas many countries subsidise low- and zero-emission cars, Italy subsidises polluting cars up to 135 g CO₂/km – the majority of new registrations (72%). Italy is one of only three countries (together with France and Romania) to offer subsidies for polluting cars and is the only country to incorporate the private use of corporate cars into its depreciation write-off policy. Finally, unlike most European countries where benefit-in-kind is applied as a simple percentage (sometimes differentiated by emissions) to car value, in Italy the tax base is determined by special tax tables produced by Automobile Club d’Italia. The resulting low tax base means that Italy has one of the lowest tax rates in Europe on salary cars.

The net effect of these taxes is that cars in Italy face low taxation. This contributes to high car ownership in Italy, ranking third in cars per capita in Europe (670 per 1000 inhabitants, after Iceland and Luxembourg).[76] Low car taxation also provides zero-emission cars with very little financial incentive compared to polluting vehicles.

Acquisition taxation and subsidisation

The acquisition tax in Italy, the *IPT* (Imposta provinciale di trascrizione) is a regional tax based on engine power (measured in kW). Until the end of 2021, Italy also had an *Ecotassa* based on CO₂ emission intensity. As the malus curve began at 160 g CO₂/km it failed to provide a financial disincentive to 94% of new registrations (Figure 70) regardless of their size, emissions, or other characteristics. As of 1 September 2022, no new tax has been introduced in its place.

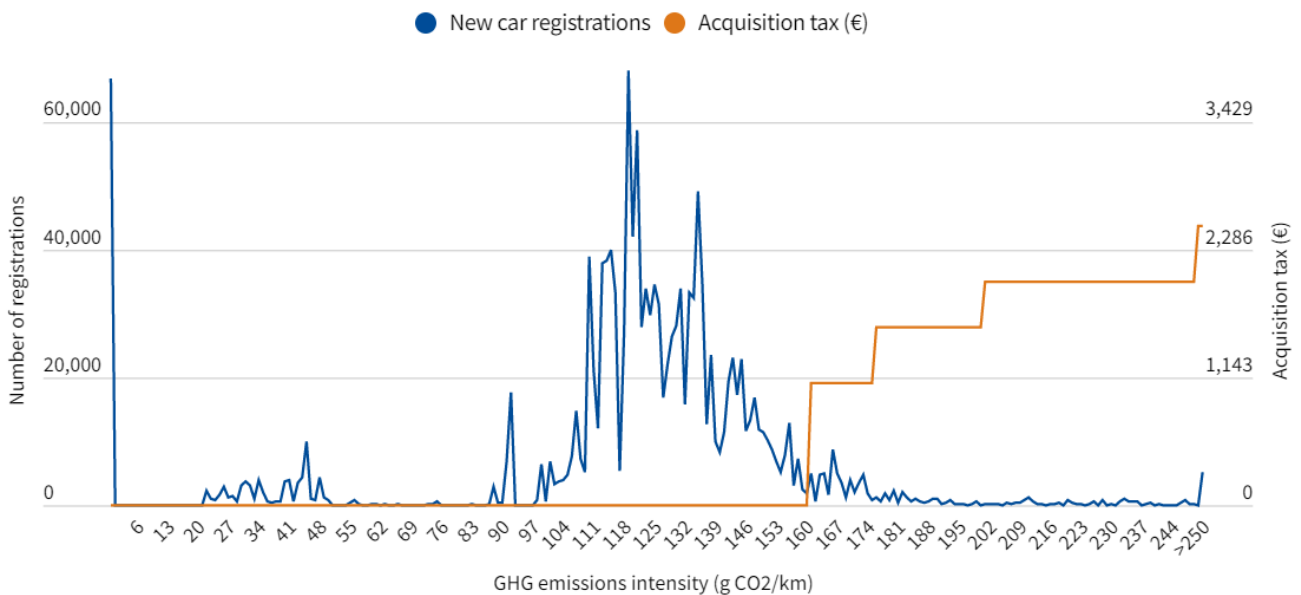


Figure 70: New passenger car registration vs acquisition tax rates

Source: Dataforce (2022) New passenger car registrations 2021

Private individuals are eligible for purchase grants of €3,000 for BEVs (cars <€35,000) and €2,000 for PHEVs (cars <€45,000). The purchase grant for BEVs is lower than the European average, while the purchase grant for PHEVs is higher. Purchase grants can be increased by 50% for those with incomes below €3,000 – a unique approach European countries.[77] Purchase grants can be increased by €2,000 with car scrappage, including for polluting cars up to 135 g CO₂/km. The delay in 2022 to introduce new purchase grants, as well as the design of the grants (e.g. beneficiaries, grants and emission ranges incentivised), has resulted in a drop-off in the uptake of zero-emission cars at odds with the continent-wide trend.[78] The disbursement of purchase grants has led environmental NGOs to appeal to the Italian Regional Administrative Court.[79]

Ownership taxation

There are also two ownership taxes in Italy. The *Superbollo* is levied on cars with high engine power (>185 kW) and the *Bollo Auto*, like the IPT on acquisition, is a regional tax based on engine power (measured in kW) and Euro standard with exemptions for PHEVs and BEVs (for five years in most regions). The overall tax burden of the ownership tax is quite low compared to other countries (Figure 21).

Benefit-in-kind taxation

Italy applies a unique system of taxing salary cars where the taxable base is calculated by multiplying a designated cost per kilometre, which varies according to the vehicle model and engine and is provided by the *Automobile Club d'Itali*, to 15,000km. Once the taxable base is calculated, a percentage rate is applied depending on CO₂ emission intensity, with 25% (0-59 g CO₂/km), 30% (60-159 g CO₂/km), 50% (160-189 g CO₂/km), and 60% thresholds (>190 g CO₂/km). Although the percentage rates are among the highest in Europe, the lower taxable base makes Italy one of the lowest taxed countries for benefit-in-kind taxation.

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a five-year period using the straight-line depreciation method. Italy is one of the few European countries where car costs can be included in the depreciation amount. Depreciation is limited to 70% for cars that are a fringe benefit, and 20% for cars not strictly used for business. There is a maximum limit for non-instrumental use of €18,076 for purchased cars, €3,615 for rented cars, and limits that vary by employee status and trade.

Value added taxation and business deductions

The value added tax on cars sold in Italy (22%) is fully deductible for cars used exclusively for business use and 40% deductible for cars used privately. Despite the similarity of this policy to other EU countries, Italy requested and received a derogation from the EU's common system of VAT (which expires at the end of 2022).[80] There is policy discussion about whether to increase the VAT deduction for privately used cars and/or introducing an emissions-based component to the VAT deduction.

Fuel taxation

Italy used to have one of the highest fuel excise duties in Europe but recently reduced the duties to 48 c/l for petrol and 37 c/l for diesel (from 73 c/l and 62 c/l). This temporary reduction is one of the largest in Europe.[13]

Car taxation in Latvia

Latvia stands in sharp contrast to many of its European peers with its approach to car taxation. It is one of only nine countries without an acquisition tax. Latvia's benefit-in-kind taxation on salary cars is the lowest of any country in Europe and the only country to levy benefit-in-kind taxation based on engine capacity. With the exceptions of a few specific vehicle categories, cars having a price above €50,000 are considered luxury vehicles and as such do not qualify for corporate car tax benefits including depreciation write-offs, VAT reduction, and benefit-in-kind.

The overall tax burden on cars in Latvia is quite low. In addition to the low benefit-in-kind tax and the absence of an acquisition tax, the annual ownership tax (based on CO₂ emission intensity) is well below the European average. The small tax burden in Latvia for polluting cars is also reflected in the high emissions of new car registrations which at 141 g CO₂/km ranks third highest in Europe (after Slovakia and Estonia). There is also little incentive to purchase zero-emission cars. In 2021, the new car registrations included a BEV share of just 2.9% and a PHEV share of 1.0%.[48]

Acquisition taxation and subsidisation

There is no acquisition tax in Latvia. This is relatively uncommon, with only nine countries in Europe taking this approach (Table 1). From 2022, a €4,500 purchase grant is available for new BEVs and €2,250 for new PHEVs and used BEVs. Cars are only eligible if registered privately and with a pre-VAT list price below €50,000. This contrasts with the other Baltic states which offer zero-emission purchase grants for both private and corporate cars but do not offer purchase grants for low-emission cars.

Ownership taxation

The car ownership tax in Latvia is based on CO₂ emission intensity with several increasing thresholds so that the tax increases progressively at higher emissions levels (Figure 71).

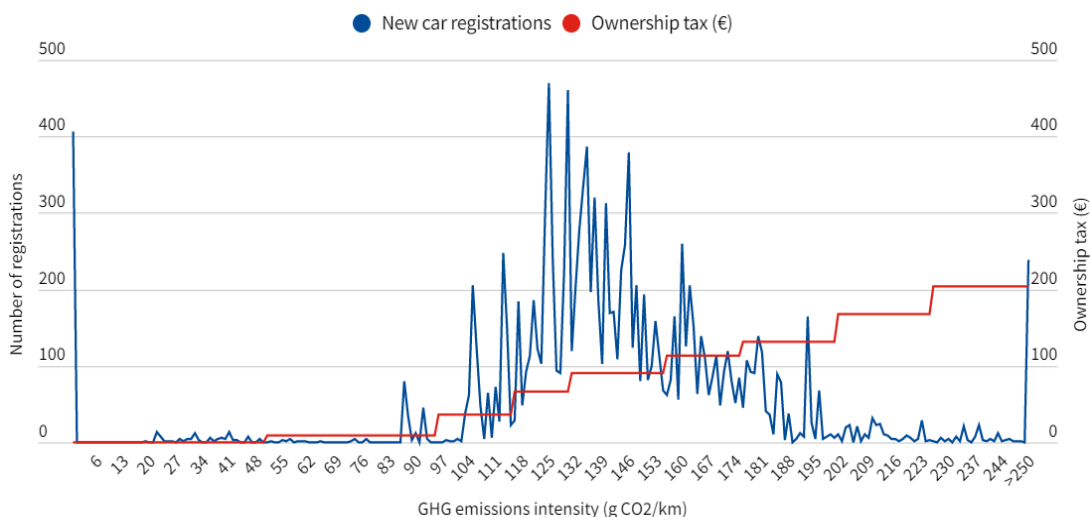


Figure 71: New passenger car registration vs ownership tax rates

Source: Dataforce (2022) New passenger car registrations 2021

This is a common approach, although the low tax rates mean that Latvia has one of the lowest tax burdens on vehicle ownership across multiple fuel types and vehicle classes (Figure 21). As the ownership tax begins at 50 g CO₂/km, BEVs and most PHEVs are exempt from the tax.

Benefit-in-kind taxation

Cars above €50,000 - considered luxury cars - are not eligible to be salary cars. For cars under €50,000, companies in Latvia may choose to pay company vehicle tax to avoid benefit-in-kind taxation. If the company opts not to pay company vehicle tax, the company car is treated as a benefit in kind and both personal income tax (20-31%) and social security payments (34.09%) have to be paid on the amount of the car depreciation and actual costs incurred during use of the vehicle.

Latvia is the only country in Europe to levy this benefit-in-kind replacement tax on a vehicle engine capacity (measured in cylinder capacity), with most European countries basing BiK on CO₂ emission intensity and/or vehicle price. As a result, and because the engine capacity tax is so low, most companies choose this route and Latvia has the lowest de facto benefit-in-kind taxation on ICE salary cars of any country in Europe (Figure 22 and 23).

Depreciation taxation

Cars above €50,000 - considered luxury cars - are not eligible for depreciation write-offs. For cars under €50,000, depreciation can be fully written off over a five year period.

Value added taxation and business deductions

Cars above €50,000 - considered luxury cars - are not eligible for VAT deduction. For cars under €50,000, the value added tax (21%) on purchase, maintenance and repair costs can be deducted by 50%. This applies regardless of whether the car is used for business or private purposes. If the corporation has not opted for company vehicle tax, it can reclaim 100% of VAT, provided that the car is used exclusively for business purposes. There is a requirement to install GPS for enforcement.

Fuel taxation

Fuel excise duties in Latvia are 52 c/l for petrol and 42 c/l for diesel. Both rates are slightly above the European average (Figure 14). Unlike many European countries, Latvia did not reduce fuel excise duties in early 2022 in response to rising fuel prices.[13]

Car taxation in Lithuania



Lithuania stands in sharp contrast to many of its European peers with its approach to car taxation. It is one of only four countries without an ownership tax and one of only four countries without VAT deductions for the purchase of corporate cars. Lithuania is the only country absent from both lists. Where Lithuania does levy car taxes and subsidies, the approach is relatively simplistic. Benefit-in-kind, for example, is only levied on vehicle price with no consideration of fuel type, emissions, or other vehicle characteristics. There is also a contradictory approach to the taxation of diesel, as diesel vehicles are taxed at a higher rate in the acquisition tax but diesel fuel is taxed at a lower rate at the pump.

Compared to the other Baltic states, new car registrations in Lithuania have a higher share of zero-emission cars (3.7%)[48] and a lower average emissions (134 g CO₂/km) - even for ICE vehicles (141 g CO₂/km). These trends present a dichotomy with the existing Lithuanian fleet which is not just the oldest among the Baltic states but the oldest in all of Europe with an average vehicle age of 17 years.[81] Updating car taxation in Lithuania presents an opportunity to consider tax instruments used in most other European countries, resolve the contradictory approach to diesel taxation, renew its ageing fleet, and cement its position as zero-emission leader in the Baltic states.

Acquisition taxation and subsidisation

The acquisition tax in Lithuania is based on CO₂ emission intensity, common to many European bonus/malus systems. Fuel type is also incorporated into the tax calculation as diesel cars pay a higher rate than petrol cars per g CO₂/km and petrol cars pay a higher rate than gas cars. This differentiation conflicts with fuel excise duty where Lithuania levies a lower rate on diesel fuel than petrol. As the acquisition tax starts at 131 g CO₂/km, many smaller ICE cars are exempt and the incentive for electrification is absent (Figure 72).

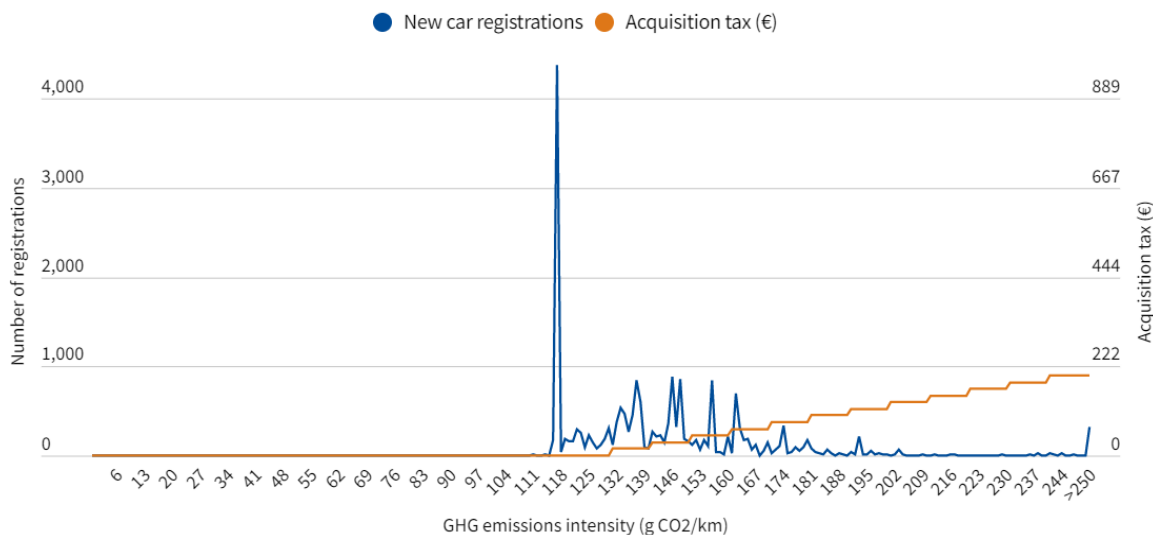


Figure 72: New passenger car registration vs acquisition tax rates

Source: Dataforce (2022) New passenger car registrations 2021

New BEVs are eligible for a purchase grant of €5,000 for private individuals with an extra €1,000 if a vehicle is scrapped. The purchase grant is reduced to €4,000 for corporations and there is a total compensation limit per company over a three-year period. Used BEVs (up to four years) are eligible for €2,500. Unlike most other European countries, there is no price threshold for the purchase grants. There is no purchase grant for PHEVs.

Ownership taxation

Lithuania is one of only four European countries (along with Czechia, Estonia, and Poland) without an ownership tax (Table 3).

Benefit-in-kind taxation

The benefit-in-kind tax is a simple calculation of 0.75% per month (9% annually) if fuel costs are included and 0.7% per month (8.4% annually) if fuel costs are not included. This approach contrasts with many other European countries that base BiK taxation on fuel type, emissions, or other vehicle attributes. As a result, the BiK tax burden for a BEV or PHEV is higher than an ICE car in the same vehicle class, generating a fiscal disincentive to opt for a BEV or PHEV salary car (Figure 22 and 23).

Depreciation taxation

The depreciation of new corporate cars can be generally written off over a six year period using the straight line depreciation method. This period is shortened to four years for short-term car rentals, driving school services, or transport services. There is no differentiation by fuel type, price, or any other factor.

Value added taxation and business deductions

Lithuania is one of the 10 European countries where the value added tax (21%) cannot be recovered on corporate car purchases (for cars with less than nine seats). This approach to VAT deductions contrasts with many European countries where VAT on cars used exclusively for business purposes is often fully recoverable and the VAT on cars used for both business and private purposes is often partially recoverable.

Fuel taxation

Fuel excise duties in Lithuania are 47 c/l for petrol and 37 c/l for diesel. Both rates are around the European average (Figure 14). Unlike many European countries, Lithuania did not reduce fuel excise duties in early 2022 in response to rising fuel prices, citing uncertainty in sanctions, alternative suppliers, and supply chain capture.[13]



Car taxation in Luxembourg

Luxembourg presents a car registration paradox. While Luxembourg leads Europe for the newest cars (an average of 6.7 years),^[82] and ranks second for the most cars per capita (682 per 1000 inhabitants),^[83] these numerous, young vehicles are not characterised by technological improvements in lowering emissions. Conversely, Luxembourg's new registrations are characterised by high emission ICE cars (153 g CO₂/km, second highest in Europe) that are still powered by diesel (25%, second highest in Europe).

Fiscal policy provides an important answer to this paradox, as Luxembourg has relatively low taxes and fiscal incentives despite being a high income country. In Luxembourg, there is no acquisition tax, although zero-emission cars registered by private households are eligible for purchase grants. In this respect, Luxembourg mirrors the 'all bonus, no malus' approach of Germany, although Luxembourg does not have domestic OEMs like Germany and has even higher emission ICE cars (153 vs 147 g CO₂/km) and a lower BEV share (10.5% vs 13.6%^[48]) than neighbouring Germany.

Luxembourg's favourability for diesel cars, second only to Ireland, also provides issues for a highly urbanised country. While this issue appears to be recognised in the form of a surcharge for diesel vehicles in Luxembourg's ownership tax, the excise duty on diesel fuel remains much lower than petrol (at the minimum allowed by the European Tax Directive)^[84] and provides a much stronger fiscal incentive. This inconsistent approach to diesel taxation, as well as the general lack of malus on vehicle emissions, is an area of potential focus for future tax reform.

Acquisition taxation and subsidisation

Luxembourg is one of the nine European countries that does not have an acquisition tax (Table 1, Figure 17). In contrast to the lack of acquisition taxes on cars, Luxembourg has relatively high purchase grants for BEVs at €8,000 (without exceeding 50% of the purchase price). Private households and corporations are both eligible for the grant. There is no purchase grant for PHEVs.

Ownership taxation

Ownership taxation in Luxembourg is based on CO₂ emission intensity (measured in g CO₂/km WLTP). As the tax rate increases very gradually with emissions (Figure 73), the tax burden and incentive for low- and zero-emission cars is minimal (Figure 21).

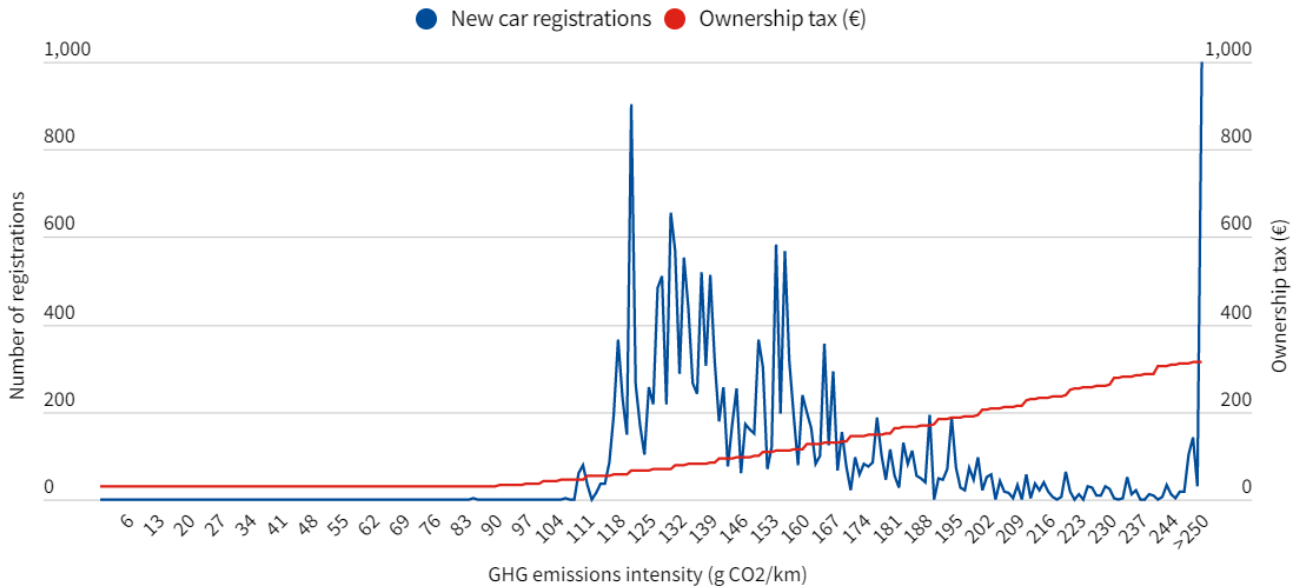


Figure 73: New passenger car registration vs ownership tax rates

Source: Dataforce (2022) New passenger car registrations 2021

Benefit-in-kind taxation

Benefit-in-kind tax rates in Luxembourg incorporate fuel type and CO₂ emission intensity (measured in g CO₂/km WLTP). The lump-sum calculation method applies default BiK rates for each fuel type and CO₂ emission band, whereas the alternative logbook method applies rates based on vehicle usage. Starting in 2025, a simplified BiK system will tax all salary cars at 2% per month with the exception of EVs which will be taxed at 1.0% or 1.2% depending on consumption (scheme C).

Depreciation taxation

The depreciation of new corporate cars can be fully written off using the straight-line depreciation method. The depreciation can be deferred to any tax year up until the depreciation life of the car.

Value added taxation and business deductions

The value added tax on cars sold in Luxembourg (17%) is the lowest in the EU and the second lowest in Europe (after Switzerland). If the car is used exclusively for business purposes, the VAT can be fully recovered. If the car is used privately then VAT is not recoverable on the taxable basis (determined by the system of remuneration).

Fuel taxation

Luxembourg recently cut fuel excise duties to 44 c/l for petrol and 33 c/l for diesel (from 42 c/l and 40 c/l respectively).[13] These reduced fuel excise duties are below the European average for both petrol and diesel fuels (Figure 14).



Car taxation in Malta

Malta is quickly transitioning to a zero-emission fleet, second among Southern Europe (behind Portugal) with a BEV share of 8.0%. [85] Malta has an even higher share of PHEVs, which at 12.4% is the seventh highest in Europe, only trailing the Nordic countries, Germany, and Belgium (Figure 74).[48] These high EV shares are mostly credited to high purchase grants for EVs,[86] which at €11,000 are the highest in Europe. The EV purchase grant is currently available for both BEVs and PHEVs, although PHEV eligibility is under review.[87]

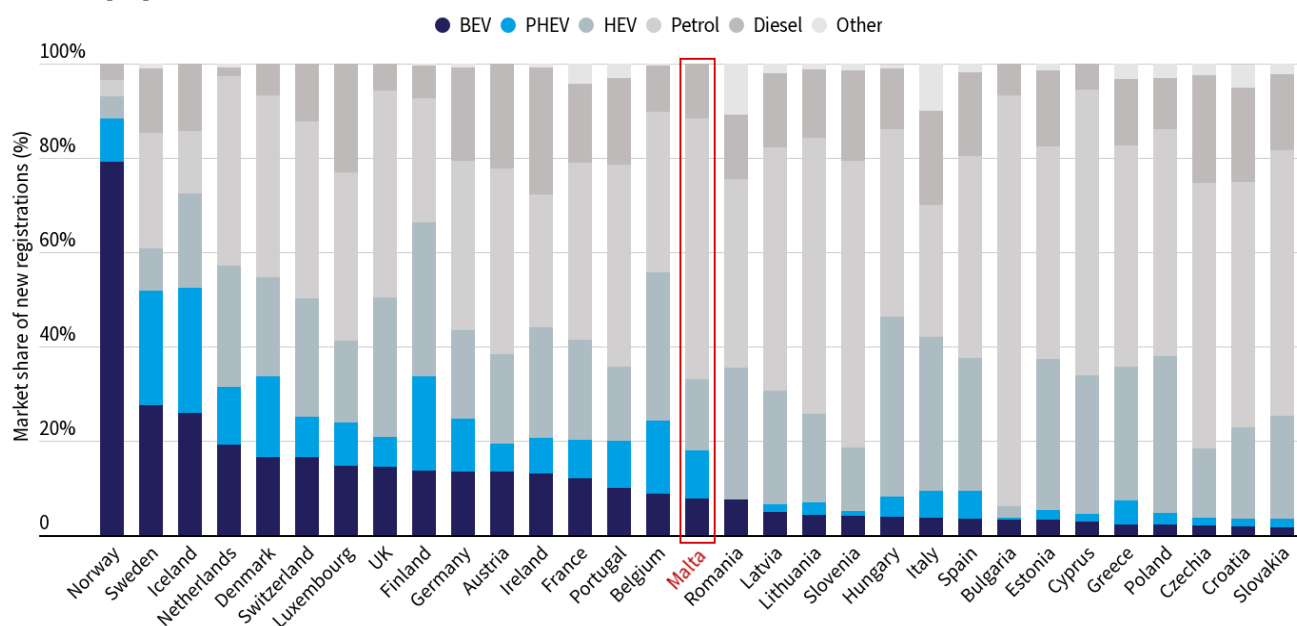


Figure 74: Drivetrain composition of new registrations in Malta

Source: T&E calculations based ACEA (July 2022) Alternative Fuel Vehicle Registrations Data

Malta has also levied both acquisition on ownership taxes on CO₂ emission intensity - further incentivising the transition to a zero-emission fleet. One unique aspect of Malta’s car taxation system is that the acquisition tax is also based on vehicle length. Malta is the only country in Europe to tax vehicles based on this attribute, which may reflect Malta’s recognised problem with road congestion.[88]

While Malta leads the transition to a zero-emission fleet compared to many European peers, reaching the government’s 2030 ambitions in terms of CO₂ emissions and EVs [89] will require additional interventions, with tax reforms identified as a particularly promising area.[90] One area of car taxation that remains unexplored as a potential lever in the transition to a zero-emission fleet is corporate car taxation. For corporate cars in Malta, there is no differentiation by fuel type of emissions for depreciation write-offs, VAT deductions, or benefit-in-kind taxation. There are many examples from other countries about how these taxes could be leveraged to provide fiscal incentives for a zero-emission fleet. Malta’s fuel prices, which are set at the EU minimum level, also provide little financial incentive for low- and zero-emission cars.

Acquisition taxation and subsidisation

The acquisition tax in Malta has two components: one based on CO₂ emission intensity (measured in g CO₂/km WLTP) and one based on vehicle length. Malta is the only European country to base any form of car taxation on vehicle length (Table 1). While the resulting acquisition taxes are large and highly differentiated by fuel type (Figure 17), this is largely influenced by CO₂ emission intensity as vehicle length is similar across fuel types.

The €11,000 purchase grant for low- and zero-emission cars is the highest among any European country for either fuel type (Figure 18). An extra €1,000 purchase grant is available with the scrapping of an old car. The government has indicated that the low-emission purchase grant may not be issued in the future with a focus on only fully electric vehicles.[87]

Ownership taxation

The ownership tax in Malta is based on CO₂ emission intensity (measured in g CO₂/km WLTP). The relatively flat taxation curve results in a small fiscal incentive between vehicles of different emission levels (Figure 21).

Benefit-in-kind taxation

Benefit-in-kind taxation is a complex calculation with four components for the car use value, the maintenance value, the fuel value, and the private use value. However, all four components are based on the value of the car, and therefore the BiK is directly linked to only one vehicle attribute. Unlike many other European countries (Table 4), neither fuel type nor emissions are included in the calculation with the result that a BEV or a PHEV pays more in BiK than an ICE of the same vehicle class (Figure 22).

Depreciation taxation

The depreciation of new corporate cars can be written off over a five year period using the straight line depreciation method. This only applies to cars that are exclusively used for business purposes (i.e. exclusively incurred in the production of income).

Value added taxation and business deductions

Malta is one of only four European countries (along with Greece, Lithuania, and Malta) where the value added tax (18%) cannot be recovered on corporate car purchases. This approach to VAT deductions contrasts with many European countries where VAT on cars used exclusively for business purposes is often fully recoverable and the VAT on cars used for both business and private purposes is often partially recoverable.

Fuel taxation

Fuel excise duties in Malta are 36 c/l for petrol and 33 c/l for diesel. Both rates are well below the European average (Figure 14) and sit at the minimum allowable level under the European Tax Directive (ETD). The rates were reduced to the ETD minimum in November 2021,[13] well before the reductions in other countries in response to rising fuel prices in early 2022.



Car taxation in Netherlands

The Netherlands has established itself as one of the leading countries on electromobility in Europe and globally. In 2021, 19% of new registrations were BEVs with a further 10% PHEVs. New diesel registrations are virtually nonexistent - reaching only 2%.[48] The Netherlands also performs well across other measures of electrification such as charging infrastructure and government policies - frequently topping rankings of 'EV readiness' alongside Norway.[49]

This leading status has been achieved in large part through taxation policy which establishes a high tax differential between vehicles with respect to emissions. The high tax differentials in acquisition tax and ownership tax are estimated to be the largest drivers. Local policies, such as the city of Amsterdam aiming to have all traffic throughout the city emissions-free by 2030, are also credited with the Netherlands' success.[4]

With these fiscal policies and results, the Netherlands provides a clear model pathway to an electrified fleet. While some countries have pursued electrification at a significant cost to the government (e.g. purchase grants for EVs in Germany, low benefit-in-kind taxation for BEVs in the UK, zero-rated VAT for BEVs in Norway), the Netherlands provides a model that comes from taxing polluting vehicles and therefore achieves a high level of electrification with only a small direct cost to the treasury. The costs of the electrification transition (or lack thereof) are explored in section 2 and 3.

Acquisition taxation and subsidisation

The acquisition tax in the Netherlands (*belasting op personenauto's en motorfietsen* or *BPM*) is applied to all first time registrations. The BPM is calculated based on CO₂ emission intensity (measured in g CO₂/km WLTP) and has several increasing thresholds so that the tax increases progressively at higher emission levels (Figure 75). There is also a diesel surcharge levied on top of the standard CO₂-based rate. The resulting tax burden is above the European average for acquisition taxes (Figure 17).

For the purchase of new BEVs, there is a grant for private individuals of €3,350 provided the car is below €45,000. As there is a limited fund available, the BEV grants are quickly exhausted. In July 2020, the €10 million subsidy pot was exhausted after only eight days.[91] There are no purchase grants for PHEVs, nor are there purchase grants for corporate entities of any fuel type.

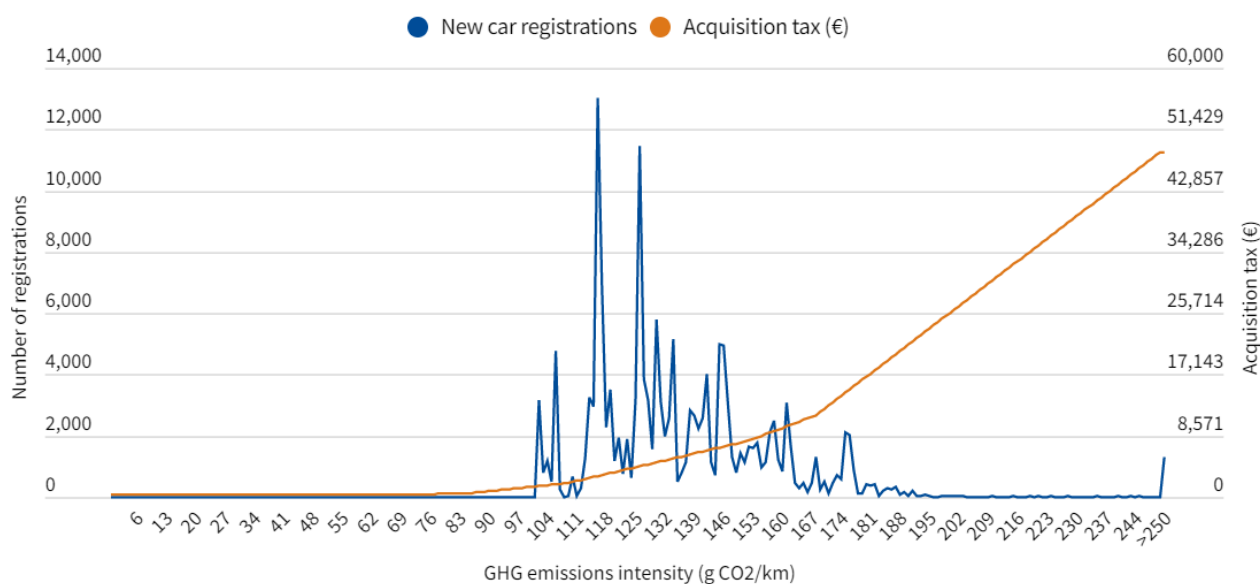


Figure 75: New passenger car registration vs acquisition tax rates

Source: Dataforce (2022) New passenger car registrations 2021

Ownership taxation

The ownership tax in the Netherlands is calculated based on vehicle weight (measured in kg). The resulting tax burden is above the European average for ownership taxes (Figure 21) and is the largest tax in Europe based on vehicle weight. Zero-emission cars are exempt from this weight-based ownership tax until 2024.

Benefit-in-kind taxation

There are only two benefit-in-kind tax rates in the Netherlands: 16% for zero-emission cars and 22% for all polluting vehicles. The 16% tax rate for zero-emission cars is one of the highest in Europe. However, in the Netherlands, the taxable basis that BiK is applied to is net taxation and thus includes the high differentiation in acquisition taxes based on vehicle emissions.

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a five year period using the straight-line method. VAT, if not deductible, can also be added to the cost of the vehicle.

Value added taxation and business deductions

The value added tax on cars sold in the Netherlands (21%) is fully recoverable if the car is used for business purposes (<500 km per year for private purposes). If the car is used privately then VAT is recoverable depending on the business usage (regardless of fuel type, emissions, or any other factor).

Fuel taxation

The Netherlands recently cut fuel excise duties to 65 c/l for petrol and 42 c/l for diesel (from 82 c/l and 53 c/l).[13] Both rates are still above the European average, particularly for petrol (Figure 14).



Car taxation in Norway

Norway has established itself as the leading country on electromobility in Europe and globally. In 2021, 65% of new registrations were BEVs with a further 22% PHEVs, leaving only 13% for ICE vehicles (Figure 76).[48] Norway also performs well across other measures of electrification such as charging infrastructure and government policies - frequently topping rankings of 'EV readiness'.[49]

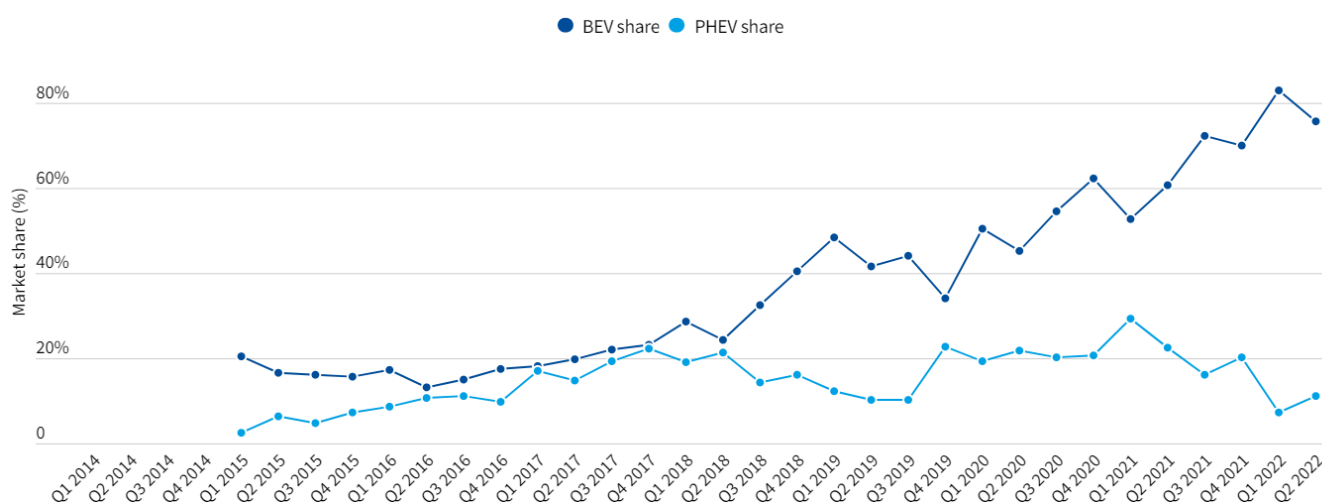


Figure 76: Electric car market share of new registrations in Norway

Source: T&E calculations based on quarterly registration data from ACEA

This leading status has been achieved in large part through taxation policy which establishes a high tax differential between vehicles with respect to emissions. This tax differential is heightened by dozens of different policies from toll roads to ferries, but the largest effect is found from acquisition taxes: three separate taxes on polluting vehicles and a full VAT exemption for BEVs.

With these fiscal policies and results, Norway provides a clear model pathway to an electrified fleet. While this pathway to electrification has come at a high cost (e.g. as measured by an implicit carbon price [92]), Norway's role as 'early adopter' at a national level purchasing many of the early BEV models has spurred on the transition far beyond its own borders. The costs of this transition are explored in section 2 and 3.

Acquisition taxation and subsidisation

Norway has a three-part acquisition tax with taxes on CO₂ emissions, NO_x emissions, and vehicle weight. For PHEVs, the maximum reduction is 15% of the weight tax depending on the electrical range. For BEVs there is a full exemption from the weight tax (and a zero rate for the two taxes on emissions). For used cars imported to Norway the taxable value is reduced based on vehicle age.

Although Norway does not have purchase grants for low-emission cars that are commonplace in other European countries, BEVs do not pay value added tax (VAT). As VAT in Norway stands at 25%, this

exemption amounts to a large subsidy that exceeds any other European country for expensive models (as the subsidy value increases with the price of the vehicle). The government proposes to replace the VAT exemption for zero-emission cars from 1 January 2023 with a subsidy scheme.[93]

Ownership taxation

The ownership tax in Norway is levied as vehicle insurance and is a simple per day calculation for all vehicles with no consideration of fuel type, price, or other factors. Despite the simplicity, the amount is significant compared to other European countries (Figure 21), totalling nearly €300 per year (2,975 NOK). There is a small increase for diesel vehicles without a particulate filter (3,493 NOK).

Benefit-in-kind taxation

Benefit-in-kind tax rates in Norway are relatively high compared to other European countries (Figure 22) with a standard rate of 30% of car value up to €32,960 and 20% of car value above this threshold. BEVs receive a 20% discount on the list price before BiK is applied. This is less differentiation based on fuel type or emissions than other taxes in Norway.

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a six year period using the declining-balance method.

Value added taxation and business deductions

The value added tax on cars sold in Norway (25%) is not recoverable regardless of business or private use. As BEVs are zero-rated for VAT there is no VAT to recover.

Fuel taxation

Fuel excise duties in Norway are 49.5 c/l (495 NOK) for petrol and 35.2 c/l (352 NOK) for diesel.[13] Both rates are lower than the European average (Figure 14).

Car taxation in Poland



Poland has one of the largest car parcs in Europe (just over 25 million cars, ranking sixth),[94] with a large number of cars per inhabitant (664 per 1,000 inhabitants, ranking fourth),[76] particularly very old cars (40% over 20 years, ranking first).[95] Despite its reputation as a market for second-hand cars, Poland is also the sixth largest country for new passenger car registrations with around half a million new passenger cars registrations every year.

This large number of cars can be explained by relatively low rates of taxation. For example, Poland is one of only four European countries without an ownership tax and fuel excise duties are among the lowest in Europe. Corporate cars constitute the vast majority (74%) of new car registrations and benefit from low rates of benefit-in-kind tax on salary cars, generous tax benefits in the form of depreciation write-offs, VAT deductions, and higher zero-emission purchase grants.

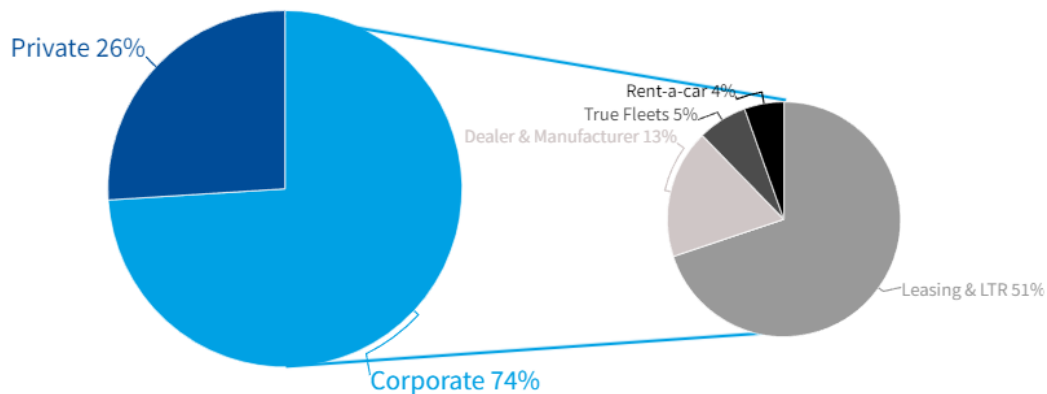


Figure 77: New passenger car registration by channel in Poland

Source: Dataforce (2022) New passenger car registrations 2021

Compared to other European countries, car taxation in Poland frequently uses a flat monetary value threshold rather than a percentage of car price. For benefit-in-kind taxation, this benefits higher value cars, whereas for depreciation write-offs it penalises them.

Poland's low tax approach to car taxation offers few incentives for low- and zero-emission cars beyond direct purchase grants. This is reflected in Poland's low transition to a zero-emission fleet with BEVs constituting just 1.6% of new registrations - the fifth lowest in Europe. In Leaseplan's 2022 EV Readiness Index, Poland is tied for last place (with the Czech Republic) among European countries.[96]

Acquisition taxation and subsidisation

Poland's acquisition tax is based on engine capacity, fuel type, and - as it is levied as an excise duty - the financial value of the car. BEVs are exempt from the tax, and PHEVs are taxed at a lower rate. The resulting

tax burden for new registrations is lower than most other European countries (Figure 17). A draft act on the reduced rates for PHEVs is currently under consultation.

For private individuals, zero-emission purchase grants are €4,125 (18,750 PLN) which is increased to €5,940 (27,000 PLN) for holders of Large Family Cards. For corporations, zero-emission purchase grants are €4,125 (18,750 PLN) which is increased to €5,940 (27,000 PLN) if the purchaser declares an annual usage of at least 15,000 km. This makes Poland the only country in Europe where the zero-emission purchase grant is higher for companies than for individuals. There is a maximum price threshold of €49,500 (225,000 PLN) to qualify for the purchase grant, but this limit does not apply to Large Family Card holders. There are no purchase grants for low-emission cars.

Ownership taxation

Poland is one of only four European countries (along with Czechia, Estonia, and Lithuania) without an ownership tax (Table 3). The EU's Recovery and resilience plan for Poland includes an obligation for Poland to introduce such a tax that is correlated with CO₂ and NO_x emissions and "in line with the 'polluter pays' principle" by Q2 2026.[97]

Benefit-in-kind taxation

Benefit-in-kind taxation is very low in Poland (Figure 22) at €660 for cars with an engine capacity below 60 kW and €1,056 for cars above, with a tax exemption for BEVs. This system of levying benefit-in-kind taxation as a single amount regardless of the size of the benefit-in-kind incentivises the most expensive salary cars. This approach to BiK taxation is unique among European countries.

Depreciation taxation

The depreciation of new corporate cars can be depreciated over five years up to a value of €33,000 (150,000 PLN) for polluting vehicles or €49,500 (225,000 PLN) for zero-emission cars. Accelerated depreciation is available for second-hand cars at 40% the annual rate. From 2026, the depreciation allowance for ICE cars will be differentiated by emissions: €33,000 (150,000 PLN) for emissions below 50 g/km and €22,000 (100,000 PLN) for cars above.

Value added taxation and business deductions

The value added tax on cars sold in Poland (24%) is fully deductible for cars used exclusively for business use and 50% deductible for cars used privately. This reduced rate is applied to self-employed companies which represent 18% of the workforce (third highest in Europe).[98]

Fuel taxation

Fuel excise duties in Poland stand at 36 c/l for petrol and 32 c/l for diesel. As these rates are already at the minimum level in the EU, in February 2022, Poland reduced the VAT on fuels from 23% to 8%. Poland is the only country to have done so, while many European countries have cut fuel excise duties.[13]



Car taxation in Portugal

Portugal has utilised fiscal policy as a key lever to electrify passenger transport and is one of the few countries that takes a differentiated approach with respect to fuel type or emissions for every major form of car taxation (Tables 1-7). The result is that Portugal has achieved a high share of BEVs in new registrations (11.0%) and low level of average emissions (97.5 g/km) [99] – besting many countries in the same region and higher income levels (e.g. Spain, Italy).

Most of the new car registrations in Portugal are made in the corporate channel (75%) (Figure 78). For corporate cars, depreciation allowances are set at higher levels for low- and zero-emission cars and benefit-in-kind tax is heavily differentiated by vehicle emissions. These policies contribute to a higher BEV share among corporate registrations than private (9.8% vs 5.7%).

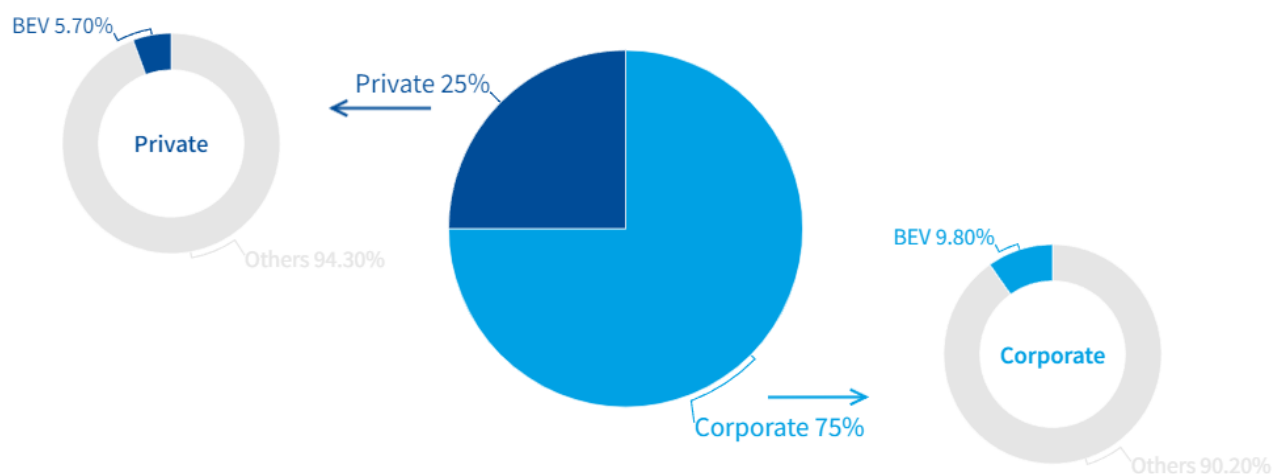


Figure 78: New passenger car registration by channel and BEV share

Source: Dataforce (2022) New passenger car registrations 2021

The two most important taxes in Portugal are acquisition and ownership – both introduced in 2007. Tax revenue for the state is evenly sourced between acquisition and ownership which diversifies tax revenues and reduces the impact from highs and lows in the automotive market. [100] Both taxes are levied at a higher rate on diesel, which conflicts with fuel excise duties where the diesel excise duty is levied at just 65% of the petrol rate - one of the largest discounts in Europe. Overall, just under 60% of passenger cars are diesel[101] and 22% of new registrations.

Acquisition taxation and subsidisation

Portugal's acquisition tax (*Imposto Sobre Veículos - ISV*) is levied when the vehicle is registered for the first time in Portugal (whether new or used). The ISV incorporates two factors: engine cubic capacity (displacement) and CO₂ emission intensity (starting at 110 g CO₂/km). There are three tax brackets for engine displacement and several tax brackets for CO₂ emission intensity, with higher tax rates for diesel

cars. Hybrid or plug-in cars have a 75% discount, and electric cars have a zero tax rate as they have neither engine capacity nor CO₂ emission intensity.

Purchase grants for BEVs are €4,000 for private cars and €6,000 for corporate light vehicles, but not for passenger cars. There is a limited number of grants for each type and individuals must apply in order to obtain the grant. There are no purchase grants for PHEVs.

Ownership taxation

The *Imposto Único de Circulação (IUC)* is an annual tax that is levied on the ownership of a vehicle. The tax is calculated considering the same figures as the ISV: engine capacity and CO₂ emission intensity (but starting at >140 g CO₂/km) and, again similar to the ISV, higher tax ratios for diesel cars and a zero tax rate for BEVs. There is also a coefficient applied to tax older cars at a lower rate. The result is that the tax burden between passenger cars varies little with respect to emissions (Figure 21).

Benefit-in-kind taxation

Benefit-in-kind taxation in Portugal is levied at some of the highest rates in Europe for ICE cars (Figure 22). The BiK tax rate is based on the price of the car and has three levels for ICE cars: 10% (€0 - 27,500), 27.5% (€27,500 - 35,000), and 35% (> €35,000). For PHEVs the BiK tax rate is reduced by half for two of the three levels: 5% (€0 - 27,500), 10% (€27,500 - 35,000) and 17.5% (> €35,000). For BEVs there is a 0% rate (along with four other European countries). BiK taxation therefore depends on price and fuel type but not emissions (e.g. a high polluting and low polluting ICE).

Depreciation taxation

The depreciation of new corporate cars can be written off over a four year period with a maximum value determined by fuel type. For diesel and petrol cars, a maximum of €25,000 can be depreciated, rising to €50,000 for PHEVs, and €62,500 for BEVs.

Value added taxation and business deductions

The value added tax on cars sold in Portugal (23%) can be deducted from corporate cars that are used exclusively for business purposes. If the car is also used for personal purposes, BEVs and PHEVs can deduct the whole VAT while ICE cars cannot.

Fuel taxation

Portugal recently cut fuel excise duties equivalent to reducing VAT to 13%, bringing excise duties on petrol to 44 c/l (from 65 c/l) and diesel to 29 c/l (from 50 c/l) [13].

Car taxation in Romania



Romania is quickly transitioning to a zero-emission fleet, leading Eastern Europe and much of Southern Europe (including Spain and Italy) with a BEV share of new sales of 5.2%.[48] This result is mostly credited to high purchase grants for EVs - the second highest (after Malta) in all of Europe. The purchase grant in Romania is also unique in its application as the current form of the programme requires a mandatory scrapping of an old car (and an additional bonus for every old car scrapped). The policy intent is clear, given Romania's old car fleet - the second oldest in Europe (after Lithuania)[102] - but the policy could create a challenge to source old cars to scrap once as the demand for new BEVs exceeds old cars. Romania also has the lowest motorisation rate in Europe with only 379 cars per 1,000 inhabitants.[103]

But purchase grants are not the only fiscal tool to deliver a zero-emission fleet and Romania has underutilised other forms of car taxation that could provide similar incentives. Unlike most other European countries, Romania has no tax on vehicle acquisition and has only a weak ownership tax based on engine capacity. For corporate cars, the majority of new registrations in Romania (53%), there is no differentiation by fuel type of emissions for depreciation write-offs, VAT deductions, or benefit-in-kind taxation. This lack of differentiation contributes to a divergence in uptake where BEVs represent 7.2% of new private registrations but only 3.7% of new corporate registrations (Figure 79). There are many examples from other countries about how these taxes could be leveraged to incentivise the transition to a zero-emission fleet.

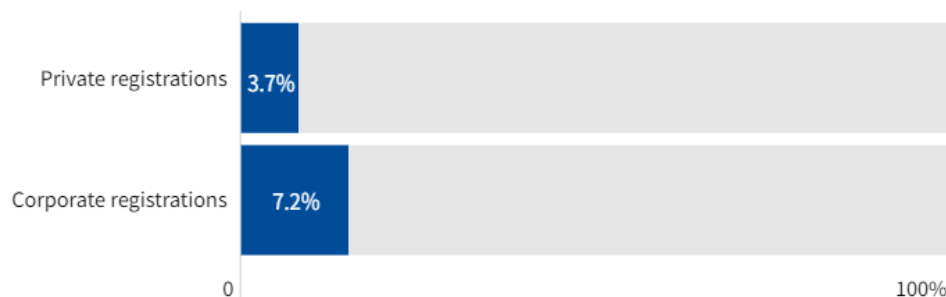


Figure 79: BEV uptake in corporate and private registrations in Belgium

Source: Dataforce (2022) New passenger car registrations 2021

Acquisition taxation and subsidisation

There is no acquisition tax in Romania. This is relatively uncommon, with only nine countries in Europe taking this approach (Table 1). A €10,200 purchase grant is available for BEVs and a €5,200 purchase grant for PHEVs, provided that an old car (at least 6 years old) is scrapped. These grants, which are some of the largest EV purchase grants in Europe, are eligible for both private households and corporations. An additional €600 is available with the scrapping of a second old car and €300 for each additional scrapped vehicle provided it is older than 15 years.

Romania is one of only two in Europe (together with France and Italy) to subsidise the purchase of new ICE cars. All new purchases are eligible for a grant of €1,200 (6,000 RON) with the scrapping of an old car and an additional €600 (3,000 RON) with the scrapping of a second car. There are also extra bonuses of:

- €300 (1,500 RON) if the new car is below 120 g CO₂/km;
- €600 (3,000 RON) if the new car is a hybrid;
- €300 (1,500 RON) if the new car is LPG/CNG; and
- €300 (1,500 RON) for the additional scrapping of a third and fourth car older than 15 years.

Ownership taxation

The ownership tax in Romania is based on engine capacity (measured in cubic centimetres). The average tax burden is very low compared to other European countries as is and the differentiation across engine capacity sizes despite a tax exemption for BEVs (Figure 21).

Benefit-in-kind taxation

The benefit-in-kind tax is a simple calculation of 20.4% annually if the car is owned by the employer or set at the rental fee if the car is leased by a third party. This approach contrasts with many other European countries that base BiK taxation on fuel type, emissions, or other vehicle attributes. As a result, the BiK tax burden for a BEV or PHEV is higher than an ICE car in the same vehicle class, generating a fiscal disincentive to opt for a BEV or PHEV salary car (Figure 22).

Depreciation taxation

The depreciation of new corporate cars can be written off to a maximum of €3,650 (18,000 RON) per year over a three to five year period using the straight-line or declining-balance depreciation method.

Value added taxation and business deductions

The value added tax on cars sold in Romania (19%) can be deducted from corporate cars that are used exclusively for business purposes and 50% of the VAT payment can be deducted if the car is also used privately. This tax rule also applies to the costs of maintenance and fuel.

Fuel taxation

Fuel excise duties in Romania are 37 c/l for petrol and 33 c/l for diesel. Both rates are well below the European average (Figure 14) and sit at the minimum allowable level under the European Tax Directive (ETD). A proposal from the Romanian government in early 2022 to cut the VAT on fuel in response to rising fuel prices did not come to fruition.[13]



Car taxation in Slovakia

Slovakia has relatively low car taxation and weak differentiation with respect to fuel type, emissions, or other environmental factors. The small tax burden in Slovakia for polluting cars is reflected in the high emissions of new car registrations (Figure 80), which at 159 g CO₂/km ranks highest in Europe. It is also reflected in the low level of EV uptake in new registrations: 1.5% BEVs and 1.5% PHEVs in 2021.[48] Slovakia also performs poorly across other measures of electrification such as charging infrastructure and government policies - ranking third last in Europe for 'EV readiness'.[49]

Where Slovakia targets tax policies to encourage electrification (e.g. accelerated depreciation), these are less consequential policies than those that have spurred electrification elsewhere (e.g. purchase grants for BEVs, high acquisition taxes for ICE). The policy intent is also at times unclear, for example taxing acquisition based on engine power (kW) and taxing ownership based on engine capacity (cc). The potential for policy innovation remains.

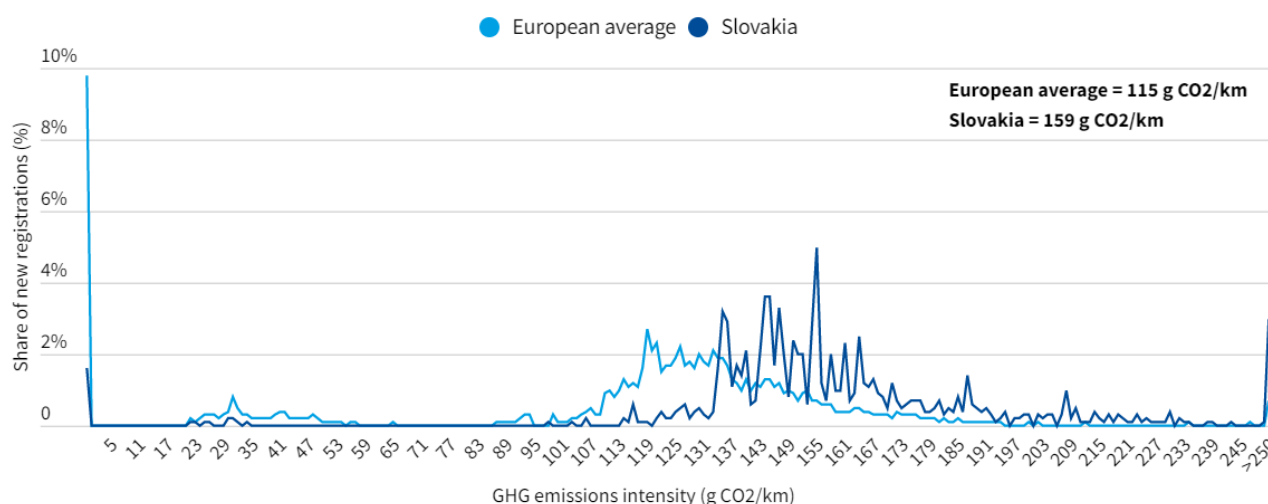


Figure 80: Czechia vs EU share of new registrations based on CO₂ emissions

Source: Dataforce (2022) New passenger car registrations 2021

Acquisition taxation and subsidisation

The acquisition tax in Slovakia is based on engine power (measured in kW). There is also a coefficient applied to tax older cars at a lower rate. Both PHEVs and BEVs receive a 50% discount, but not more than €33 per vehicle - a threshold that is reached for the vast majority of acquisitions. The tax burden and the differentiation are relatively low compared to other European countries (Figure 17). There are no purchase grants for low- or zero-emission cars in Slovakia.

Ownership taxation

The ownership tax in Slovakia is based on engine capacity (measured in cubic centimetres). The tax burden and the differentiation are relatively low compared to other European countries (Figure 21).

Benefit-in-kind taxation

Benefit-in-kind tax is applied using a 1% monthly rule (12% annually), which is common for European countries (Table 4). However, unlike many other countries that apply a discount for low- or zero-emission cars, in Slovakia there is only one BiK rate. Slovakia is also unique in the application of a coefficient to reduce the value of the car (and thus the BiK paid) over time.

Depreciation taxation

The depreciation of new corporate cars can be written off to a maximum allowance of €48,000 over a four year period (or six years using the accelerated method). PHEVs and BEVs are eligible to write off depreciation over a two year period.

Value added taxation and business deductions

The value added tax on cars sold in Slovakia (20%) can be deducted from corporate cars that are used exclusively for business purposes. For cars that are also used for private purposes, the share of VAT deductibility is set equal to the share of business use.

Fuel taxation

Fuel excise duties in Slovakia are 54 c/l for petrol and 40 c/l for diesel. Both rates are around the European average (Figure 14). Unlike many European countries, Slovakia did not reduce fuel excise duties in early 2022 in response to rising fuel prices [13].



Car taxation in Slovenia

Slovenia has distinguished itself from its European peers in the unique design of many forms of car taxation. This is particularly noticeable in its approach to the taxation of corporate cars and the design of incentives for the uptake of zero-emission cars. In Slovenia, the value added tax can only be recovered on zero-emission corporate cars. Similarly, for employees receiving a car as a salary perk, the benefit-in-kind tax is reduced by 80% for zero-emission. These policies provide a strong incentive for electrification. In 2021 (before the VAT recovery for zero-emission cars was introduced), the BEV share of new corporate registrations reached 5.9%, over twice the BEV share of new private registrations at 2.9%.[48]

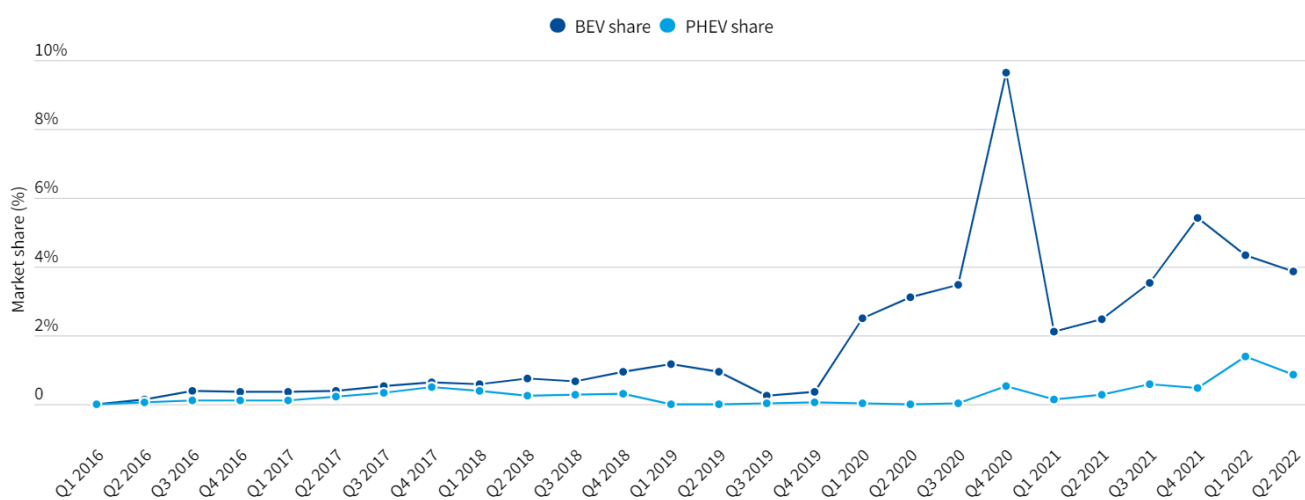


Figure 81: Electric car market share of new registrations in Slovenia

Source: T&E calculations based on quarterly registration data from ACEA

Slovenia has also taken a unique approach to fuel taxation as the only country in the EU to tax diesel at a higher rate than petrol (but aligning with the diesel disincentive in the tax on vehicle acquisition). While Slovenia followed many other European countries in early 2022 by reducing fuel excise duties in response to rising fuel prices, it was also the first country to return excise taxes to their regular rates with the fuel duty reduction only lasting a month.

Other European countries have targetted taxation on vehicle acquisition and/or ownership as a means to offer the most significant incentives for low- and zero-emission cars. On these taxes, Slovenia levies a very small tax burden and thus more opportunities remain for fiscal incentives.

Acquisition taxation and subsidisation

The acquisition tax in Slovenia is based on CO₂ emission intensity (measured in g CO₂/km WLTP) common to many European bonus/malus systems. Fuel type is also incorporated into the tax calculation as diesel cars pay a higher rate than petrol cars per g CO₂/km. This disincentive for diesel is also reflected in

Slovenia's fuel excise duties. However the overall tax burden is very low (just €57 for a small ICE and 128 for a large ICE), providing little incentives based on emissions or fuel type (Figure 17).

For the purchase of new BEVs, there is a grant for individuals of €4,500 provided the car is below €65,000 (one of the highest thresholds used). There are no purchase grants for PHEVs, nor are there purchase grants for corporate entities of any fuel type.

Ownership taxation

The ownership tax in Slovenia is based on engine capacity (measured in cubic centimetres). The average tax burden is relatively low compared to other European countries as is and the differentiation across engine capacity sizes despite a tax exemption for BEVs (Figure 21).

Benefit-in-kind taxation

The standard benefit-in-kind tax rate in Slovenia is 1.5% a month (18% annually) applied to the value of the vehicle. This rate is then reduced in each subsequent year of ownership to reflect the decreasing value of the vehicle - a policy unique to Slovenia.

For zero-emission cars there is an 80% reduction to 0.3% a month (3.6% annually). This strong differentiation for zero-emission cars means that while BiK taxation in Slovenia is around the European average for ICE vehicles, the BiK for zero-emissions is less than half of the European average (Figure 22).

Depreciation taxation

The depreciation of new corporate cars can be written off over a five year period using the straight line depreciation method. The same rates apply to other costs associated with the asset including fuel, repair and maintenance, and insurance premiums. There is no differentiation by fuel type, price, or any other factor.

Value added taxation and business deductions

The value added tax in Slovenia (22%) can only be recovered on corporate cars if the vehicle is used for the transport of passengers and goods. This approach to VAT deductions contrasts with many European countries where VAT on cars used exclusively for business purposes is often fully recoverable and the VAT on cars used for both business and private purposes is often partially recoverable. An amendment to the VAT Act entered into force on 1 January 2022, which exercises the right of companies to deduct VAT on the purchase of BEVs not exceeding €80,000.

Fuel taxation

Fuel excise duties in Slovenia are 45 c/l for petrol and 46 c/l for diesel. This makes Slovenia one of only three European countries (along with Iceland and Switzerland), and the only country in the EU to tax diesel fuel at a higher rate than petrol (Figure 14). Slovenia, like many European countries, reduced fuel excise duty in early 2022 in response to rising fuel prices, but the reduction lasted only one month in duration while the reduced rates have continued in many other countries.[13]



Car taxation in Spain

Spain is one of the European countries with lower fuel duties and vehicle taxation. In terms of the tax burden at the vehicle level, for example Spain ranks 30th out of 31 countries for the tax burden on a small petrol car (Figure 29) and 23rd for the tax burden on a compact petrol SUV (Figure 31). Similarly, the European Automobile Manufacturers' Association ranks Spain 13th out of the 13 largest EU markets by annual tax revenue per motor vehicle (an average of €1,148) [32]. This has ramifications for public finances. In the International Monetary Fund comparison of fiscal revenues from road transport, Spain ranks 29th out of 29 countries in terms of fiscal revenues raised as a percentage of GDP (just under 1%) [33]. These results indicate that there is a clear need to introduce car taxation in line with the polluter pays principle and increase the low levels of BEV uptake.

Acquisition taxation and subsidisation

Spain, like most European countries, levies a registration tax (*IEDMT - Impuesto Especial sobre Determinados Medios de Transporte*) on the purchase of new vehicles that increases based on the emissions of the vehicle since 2009. The national IEDMT rate serves as a minimum and regions can increase the rate, although only a few regions have utilised this option and to a limited extent. There are four IEDMT tax bands and they are levied at a high level of emissions (starting at >120 g CO₂/km). As a result, only 1.1% of new registrations are in the fourth emission band and 5.9% in the third emission band (Figure 82), meaning the incentive effect reaches only a small share of vehicles.

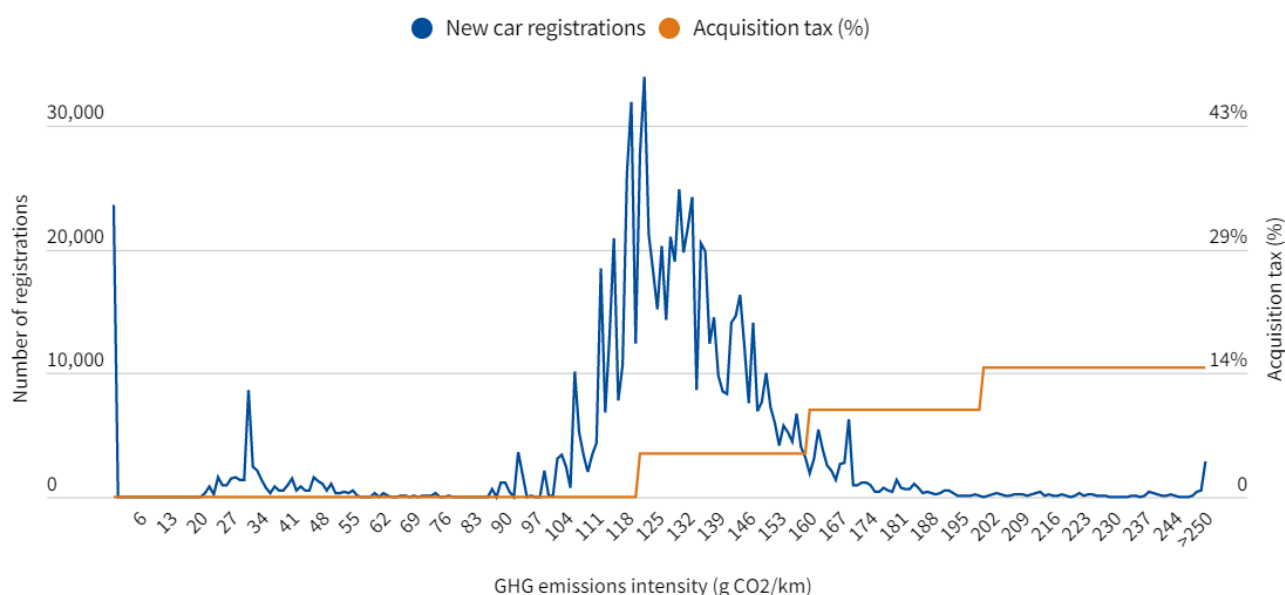


Figure 82: New passenger car registration vs acquisition tax rates

Source: Dataforce (2022) New passenger car registrations 2021

Purchase grants in Spain differ depending on whether the registration is made in the private or corporate channel and, if it is a corporate registration, on the size of the business (being the only country in Europe

to differentiate by business size). Purchase grants are only available for cars with a purchase price under €45,000. For BEVs, individuals receive €4,500 (€7,000 with scrapping), small and medium-sized companies receive €2,900 (€4,000 with scrapping) and large companies €2,200 (€3,000 with scrapping). For PHEVs, individuals receive €2,500 (€5,000 with scrapping), small and medium-sized companies receive €1,700 (€2,300 with scrapping) and large companies €1,600 (€2,200 with scrapping).

Ownership taxation

The ownership tax in Spain (*IVTM - Impuesto sobre Vehículos de Tracción Mecánica*) is a municipal tax that is regulated by federal law. The IVTM is based on fiscal horsepower, which takes into account displacement, the number of cylinders, and cycle time of the engine. In most municipalities, the higher tax bands are set at high thresholds, the most polluting cars are taxed at a low rate and BEVs and PHEVs have a 75% discount. The resulting tax burden leads to a complex incentive whereby a small BEV is taxed higher than a small ICE car but a large BEV is taxed slightly less than a large ICE car (Figure 21).

Benefit-in-kind taxation

In Spain, the value of a salary car is taxed as a benefit-in-kind (BiK) at a general rate of 20%. This rate is reduced to 17% for low emissions vehicles (<120 g CO₂/km), to 16% for mild hybrids/LPG/CNG, and to 14% for PHEVs and BEVs. This equal taxation of PHEVs and BEVs stands in stark contrast to the approach used in most other European countries including the UK, Germany, France, where the benefit-in-kind tax reduction for BEVs is at least twice the rate for PHEVs (Figure 22).

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a four to six years period if the car is used exclusively for business purposes. For mixed use, it is possible to deduct all the expenses related to this tangible fixed asset, such as fuel, the cost of parking or tolls.

Value added taxation and business deductions

The value added tax on cars sold in Spain (21%) can be deducted from corporate cars that are used exclusively for business purposes and 50% of the VAT payment can be deducted if the car is also used privately.

Fuel taxation

Spain recently cut fuel excise duties to 27 c/l for petrol and 18 c/l for diesel (from 47 c/l and 38 c/l) [13]. This system works as a rebate to the pump, because a simple cut to fuel duty, like those applied in other countries, would bring Spain below the European minimum.



Car taxation in Sweden

Sweden has the second highest share of PHEVs in Europe (26% in 2021), closely following Iceland (27%). This is the result of several taxes based on CO₂ emission intensity as measured by WLTP, as opposed to real world emissions. While this taxation approach has benefitted Swedish OEMs, which are oriented towards PHEV production, there is growing awareness that the real world emissions of PHEVs are many times higher than their WLTP measurement.[104] Thus in 2022, Sweden followed several other European countries (e.g. the Netherlands, the UK) in adjusting the fiscal benefits available to PHEVs. Now, Sweden's taxes based on CO₂ emission intensity will use the WLTP emissions that are produced by the ICE engine of the PHEV, thus making these vehicles taxed at similar rates to ICE vehicles. Even before this tax reform there were signs that electromobility is shifting in Sweden with BEV registrations (28%) surpassing PHEVs (24%).[48] This shift is likely to continue and set Sweden on course to follow Norway and Iceland's lead and become Europe's third country for full electrification.

Acquisition taxation and subsidisation

There is no acquisition tax in Sweden. This is relatively uncommon, with only nine countries in Europe taking this approach (Table 1). Purchase grants for low emission and zero-emission cars are calculated based on CO₂ emission intensity (measured in g CO₂/km WLTP). The grant cannot exceed 25% of the list price. Sweden is the only European country to use an emission-based calculation (as opposed to one amount per fuel type) for purchase grants.

Ownership taxation

The ownership tax in Sweden is calculated based on CO₂ emission intensity starting at 75 g CO₂/km WLTP. The results rates are reduced after the third year of ownership. Diesel vehicles face an additional surcharge. The resulting tax burden is below the European average for ownership taxes (Figure 21).

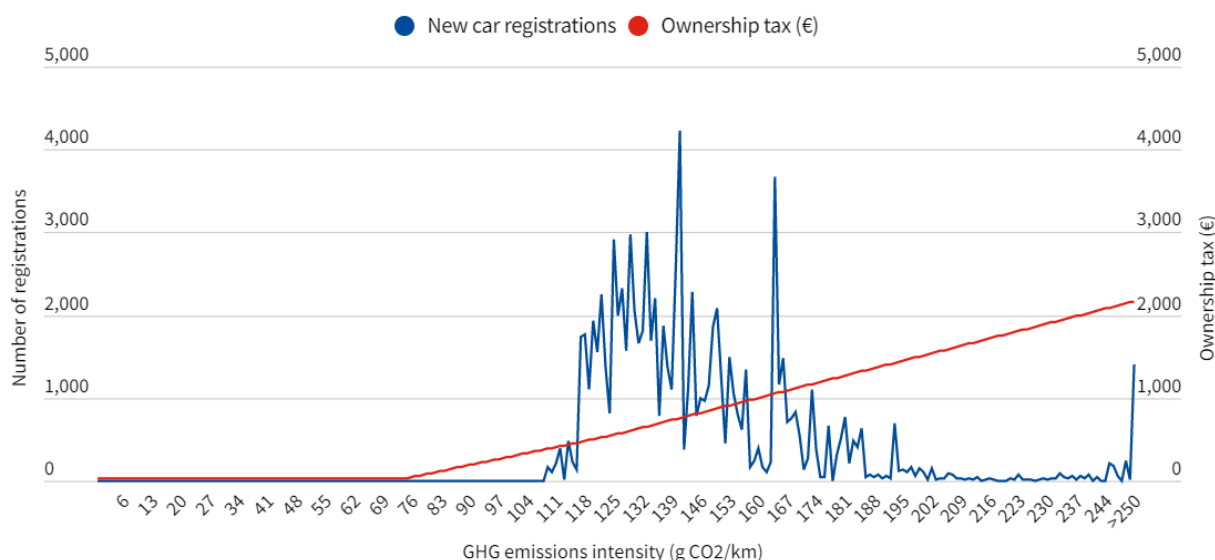


Figure 83: New passenger car registration vs ownership tax rates

Source: Dataforce (2022) New passenger car registrations 2021

Benefit-in-kind taxation

Benefit-in-kind taxation in Sweden is based on ownership taxation (which is based on CO₂ emission intensity) and vehicle list price. As the vehicle list price features strongly in the BiK calculation, the tax burden is low for smaller car models compared to other European countries. There is also little differentiation between fuel types due to the vehicle list price component (Figure 22).

BiK taxation in Sweden also incorporates the capital cost and the government interest rate. Sweden is the only country in Europe to apply such a charge, although the tax burden is low reflecting low interest rates.

Depreciation taxation

The depreciation of new corporate cars can be fully written off over a five year period using the straight-line method (20% per annum) or less than four years using the declining-balance method (30% per annum).

Value added taxation and business deductions

The value added tax on cars sold in Sweden (25%) is not recoverable if the car is owned outright. If the car is leased, then the VAT paid is half recoverable. This distinction based on vehicle ownership but not on business/private usage is relatively uncommon among European countries.

Fuel taxation

Sweden recently cut fuel excise duties to 50 c/l for petrol and 33 c/l for diesel (from 60 c/l and 43 c/l).[13] The new rates are above the European average for petrol and below the European average for diesel (Figure 14).



Car taxation in Switzerland

Switzerland is a special case, as taxes vary from canton to canton. In this analysis, the canton of Bern (the capital) is used as a reference for the Swiss model. There is a relatively large tax burden on cars in Switzerland, with the country featuring top of the table for several taxes. On fuel taxes, Switzerland has the highest petrol excise duty in Europe, the highest diesel excise duty, and is one of only three countries in Europe to take diesel fuel at a higher rate than petrol fuel. Switzerland's tax on vehicle ownership is also relatively high and is one of only three examples in Europe of an ownership tax based primarily on vehicle weight (Table 3).

The relatively large tax burden is also reflected in relatively minor tax benefits and subsidies. In Switzerland there are no purchase grants for low- or zero-emission cars and VAT deductions, while present, are comparatively small as Switzerland has the lowest VAT in Europe (7.7%).

However, it is a high tax differentiation between vehicles, rather than high car taxation itself, that delivers a low emission fleet. As zero-emission cars are still subjected to a relatively large tax burden, Switzerland's 13.4% share of BEVs among new registrations is above the European average but slightly below many of its peers (e.g. Germany and Austria) (Figure 84).[48] This middling approach is also reflected across other measures of electrification such as charging infrastructure and government policies - as measured in rankings of 'EV readiness'.[49]

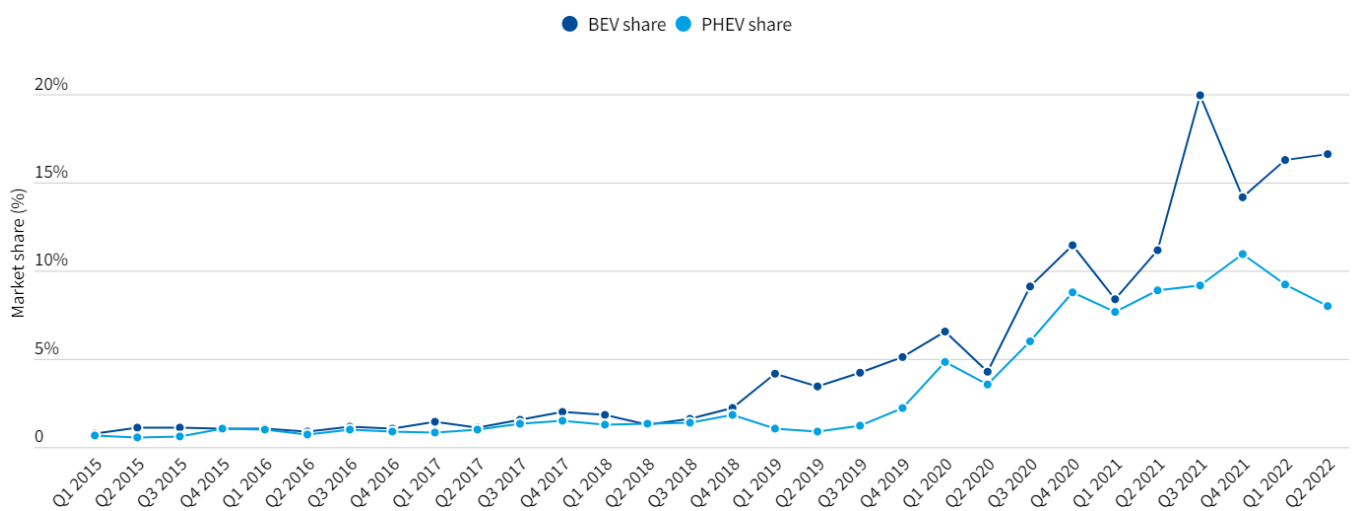


Figure 84: Electric car market share of new registrations in Switzerland

Source: T&E calculations based on quarterly registration data from ACEA

Acquisition taxation and subsidisation

There is no acquisition tax in any canton of Switzerland. This is relatively uncommon, with only nine countries in Europe taking this approach (Table 1).

There are no purchase grants for low- or zero-emission cars in Switzerland.

Ownership taxation

Switzerland is one of only two European countries (along with the Netherlands) to base its ownership tax primarily on vehicle weight. It is a significant fiscal incentive for lighter vehicles as the tax burden is relatively high compared to other European ownership taxes (Figure 21). There is a 60% discount for BEVs, a 40% discount for cars with an A energy efficiency rating and a 20% discount for cars with a B energy efficiency rating.

Benefit-in-kind taxation

Benefit-in-kind tax rates in Switzerland are relatively high compared to other European countries (Figure 22) with a 1.7% per month (20.4% annually) BiK rate applied to all cars with a minimum floor of €153 a month (150 CHF). There is an alternative tax method based on a cost of €0.72 (0.7 CHF) per kilometre. Most cantons have switched from the kilometre-based approach to the flat-rate. There is no differentiation based on fuel type, emissions, or other vehicle attributes.

Depreciation taxation

The depreciation of new corporate cars (and associated car costs) can be fully written off over a five year period using the straight-line (20%) or declining-balance (40%) method.

Value added taxation and business deductions

The value added tax on cars sold in Switzerland (7.7%) is the lowest in Europe. If the car is used exclusively for business purposes, the VAT can be fully recovered. Corporate cars that are also used for private purposes, but continue to be used for business purposes at least half the time, are taxed for VAT purposes at a flat rate of 0.9% per month.

Fuel taxation

Fuel excise duties in Switzerland are 75 c/l for petrol (0.7312 CHF) and 78 c/l (0.7587 CHF) for diesel.^[13] Both excise duties are the highest in Europe for their fuel category (Figure 14). Switzerland is also one of only three countries (along with Iceland and Slovenia) to tax diesel fuel at a higher rate than petrol fuel.



Car taxation in United Kingdom

The UK is frequently a place of tax innovation in Europe. This is particularly the case with the UK's steeply increasing benefit-in-kind (BiK) taxation with emissions, which stands as an outlier compared to the flat rates applied in other countries. The UK's phase-out of EV purchase grants also leads the way with other countries, even those with similar levels of EV uptake, continuing to subsidise EV purchase.

This policy leadership is not universally true across tax types, however. On several taxes, particularly ownership taxes as well as depreciation write-offs and VAT deductions for corporate cars, the UK takes a straightforward tax approach and fails to utilise taxation as a policy lever to guide behavioural change. Furthermore, aspects of the UK system appear inconsistent, for example charging PHEVs - which have low test-cycle emissions but high real-world emissions - with rates near those of other combustion engines for ownership tax but not for acquisition tax.

Further tax innovations may be on the horizon. Recent policy discussions in the UK have focused on road pricing proposals,[105] which, while the likely direction of travel, is scarcely used in Europe outside of road tolls.

Acquisition taxation and subsidisation

The UK's acquisition tax (*Vehicle Excise Duty* or *VED*) is one of the lowest in Europe. While based on CO₂ emission intensity, the difference VED between zero-emission and emitting cars (e.g. £230 or €268 for a compact SUV, see Figure 17) is lower than in 12 other countries and ten times lower than the European countries with the highest acquisition taxes. With the UK in the final stage of phasing out EV purchase grants for cars (ending 14 June 2022),[106] there is little financial incentive at the point of purchase. This is problematic for myopic consumers who discount costs in future periods.

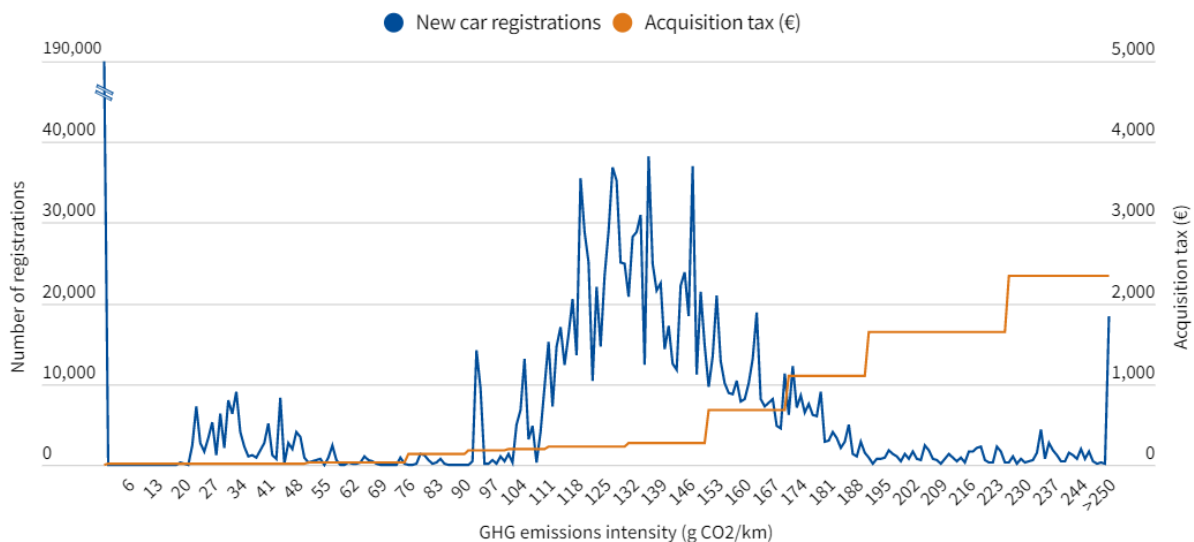


Figure 85: New passenger car registration vs acquisition tax rates

Source: Dataforce (2022) New passenger car registrations 2021

Ownership taxation

Ownership tax in the UK (also part of *VED*) is similarly based on CO₂ emission intensity. Unlike the UK acquisition tax component where most PHEVs (<50 g CO₂/km) are untaxed, the ownership tax on PHEVs is similar to other combustion fuel types leading to a very different financial incentive (Figure 21). Overall, ownership taxation in the UK is in the middle of the pack compared to other European countries.

Benefit-in-kind taxation

The UK applies a benefit-in-kind rate that linearly increases based on car emissions. In April 2020, the government reduced BiK rates for low-emission cars including a 0% rate for zero-emission cars. This rate increased to 1% for the 2021 tax year and 2% for 2022, continuing to provide a strong incentive for employees to opt for a zero-emission car. UK leasing companies have reported strong demand for BEVs as company cars. [5, 107]

Depreciation taxation

The depreciation of new corporate cars can be fully written off using write-down allowances that are based on vehicle CO₂ emission intensity. For zero-emission cars, there is an Enhanced Capital Allowance allowing cars to be fully depreciated in the first year, whereas low-emission cars (1-50 g CO₂/km) can be depreciated at 18% annually (standard rate) and vehicles above 50 g CO₂/km can be depreciated at 6% (special rate). Because corporate cars typically depreciate at a rate faster than the 18% or 6% capital allowances rate, the effect of capital allowances is to defer business tax relief on depreciation for company cars. While incentivises zero-emission cars through corporate cash flow, it only affects the timing of taxation whereas other countries provide a stronger incentive by limiting depreciation write-offs for combustion vehicles (e.g. Belgium, France, Ireland, Portugal in Figure 26).

Value added taxation and business deductions

The value added tax on cars sold in the UK (20%) is fully recoverable if the car is used exclusively for business purposes. If used privately, VAT is not recoverable for purchased cars and half recoverable for leased cars.

Fuel taxation

The UK recently cut fuel excise duties to 57.4 c/l for petrol and diesel (from 63 c/l). Announced for a period of 12 months, this reduction is one of the longest in Europe and thus one of the most costly reductions.[13] Since 2010, the planned fuel duty rises have been cancelled or delayed thirteen times to override previous commitments and keep fuel duty at the current level (and falling over time when accounting for inflation).[13]

Bibliography

1. EUR-Lex - 32011R0691 - EN - EUR-Lex. (n.d.). Retrieved September 6, 2022, from <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32011R0691>
2. Green and fair taxation in the EU. (n.d.). Retrieved September 7, 2022, from <https://ieep.eu/publications/green-and-fair-taxation-in-the-eu>
3. karenbeynon. (2021, May 10). Portfolio effect stabilises residual values of BEVs. *Autovista24*. Retrieved September 7, 2022, from <https://autovista24.autovistagroup.com/news/portfolio-effect-stabilises-residual-values-bevs/>
4. Wappelhorst, B. S. (2021, February 18). Small but mighty: The Netherlands' leading role in electric vehicle adoption. *International Council on Clean Transportation*. Retrieved September 7, 2022, from <https://theicct.org/small-but-mighty-the-netherlands-leading-role-in-electric-vehicle-adoption/>
5. Autocar. (2020, April 1). New tax rules herald EV sales boom. *Autocar*. Retrieved September 7, 2022, from <https://www.autocar.co.uk/car-news/industry/new-tax-rules-herald-ev-sales-boom>
6. [No title]. (n.d.). Retrieved September 6, 2022, from https://ec.europa.eu/eurostat/databrowser/view/env_ac_tax/default/table?lang=en
7. Internal combustion engine phase-outs. (2021, July 23). *International Council on Clean Transportation*. Retrieved October 10, 2022, from <https://theicct.org/ice-phase-outs/>
8. Mock, B. P. (2021, May 9). Europe's lost decade: About the importance of interim targets. *International Council on Clean Transportation*. Retrieved September 7, 2022, from <https://theicct.org/europes-lost-decade-about-the-importance-of-interim-targets/>
9. Details matter: The outsized climate benefits of setting annual targets for new cars in Europe. (2021, July 8). *International Council on Clean Transportation*. Retrieved September 7, 2022, from <https://theicct.org/details-matter-the-outsized-climate-benefits-of-setting-annual-targets-for-new-c>

ars-in-europe/

10. Faire Preise im Straßenverkehr. (2022, October 26). Retrieved October 26, 2022, from <https://www.agora-verkehrswende.de/veroeffentlichungen/faire-preise-im-strassenverkehr/>
11. ACEA Tax Guide 2022. (2022, June 2). ACEA - *European Automobile Manufacturers' Association*. Retrieved September 7, 2022, from <https://www.acea.auto/publication/acea-tax-guide-2022/>
12. PricewaterhouseCoopers. (n.d.). Publications. PwC. Retrieved September 7, 2022, from <https://www.pwc.com/gx/en/industries/automotive/publications.html>
13. Cuts to fuel taxes. (n.d.). *Transport & Environment*. Retrieved August 16, 2022, from <https://www.transportenvironment.org/challenges/climate-tools/fuel-taxes/cuts-to-fuel-taxes/>
14. Miller, J. (2022, September 3). Electric cars subsidised by German taxpayers end up on foreign roads. *Financial Times*. Financial Times. Retrieved from <https://www.ft.com/content/e599a283-4456-483e-9bb0-cf1de5495a0e>
15. Real-world usage of plug-in hybrid vehicles in Europe: A 2022 update on fuel consumption, electric driving, and CO2 emissions. (2022, June 8). *International Council on Clean Transportation*. Retrieved July 30, 2022, from <https://theicct.org/publication/real-world-phev-use-jun22/>
16. EUR-Lex - 32003L0096 - EN - EUR-Lex. (n.d.). Retrieved October 7, 2022, from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32003L0096>
17. All-electric vehicles. (n.d.). Retrieved October 8, 2022, from <https://www.fueleconomy.gov/feg/evtech.shtml>
18. Press corner. (n.d.). *European Commission - European Commission*. Retrieved October 7, 2022, from https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3662
19. Review 01/2022: Energy taxation, carbon pricing and energy subsidies. (n.d.). Retrieved October 10, 2022, from <https://www.eca.europa.eu/en/Pages/DocItem.aspx?did=60760>
20. Brand, C., Anable, J., & Tran, M. (2013). Accelerating the transformation to a low carbon passenger

transport system: The role of car purchase taxes, feebates, road taxes and scrappage incentives in the UK. *Transportation Research Part A: Policy and Practice*, 49, 132–148.

21. Gallagher, K. S., & Muehlegger, E. (2011). Giving green to get green? Incentives and consumer adoption of hybrid vehicle technology. *Journal of environmental economics and management*, 61(1), 1–15.
22. Gerlagh, R., van den Bijgaart, I., Nijland, H., & Michielsen, T. (2018). Fiscal Policy and CO₂Emissions of New Passenger Cars in the EU. *Environmental & Resource Economics*, 69(1), 103–134.
23. Klier, T., & Linn, J. (2015). Using Taxes to Reduce Carbon Dioxide Emissions Rates of New Passenger Vehicles: Evidence from France, Germany, and Sweden. *American Economic Journal: Economic Policy*, 7(1), 212–242.
24. PBL. (2014, January 20). Greening the Dutch car fleet: the role of differentiated sales taxes. *PBL Netherlands Environmental Assessment Agency*. Retrieved September 18, 2022, from <https://www.pbl.nl/en/publications/greening-the-dutch-car-fleet-the-role-of-differentiated-sales-taxes>
25. Publikation. (n.d.). Retrieved September 18, 2022, from https://foes.de/de-de/publikationen/publikation?tx_foespublications_listpublications%5Baction%5D=show&tx_foespublications_listpublications%5Bcontroller%5D=Publication&tx_foespublications_listpublications%5Bpublication%5D=212&cHash=0b98bdc3591381908cde2ac4608dfb95
26. Busse, M. R., Knittel, C. R., & Zettelmeyer, F. (2013). Are Consumers Myopic? Evidence from New and Used Car Purchases. *The American economic review*, 103(1), 220–256.
27. Allcott, H., & Wozny, N. (2014). Gasoline prices, fuel economy, and the energy paradox. *The review of economics and statistics*, 96(5), 779–795.
28. Greene, D. L., Evans, D. H., & Hiestand, J. (2013). Survey evidence on the willingness of U.S. consumers to pay for automotive fuel economy. *Energy policy*, 61, 1539–1550.

29. Davis, L. W., & Kilian, L. (2011). Estimating the effect of a gasoline tax on carbon emissions. *Journal of applied economics*, 26(7), 1187–1214.
30. Burke, P. J., & Nishitateno, S. (2013). Gasoline prices, gasoline consumption, and new-vehicle fuel economy: Evidence for a large sample of countries. *Energy Economics*, 36, 363–370.
31. Klier, T., & Linn, J. (2010). The Price of Gasoline and New Vehicle Fuel Economy: Evidence from Monthly Sales Data. *American Economic Journal: Economic Policy*, 2(3), 134–153.
32. Interactive map – Tax revenue per motor vehicle in major EU markets. (2022, July 1). ACEA - European Automobile Manufacturers' Association. Retrieved July 26, 2022, from <https://www.acea.auto/figure/tax-per-motor-vehicle-major-eu-markets/>
33. Spain: Selected Issues. (2022, February 16). IMF. Retrieved September 19, 2022, from <https://www.imf.org/en/Publications/CR/Issues/2022/02/15/Spain-Selected-Issues-513181>
34. Schroten, A., Király, J., & Scholten, P. (2022, May 12). Pricing instruments on transport emissions. CE Delft - EN. CE Delft. Retrieved October 26, 2022, from <https://cedelft.eu/publications/pricing-instruments-on-transport-emissions/>
35. Taxation of company cars in Belgium – room to reduce their favourable treatment. (n.d.). *Economy and Finance*. Retrieved September 18, 2022, from https://economy-finance.ec.europa.eu/publications/taxation-company-cars-belgium-room-reduce-their-favourable-treatment_en
36. Harding, M. (2014). *Personal tax treatment of company cars and commuting expenses*. Organisation for Economic Co-Operation and Development (OECD). <https://doi.org/10.1787/5jz14cg1s7vl-en>
37. Company cars: Time to end one of the largest fossil fuel subsidies in Europe. (2021, May 30). *Transport & Environment*. Retrieved September 18, 2022, from <https://www.transportenvironment.org/discover/company-cars-time-to-end-one-of-the-largest-fossil-fuel-subsidies-in-europe/>

38. LeasePlan. (2021, October 13). Plug cheaper than the pump in the majority of European countries. *LeasePlan*. Retrieved September 18, 2022, from <https://www.leaseplan.com/en-ix/blog/tco/car-cost-index-2021/>
39. EVs will be cheaper than petrol cars in all segments by 2027. (2021, May 10). *Transport & Environment*. Retrieved September 18, 2022, from <https://www.transportenvironment.org/discover/evs-will-be-cheaper-than-petrol-cars-in-all-segments-by-2027-bnef-analysis-finds/>
40. Neumark, F., McLure, C. E., & Cox, M. S. (2022, September 2). taxation. In *Encyclopedia Britannica*. Retrieved from <https://www.britannica.com/topic/taxation>
41. OECD. (2014, September 16). Fundamental principles of taxation. Organisation for Economic Co-Operation and Development (OECD). <https://doi.org/10.1787/9789264218789-5-en>
42. Subsidiepot nieuwe elektrische auto's voor particulieren na week leeg. (2020, July 9). *NOS Nieuws*. Retrieved October 10, 2022, from <https://nos.nl/artikel/2340046-subsidiepot-nieuwe-elektrische-auto-s-voor-particulieren-na-week-leeg>
43. Spasić, V. (2020, July 14). Limit for electric vehicle incentives in Croatia reached in just two minutes. *Balkan Green Energy News*. Retrieved September 18, 2022, from <https://balkangreenenergynews.com/limit-for-electric-vehicle-incentives-in-croatia-reached-in-just-two-minutes/>
44. Gars, J., Spiro, D., & Wachtmeister, H. (2022). The effect of European fuel-tax cuts on the oil income of Russia. *Nature Energy*, 1–9.
45. A dereliction of fuel duty: Europe's €9bn gift to Putin and the rich. (2022, March 21). *Transport & Environment*. Retrieved September 19, 2022, from <https://www.transportenvironment.org/discover/a-dereliction-of-fuel-duty-europes-e9bn-gift-to-putin>

in-and-the-rich/

46. McKerracher, C. (2022, August 2). Climate Bill Would Put US Back in Global Race for EV Leadership. *Bloomberg News*. Retrieved from <https://www.bloomberg.com/news/articles/2022-08-02/climate-bill-would-put-us-back-in-global-race-for-ev-leadership>
47. Visontay. (n.d.). NSW treasurer takes swipe at Morrison's electric car policy as state dwarfs federal funding. *The guardian*. Retrieved from <https://amp.theguardian.com/environment/2021/nov/10/nsw-treasurer-takes-swipe-at-morrison-electric-car-policy-as-state-dwarfs-federal-funding>
48. Plugged-In: T&E's EV market watch - Infogram. (n.d.). Retrieved August 9, 2022, from <https://infogram.com/1pd21nkxzz7vnxcmv9z7xjv5llfk75zdzjg>
49. Download the EV Readiness Index 2022. (n.d.). *LeasePlan*. Retrieved July 20, 2022, from <https://www.leaseplan.com/en-us/lpus-ev-readiness-index-2022/>
50. Taxing wages 2022: Impact of COVID-19 on the Tax Wedge in OECD countries. (n.d.). Retrieved July 26, 2022, from <https://www.oecd.org/tax/taxing-wages-20725124.htm>
51. Company cars: How European governments are subsidising pollution and climate change. (2020, October 5). *Transport & Environment*. Retrieved July 26, 2022, from <https://www.transportenvironment.org/discover/company-cars-how-european-governments-are-subsidising-pollution-and-climate-change/>
52. Report - vehicles in use, Europe 2022. (2022, January 19). *ACEA - European Automobile Manufacturers' Association*. Retrieved August 2, 2022, from <https://www.acea.auto/publication/report-vehicles-in-use-europe-2022/>
53. the rEV index. (n.d.). Retrieved July 20, 2022, from <https://impact.economist.com/sustainability/project/the-rev-index/rev-index/>

54. Taxing wages 2022: Impact of COVID-19 on the Tax Wedge in OECD countries. (n.d.). Retrieved July 29, 2022, from <https://www.oecd.org/tax/taxing-wages-20725124.htm>
55. Download the EV Readiness Index 2022. (n.d.). *LeasePlan*. Retrieved July 29, 2022, from <https://www.leaseplan.com/en-us/lpus-ev-readiness-index-2022/>
56. Appropriate taxes and incentives do affect purchases of new cars. (2018, April 3). *European Environment Agency*. Retrieved June 27, 2022, from <https://www.eea.europa.eu/themes/transport/vehicules-taxation>
57. Électrification des voitures de société. (2022, January 10). *Transport & Environment*. Retrieved June 28, 2022, from <https://www.transportenvironment.org/discover/electrification-des-voitures-de-societe-une-reforme-fiscale-est-necessaire/>
58. « Remise carburant » : quel fonctionnement ? (n.d.). Retrieved October 11, 2022, from <https://www.economie.gouv.fr/remise-carburant-fonctionnement>
59. Transport & Environment. (2021, November 4). Klimaschädliche Subventionen für Dienstwagen abbauen. *Transport & Environment*. Retrieved May 24, 2022, from <https://www.transportenvironment.org/discover/klimaschadliche-subventionen-abbauen/>
60. Koalitionsvertrag 2021 – 2025. (n.d.). *Sozialdemokratische Partei Deutschlands (SPD)*. Retrieved May 24, 2022, from <https://www.spd.de/koalitionsvertrag2021/>
61. Meza, E. (2022, February 20). Germany to tighten EV subsidy rules to stop lucrative resale rorts. *The Driven*. Retrieved May 24, 2022, from <https://thedriven.io/2022/02/21/germany-to-tighten-ev-subsidy-rules-to-stop-lucrative-resale-rorts/>
62. Hajek, S. (2020, August 14). E-Autos: Verfällt der Wiederverkaufswert von Elektroautos schneller als der von Benzinern und Dieseln? *Wirtschaftswoche*. Retrieved May 24, 2022, from <https://www.wiwo.de/technologie/mobilitaet/restwerte-von-e-autos-was-aelter-und-kein-tesla-ist-s>

teht-oft-monatelang-im-hof/26093148.html

63. Autovista. (2021, May 10). Portfolio effect stabilises residual values of BEVs. *Autovista24*. Retrieved May 24, 2022, from <https://autovista24.autovistagroup.com/news/portfolio-effect-stabilises-residual-values-bevs/>
64. Nienaber, M. (2022, April 14). Germany Aims to Scrap Hybrid Car Aid Earlier Than Planned. *Bloomberg News*. Retrieved from <https://www.bloomberg.com/news/articles/2022-04-14/germany-aims-to-scrap-hybrid-car-subsidies-earlier-than-planned>
65. ACEA. (2021, April 29). ACEA Tax Guide 2021. *ACEA - European Automobile Manufacturers' Association*. Retrieved May 24, 2022, from <https://www.acea.auto/publication/acea-tax-guide-2021/>
66. Bundesministerium für Wirtschaft und Klimaschutz. (n.d.). Habeck: „Umweltbonus wird ab Januar 2023 konsequent auf Klimaschutz ausgerichtet“. *BMWi*. Retrieved September 9, 2022, from <https://www.bmwk.de/Redaktion/DE/Pressemitteilungen/2022/07/20220726-habeck-umweltbonus-wird-ab-januar-2023.html>
67. Zusammensetzung der Spritpreise - Bundesfinanzministerium - Themen. (n.d.). *Bundesministerium der Finanzen*. Retrieved June 10, 2022, from <https://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Steuern/2022-03-14-zusammensetzung-der-spritpreise.html>
68. § 10 BEHG - Einzelnorm. (n.d.). Retrieved June 26, 2022, from https://www.gesetze-im-internet.de/behg/__10.html
69. Report - Vehicles in use, Europe 2022. (2022, January 19). *ACEA - European Automobile Manufacturers' Association*. Retrieved August 11, 2022, from <https://www.acea.auto/publication/report-vehicles-in-use-europe-2022/>
70. Greece population (2022) - worldometer. (n.d.). Retrieved July 29, 2022, from

<https://www.worldometers.info/world-population/greece-population/>

71. Hungary tightens eligibility for subsidised fuel amid surge in demand. (2022, March 10). *Reuters*. Retrieved from <https://www.reuters.com/business/energy/hungary-tightens-eligibility-subsidised-fuel-amid-surge-demand-2022-03-10/>
72. Iceland is one of the world's most interesting electric vehicle markets. (2018, July 9). *International Council on Clean Transportation*. Retrieved July 31, 2022, from <https://theicct.org/iceland-is-one-of-the-worlds-most-interesting-electric-vehicle-markets/>
73. A land of ice, fire and EVs - Iceland lights path to electrification. (2022, July 4). *Autovista24*. Retrieved July 31, 2022, from <https://autovista24.autovistagroup.com/news/iceland-lights-path-to-automotive-electrification/>
74. Houses of the Oireachtas. (2022, June 28). Parliamentary Budget Office. Retrieved August 7, 2022, from <https://www.oireachtas.ie/en/how-parliament-is-run/houses-of-the-oireachtas-service/parliamentary-budget-office/>
75. Houses of the Oireachtas. (2018, February 2). Publications. Retrieved August 7, 2022, from <https://www.oireachtas.ie/en/publications/?q=An%20Overview%20of%20Ireland%E2%80%99s%20Electric%20Vehicle%20Incentives%20and%20a%20Comparison%20With%20International%20Peers&author%5B%5D=parliamentary-budget-office&date=&term=%2Fie%2Foireachtas%2Fhouse%2Fdai%2F33&fromDate=06%2F12%2F2021&toDate=06%2F12%2F2021>
76. [No title]. (n.d.). Retrieved June 29, 2022, from https://ec.europa.eu/eurostat/databrowser/view/road_eqs_carhab/default/table?lang=en
77. I nuovi incentivi: 7.500 se rottami con reddito entro 30mila. (2022, August 6). *Vaielettrico*. Retrieved August 10, 2022, from

<https://www.vaielettrico-it.cdn.ampproject.org/c/s/www.vaielettrico.it/i-nuovi-incentivi-7-500-se-ro-ttami-con-isee-entro-30mila/?amp=1>

78. Ombello, C. (2022, June 14). Italy's EV debacle in April ahead of new incentives. *InsideEVs*. Retrieved September 7, 2022, from <https://insideevs.com/news/592024/italy-electric-car-sales-april-2022/>
79. "I bonus auto non devono supportare tecnologie da abbandonare." (2022, September 9). *Transport & Environment*. Retrieved October 21, 2022, from <https://www.transportenvironment.org/discover/i-bonus-auto-non-devono-supportare-tecnologie-da-abbandonare/>
80. EUR-Lex - 32019D2138 - EN - EUR-Lex. (n.d.). Retrieved October 9, 2022, from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019D2138>
81. Report - vehicles in use, Europe 2022. (2022, January 19). *ACEA - European Automobile Manufacturers' Association*. Retrieved August 2, 2022, from <https://www.acea.auto/publication/report-vehicles-in-use-europe-2022/>
82. Report - vehicles in use, Europe 2022. (2022, January 19). *ACEA - European Automobile Manufacturers' Association*. Retrieved August 5, 2022, from <https://www.acea.auto/publication/report-vehicles-in-use-europe-2022/>
83. [No title]. (n.d.). Retrieved August 5, 2022, from https://ec.europa.eu/eurostat/databrowser/view/road_eqs_carhab/default/table?lang=en
84. Cuts to fuel taxes. (n.d.). *Transport & Environment*. Retrieved August 5, 2022, from <https://www.transportenvironment.org/challenges/climate-tools/fuel-taxes/cuts-to-fuel-taxes/>
85. Monitoring of CO2 emissions from passenger cars. (n.d.). Retrieved October 11, 2022, from http://co2cars.apps.eea.europa.eu/?source=%7B%22track_total_hits%22%3Atrue%2C%22query%22%3A%7B%22bool%22%3A%7B%22must%22%3A%5B%7B%22constant_score%22%3A%7B%22filter%22%3A%7B%22bool%22%3A%7B%22must%22%3A%5B%7B%22bool%22%3A%7B%22should

%22%3A%5B%7B%22term%22%3A%7B%22year%22%3A2021%7D%7D%5D%7D%7D%2C%7B%22
bool%22%3A%7B%22should%22%3A%5B%7B%22term%22%3A%7B%22scStatus%22%3A%22Prov
isional%22%7D%7D%5D%7D%7D%5D%7D%7D%7D%7D%5D%7D%7D%2C%22display_type%22%
3A%22tabular%22%7D

86. Cefai, S. (2021, May 4). Has demand for electric vehicles increased in Malta? *BusinessNow.mt*. Retrieved October 9, 2022, from <https://businessnow.mt/has-demand-for-electric-vehicles-increased-in-malta/>
87. Martin, I. (2022, May 17). Green transport schemes should focus on fully electric vehicles - Miriam Dalli. *Times of Malta - Malta's Leading News Service since 1935*. Retrieved August 9, 2022, from <https://timesofmalta.com/articles/view/green-transport-schemes-should-focus-on-fully-electric.955573>
88. Attard, M., von Brockdorff, P., & Bezzina, F. (2015). The external costs of passenger and commercial vehicles use in Malta. Retrieved from <https://www.um.edu.mt/library/oar/handle/123456789/5014>
89. 2030 National Energy and Climate Plan. (2018, January 16). *EWA*. Retrieved August 10, 2022, from <https://energywateragency.gov.mt/2030-necp/>
90. Fenech, R. (2022, April 6). EXCLUSIVE: Plans to fully electrify national fleet by 2050 unattainable, says state-commissioned report. *BusinessNow.mt*. Retrieved August 10, 2022, from <https://businessnow.mt/state-commissioned-report-pours-cold-water-on-unattainable-plans-to-fully-electrify-national-fleet-by-2050/>
91. Beedham, M. (2020, July 9). EV fans deplete Dutch gov's €10M electric vehicle grant in just 8 days. *The Next Web*. Retrieved September 10, 2022, from <https://thenextweb.com/news/the-netherlands-dutch-crazy-new-evs-10m-subsidies-used-8-days>
92. Norwegian motorists face a very high price of Carbon. (n.d.). *Transportøkonomisk institutt*. Retrieved July 20, 2022, from

<https://www.toi.no/frontpage/norwegian-motorists-face-a-very-high-price-of-carbon-article36836-25.html>

93. Finansdepartementet. (2022). Merverdiavgiftsfritaket for elbiler erstattes med en tilskuddsordning. Retrieved from <https://www.regjeringen.no/no/aktuelt/merverdiavgiftsfritaket-for-elbiler-erstattes-med-en-tilskuddsordning/id2912423/>
94. Report - vehicles in use, Europe 2022. (2022, January 19). ACEA - European Automobile Manufacturers' Association. Retrieved July 3, 2022, from <https://www.acea.auto/publication/report-vehicles-in-use-europe-2022>
95. [No title]. (n.d.). Retrieved July 19, 2022, from https://ec.europa.eu/eurostat/databrowser/view/road_eqs_carage/default/table?lang=en
96. Download the EV Readiness Index 2022. (n.d.). LeasePlan. Retrieved August 12, 2022, from <https://www.leaseplan.com/en-us/lpus-ev-readiness-index-2022/>
97. Recovery and resilience plan for Poland. (2021, July 29). European Commission - European Commission. Retrieved July 19, 2022, from https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility/recovery-and-resilience-plan-poland_en
98. [No title]. (n.d.). Retrieved July 19, 2022, from https://ec.europa.eu/eurostat/databrowser/view/lfsq_egaps/default/table?lang=en
99. Interactive map - CO2 emissions from new passenger cars in the EU, by country. (2021, October 18). ACEA - European Automobile Manufacturers' Association. Retrieved July 18, 2022, from <https://www.acea.auto/figure/interactive-map-co2-emissions-from-new-passenger-cars-in-the-eu-by-country/>
100. Imposto Sobre Veículos e Imposto Único de Circulação. (n.d.). Retrieved August 7, 2022, from

<https://impostosobreveiculos.info/>

101. Report - Vehicles in use, Europe 2022. (2022, January 19). *ACEA - European Automobile Manufacturers' Association*. Retrieved August 7, 2022, from <https://www.acea.auto/publication/report-vehicles-in-use-europe-2022>
102. Report - vehicles in use, Europe 2022. (2022, January 19). *ACEA - European Automobile Manufacturers' Association*. Retrieved August 2, 2022, from <https://www.acea.auto/publication/report-vehicles-in-use-europe-2022/>
103. [No title]. (n.d.). Retrieved August 2, 2022, from https://ec.europa.eu/eurostat/databrowser/view/road_eqs_carhab/default/table?lang=en
104. Real-world usage of plug-in hybrid vehicles in Europe: A 2022 update on fuel consumption, electric driving, and CO2 emissions. (2022, June 8). *International Council on Clean Transportation*. Retrieved July 26, 2022, from <https://theicct.org/publication/real-world-phev-use-jun22/>
105. Campaign for Better Transport. (n.d.). Pay-as-you-drive. *Campaign for Better Transport*. Retrieved October 9, 2022, from <https://bettertransport.org.uk/node/4613/done?sid=22272>
106. Department for Transport. (2022, June 14). Plug-in grant for cars to end as focus moves to improving electric vehicle charging. *GOV.UK*. Retrieved June 27, 2022, from <https://www.gov.uk/government/news/plug-in-grant-for-cars-to-end-as-focus-moves-to-improving-electric-vehicle-charging>
107. Wright, C. (2020, October 7). EV leasing booms following Benefit in Kind tax changes. *Leasing Broker Federation*. Retrieved June 25, 2022, from <https://leasingbrokernews.co.uk/ev-leasing-booms-following-benefit-in-kind-tax-changes/>