



MAKING THE TRANSITION TO ZERO-EMISSION MOBILITY

2019 PROGRESS REPORT

ENABLING FACTORS FOR
ALTERNATIVELY-POWERED CARS IN THE EU

SEPTEMBER 2019



ACEA

European
Automobile
Manufacturers
Association

EXECUTIVE SUMMARY

1 – MARKET UPTAKE OF ALTERNATIVELY-POWERED CARS

- 2.0% of all cars sold in 2018 were electrically-chargeable (+1.4 percentage points since 2014).
- 3.8% of new passenger cars in the EU were hybrid electric last year (+2.4 percentage points over the last five years).
- 0.4% of all cars sold in 2018 were natural gas-powered (-0.4 percentage points since 2014).
- Fuel cell vehicles currently account for a negligible share of total EU car sales.

2 – CO₂ EMISSIONS OF NEW PASSENGER CARS

- In 2017, petrol vehicles became the most sold car type in the EU for the first time since 2009.
- 2017 also marked the first increase (+0.3%) in CO₂ from new cars since records began.
- 2018 saw an even bigger drop in diesel sales, and a stronger surge in demand for petrol, resulting in a 1.8% increase of new-car CO₂ emissions.

3 – AFFORDABILITY

- The market uptake of electrically-chargeable vehicles (ECVs) is directly correlated to a country's GDP per capita, showing that affordability is a major barrier to consumers.
- All countries with an ECV market share of less than 1% have a GDP below €29,000, including EU member states in Central and Eastern Europe, but also Spain, Italy and Greece.
- An ECV share of above 3.5% only occurs in countries with a GDP per capita of more than €42,000.
- Only 12 EU countries offer bonus payments or premiums to buyers of ECVs. These purchase incentives, and especially their monetary value, differ greatly across the European Union.
- If we expand the scope to also include tax exemptions and reductions (ie related to acquisition and ownership), four member states do not offer any tax benefits or incentives for ECVs at all.

4 – INFRASTRUCTURE AVAILABILITY

- Although there has been a strong growth in the deployment of ECV infrastructure, the total number of charging points available across the EU (144,000) falls far short of what is required.
- According to conservative estimates by the European Commission, at least 2.8 million ECV charging points will be needed by 2030. That means a 20-fold increase within the next 12 years.
- Four countries covering 27% of the EU's total surface area – the Netherlands, Germany, France and the UK – account for 76% of all ECV charging points in the EU.
- Almost all EU member states with less than 1 charging point per 100 km of road have an ECV market share of under 1%.
- There were just 47 hydrogen filling stations available across 11 EU countries in 2018.
- 17 member states did not have a single hydrogen filling station.
- There are some 3,400 natural gas filling stations in the EU, up 17.5% since 2014.
- Two-thirds of these filling points are concentrated in two countries alone (Italy and Germany).

INTRODUCTION

THE CONTEXT

On 17 April 2019, the European Parliament and Council adopted Regulation (EU) 2019/631 introducing CO₂ emission standards for new passenger cars and light commercial vehicles in the European Union. This regulation set reduction targets of -15% and -37.5% for the tailpipe CO₂ emissions of newly-registered passenger cars for the years 2025 and 2030 respectively.

These targets will follow on from the target of 95g CO₂/km for the year 2021, set in 2013. Using laboratory test (WLTP) results, manufacturers' progress is monitored each year by the member states based on new car registration data – see page 10 of this report.

In 2023, the European Commission will review the Regulation, reporting back to the European Parliament and Council on the progress made towards reaching the car CO₂ targets. Amongst other things, this 'mid-term review' will take stock of the roll-out of charging and refuelling infrastructure for alternatively-powered vehicles, their market uptake, as well as CO₂ reductions from the car fleet.

THE PURPOSE OF THIS REPORT

Sales of electric and other alternatively-powered passenger cars – including electrically-chargeable, hybrid, fuel cell and natural gas-powered vehicles – will have to pick up strongly if the 2025 and 2030 CO₂ targets are to be achieved.

All European automobile manufacturers are constantly expanding their portfolios of such vehicles. However, their market penetration remains low and fragmented across the EU. Consumers looking for an alternative to diesel often opt for petrol vehicles, but are not yet making the switch to alternatively-powered vehicles on a large scale.

In order to drive this shift to zero- and low-emission cars, governments across the EU need to ramp up investments in charging and refuelling infrastructure, and to put in place meaningful and sustainable incentives to stimulate sales of alternatively-powered cars in the long run. The purpose of this report is to track progress on these key 'enabling factors' for passenger cars.

The European Automobile Manufacturers' Association (ACEA) will publish this statistical report on an annual basis in the run-up to the mid-term review of Regulation (EU) 2019/631 in 2023, with a view to monitoring the availability of infrastructure and purchase incentives for consumers.

ACEA will put this in the context of the composition of the new car market by fuel type and the average CO₂ emissions of new cars. The report will also make a number of correlations, analysing the influence of some factors – such as national income or the number of charging points per 100 km of road – on the market uptake of alternatively-powered vehicles.

This report provides a factual, data-driven picture of progress, bringing together all available data sources (ACEA, EAFO¹, EEA, Eurostat, IHS). In all cases it is the latest available full-year data.

¹ Currently, the only available source of EU-wide infrastructure data for all types of alternatively-powered vehicles is the European Commission's European Alternative Fuels Observatory (EAFO), www.eafo.eu.

GLOSSARY

CONVENTIONALLY-POWERED VEHICLES

Conventional vehicles use fossil fuels (diesel and petrol) to power an internal combustion engine (ICE). Both diesel and petrol engines convert fuel into energy via combustion, with the main difference being the way the combustion process occurs.

Diesel fuel has a higher energy content per litre than other fuels. Moreover, diesel engines convert more of this energy into useful work. Due to these two factors, diesel cars consume less fuel by volume than equivalent petrol vehicles.

Consequently, diesel cars have lower average CO₂ emissions per kilometre than equivalent petrol-powered cars. Although this gap is narrowing, it still remains significant. According to a 2019 report by the European Environment Agency (EEA), “if similar petrol and diesel segments are compared, new conventional petrol cars emitted 10-40% more [CO₂] than new conventional diesel cars”.

ALTERNATIVELY-POWERED VEHICLES

Alternatively-powered vehicles (APVs) are vehicles powered by technologies alternative to, or supplemental to, conventional internal combustion engines using fossil fuels. The main types of APVs, and how they differ from each other, are explained below.

1 – ELECTRIC VEHICLES

Electric vehicles include electrically-chargeable vehicles (ECVs) and fuel cell electric vehicles (FCEVs). Both are propelled by an electric motor but require very different infrastructure.

1A – ELECTRICALLY-CHARGEABLE VEHICLES

Electrically-chargeable vehicles (ECVs) include full battery electric vehicles and plug-in hybrids, both of which require recharging infrastructure which connects them to the electricity grid.

- **Battery electric vehicles (BEVs)** are fully powered by an electric motor, using electricity stored in an on-board battery that is charged by plugging into the electricity grid.
- **Plug-in hybrid electric vehicles (PHEVs)** have an internal combustion engine (running on petrol or diesel) and a battery-powered electric motor. The battery is recharged by connecting to the grid as well as by the on-board engine. Depending on the battery level, the vehicle can run on the electric motor and/or the internal combustion engine.



1B – FUEL CELL ELECTRIC VEHICLES

Fuel cell electric vehicles (FCEVs) are also propelled by an electric motor, but their electricity is generated within the vehicle by a fuel cell that uses compressed hydrogen (H₂) and oxygen from the air. So, unlike ECVs, they are not recharged by connecting to the electricity grid. Instead, FCEVs require dedicated hydrogen filling stations.



2 – HYBRID ELECTRIC VEHICLES

Hybrid electric vehicles (HEVs) have an internal combustion engine (running on petrol or diesel) and a battery-powered electric motor. Electricity is generated internally from regenerative braking, cruising and the combustion engine, so they do not need recharging infrastructure. The hybridisation level ranges from mild to full.



- **Mild hybrid electric vehicles** are powered by an internal combustion engine, but also have a battery-powered electric motor that supports the conventional engine. These vehicles cannot be powered by the electric motor alone.
- **Full hybrid electric vehicles** are powered by both an electric motor and a combustion engine, each of which (or together) can power the wheels.

3 – NATURAL GAS VEHICLES

Natural gas vehicles (NGVs) run on compressed natural gas (CNG) or liquefied natural gas (LNG), the latter mainly being used for commercial vehicles such as trucks and the former for passenger cars. NGVs are based on mature technologies and use internal combustion engines. Dedicated refuelling infrastructure is required.



‘ELECTRIFIED’ AND ‘ELECTRIC’ VEHICLES

Some people presume that the term ‘**electrified**’ or ‘**electric**’ refers exclusively to battery electric vehicles (BEVs) that are fully powered by electricity and have no CO2 coming from their tailpipe.

However, in practice ‘**electrified**’ and ‘**electric**’ are often used as blanket terms for all available electrification technologies, ie BEVs, PHEVs and HEVs. The reality is that each of these technologies has different requirements in terms of infrastructure as well as varying CO2 reduction levels.

| | ELECTRICALLY-CHARGEABLE CARS 2.0% OF EU CAR SALES IN 2018 | | HYBRID ELECTRIC CARS 3.8% CAR SALES | FUEL CELL CARS 0% CAR SALES |
|--------------------------------------------|--------------------------------------------------------------|--------------------------------------------------|-----------------------------------------|---------------------------------------------|
| | BEVs Battery electric | PHEVs Plug-in hybrid electric vehicles | HYBRIDS Full and mild hybrids | FCEVs Fuel cell electric vehicles |
| TAILPIPE CO2 REDUCTION (ON AVERAGE) | 100% | 50-75% | MILD: 10-20% FULL: 20-40% | 100% |
| SHARE OF ‘ELECTRIFIED’ CARS | 17% | 17.3% | 65.7% | 0% |

1. MARKET UPTAKE

1.1 REGISTRATIONS OF NEW CARS IN THE EU, BY FUEL TYPE

Trends over time in the EU28 (2014-2018, in units)

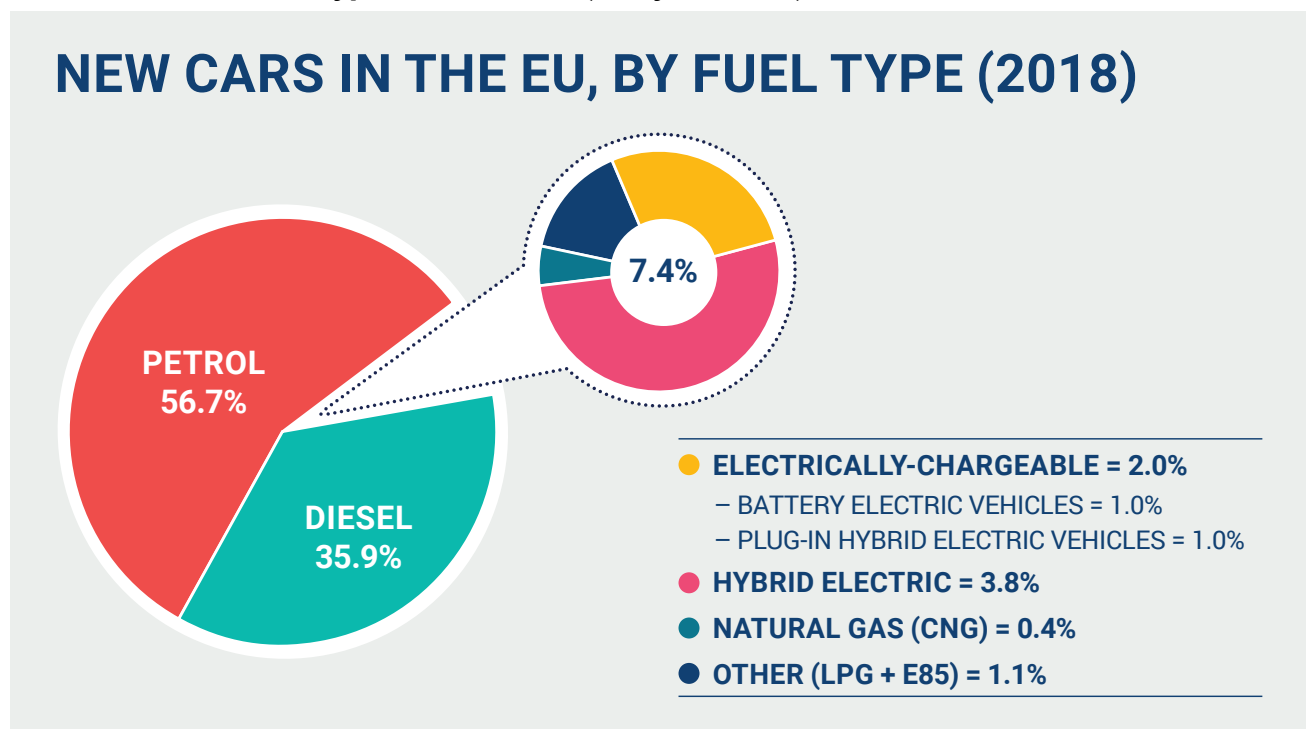
| | 2014 | 2015 | 2016 | 2017 | 2018 |
|-------------------------|-----------|-----------|-----------|-----------|-----------|
| Petrol | 5,358,452 | 6,036,564 | 6,800,116 | 7,563,739 | 8,532,104 |
| Diesel | 6,599,462 | 7,039,611 | 7,175,630 | 6,617,051 | 5,406,574 |
| Electrically-chargeable | 69,958 | 148,027 | 155,634 | 218,083 | 301,581 |
| – Battery electric | 37,517 | 59,165 | 63,479 | 97,667 | 149,737 |
| – Plug-in hybrids | 32,441 | 88,862 | 92,155 | 120,416 | 151,844 |
| Hybrid electric | 176,525 | 218,755 | 278,729 | 426,769 | 578,620 |
| Fuel cell | 38 | 176 | 123 | 253 | 266 |
| Natural gas (CNG) | 97,214 | 78,511 | 57,609 | 49,553 | 65,092 |
| Other (LPG + E85) | 141,452 | 140,321 | 118,430 | 156,710 | 164,310 |

Source: ACEA, 2018

KEY FINDINGS

- Between 2014-2018, the petrol market grew by 3.2 million units, reaching 8.5 million cars in 2018.
- The number of diesel cars sold dropped by 1.2 million (to 5.4 million) over the same timeframe.
- The number of electrically-chargeable cars sold went up some 232,000 (to 301,581 cars in total) over the five-year period.
- 402,000 more hybrid electric vehicles were sold in 2018 compared to 2014.

Market shares of fuel types in the EU28 (full-year 2018)



Source: ACEA, full-year 2018

KEY FINDINGS

- Overall in 2018, more than half of all new passenger cars registered in the EU ran on petrol (56.7%, compared to 50.3% in 2017). Petrol cars are now the most sold fuel type in the EU.
- Diesel accounted for 35.9% of new passenger cars sold last year (down from 44% in 2017).
- 7.4% of all new passenger cars were alternatively-powered last year.
- 2.0% of all cars sold in 2018 were electrically-chargeable ones, and 3.8% were hybrid electric.

1.2 NEW SALES: SHARE OF ALTERNATIVELY-POWERED CARS

Trends over time in the EU28 (2014-2018, market share)

| | 2014 | 2015 | 2016 | 2017 | 2018 | Change 14/18 |
|-------------------------|------|------|------|------|------|---------------|
| Electrically-chargeable | 0.6% | 1.1% | 1.1% | 1.5% | 2.0% | +1.4 % points |
| – Battery electric | 0.3% | 0.4% | 0.4% | 0.6% | 1.0% | +0.7 % points |
| – Plug-in hybrids | 0.3% | 0.7% | 0.6% | 0.8% | 1.0% | +0.7 % points |
| Hybrid electric | 1.4% | 1.6% | 1.9% | 2.8% | 3.8% | +2.4 % points |
| Fuel cell | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0 |
| Natural gas (CNG) | 0.8% | 0.6% | 0.4% | 0.3% | 0.4% | -0.4 % points |
| Other (LPG + E85) | 1.1% | 1.0% | 0.8% | 1.0% | 1.1% | 0 |

Source: ACEA, 2018

KEY FINDINGS

- The electrically-chargeable car market grew by 1.4 percentage points over the last five years.
- During the same period, the share of hybrid electric vehicles increased by 2.4 percentage points.
- 0.4% of all cars sold in 2018 were natural gas-powered (-0.4 percentage points since 2014).

By country: market share of alternatively-powered cars (full-year 2018)

MARKET SHARE OF ALTERNATIVELY-POWERED CARS, BY COUNTRY

| | AT | BE | BG | HR | CY | CZ | DK | EE | FI | FR | DE | GR | HU | IE |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ECVs | 2.5% | 2.4% | 0.6% | 0.0% | 0.0% | 0.4% | 2.1% | 0.5% | 4.7% | 2.1% | 2.0% | 0.3% | 1.5% | 1.6% |
| HEVs | 2.2% | 2.8% | 4.7% | 0.0% | 0.0% | 1.7% | 4.0% | 6.2% | 9.8% | 4.2% | 2.9% | 3.5% | 4.1% | 5.5% |
| FCEVs | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| NGVs | 0.0% | 0.7% | 0.9% | 0.0% | 0.0% | 0.7% | 0.0% | 0.0% | 1.0% | 0.0% | 0.3% | 1.0% | 0.0% | 0.0% |
| OTHER | 0.2% | 0.2% | 0.0% | 0.0% | 0.0% | 0.3% | 0.0% | 0.0% | 0.0% | 0.1% | 0.1% | 0.0% | 0.0% | 0.0% |

| | IT | LV | LT | LU | MT | NL | PL | PT | RO | SK | SI | ES | SE | GB |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ECVs | 0.5% | 0.6% | 0.4% | 0.0% | 0.0% | 6.7% | 0.2% | 3.4% | 0.5% | 0.3% | 0.9% | 0.9% | 8.0% | 2.5% |
| HEVs | 4.3% | 4.0% | 7.2% | 0.0% | 0.0% | 4.6% | 4.3% | 3.2% | 2.9% | 2.5% | 2.0% | 5.7% | 5.8% | 3.4% |
| FCEVs | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| NGVs | 2.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% | 0.2% | 0.0% | 0.3% | 0.9% | 0.0% |
| OTHER | 6.5% | 0.3% | 0.0% | 0.0% | 0.0% | 0.2% | 1.4% | 0.8% | 1.0% | 0.5% | 0.3% | 1.3% | 0.3% | 0.0% |

ECVs = ELECTRICALLY-CHARGEABLE VEHICLES
 HEVs = HYBRID ELECTRIC VEHICLES
 FCEVs = FUEL CELL ELECTRIC VEHICLES

NGVs = NATURAL GAS VEHICLES (CNG)
 OTHER = OTHER ALTERNATIVELY-POWERED VEHICLES (LPG + E85)

Source: ACEA, full-year 2018

ELECTRICALLY-CHARGEABLE VEHICLES (ECVs)

Top 5: **MOST** ECVs sold (units + share)

1. Germany: 67,504 (2.0%)
2. United Kingdom: 59,911 (2.5%)
3. France: 45,587 (2.1%)
4. Netherlands: 29,695 (6.7%)
5. Sweden: 28,327 (8.0%)

Top 5: **LEAST** ECVs sold (units + share)

1. Latvia: 93 (0.6%)
2. Estonia: 118 (0.5%)
3. Lithuania: 143 (0.4%)
4. Bulgaria: 220 (0.6%)
5. Slovakia: 293 (0.3%)

HYBRID ELECTRIC VEHICLES (HEVs)

Top 5: **MOST** HEVs sold (units + share)

1. Germany: 98,816 (2.8%)
2. France: 91,815 (4.6%)
3. Italy: 81,892 (3.2%)
4. United Kingdom: 81,323 (4.0%)
5. Spain: 75,768 (6.2%)

Top 5: **LEAST** HEVs sold (units + share)

1. Latvia: 672 (5.5%)
2. Slovenia: 1,459 (4.7%)
3. Estonia: 1,566 (4.3%)
4. Bulgaria: 1,600 (4.3%)
5. Lithuania: 2,351 (4.1%)

FUEL CELL ELECTRIC VEHICLES (FCEVs)

Top 5: **MOST** FCEVs sold (units + share)

1. Germany: 154 (0%)
2. United Kingdom: 36 (0%)
3. France: 36 (0%)
4. Netherlands: 13 (0%)
5. Belgium: 8 (0%)

Top 5: **LEAST** FCEVs sold (units + share)

1. Italy: 0 (0%)
2. Poland: 0 (0%)
3. Czech Republic: 0 (0%)
4. Portugal: 0 (0%)
5. Hungary: 0 (0%)

NATURAL GAS VEHICLES (NGVs)

Top 5: **MOST** NGVs sold (units + share)

1. Italy: 37,406 (2%)
2. Germany: 10,804 (0.3%)
3. Belgium: 3,987 (0.7%)
4. Spain: 3,754 (0.3%)
5. Sweden: 3,235 (0.9%)

Top 5: **LEAST** NGVs sold (units + share)

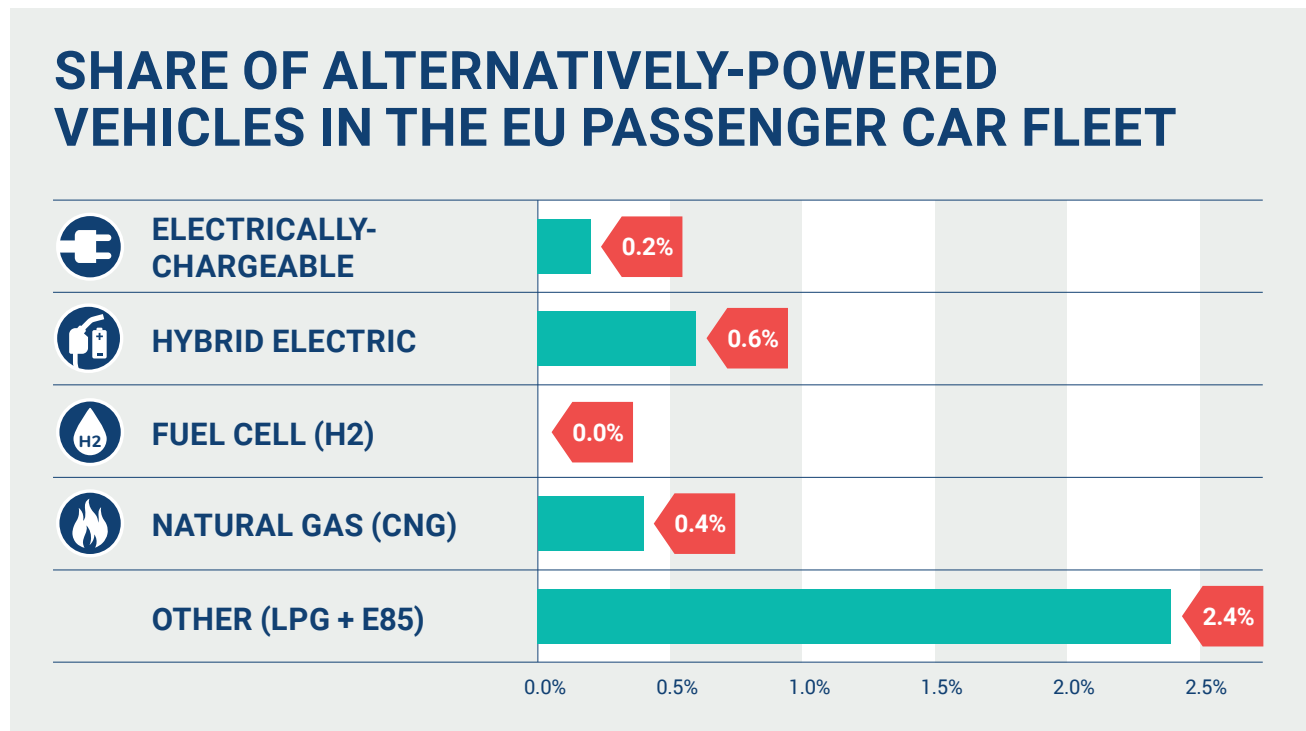
1. United Kingdom: 0 (0%)
2. Romania: 0 (0%)
3. Ireland: 0 (0%)
4. Lithuania: 0 (0%)
5. Latvia: 3 (0%)

KEY FINDINGS

- In only four EU countries, electrically-chargeable vehicles have a market share of over 2.5%.
- 20 member states have an ECV market share of 2.5% and under.
- Half of all EU member states have an ECV market share lower than 1%.
- The market share of hybrid electric cars is almost two times bigger than that of ECVs.
- Hybrid electric vehicles make up more than half of all EU sales of alternatively-powered cars.
- Sales of cars running on natural gas are mainly concentrated in Italy and Germany (74% of total).
- Fuel cell cars account for a negligible share of total EU car sales for the time being.
- In terms of units, Germany is the number one market for all types of electric vehicles.

1.3 ON THE ROAD

Alternatively-powered vehicles: share of the EU car fleet



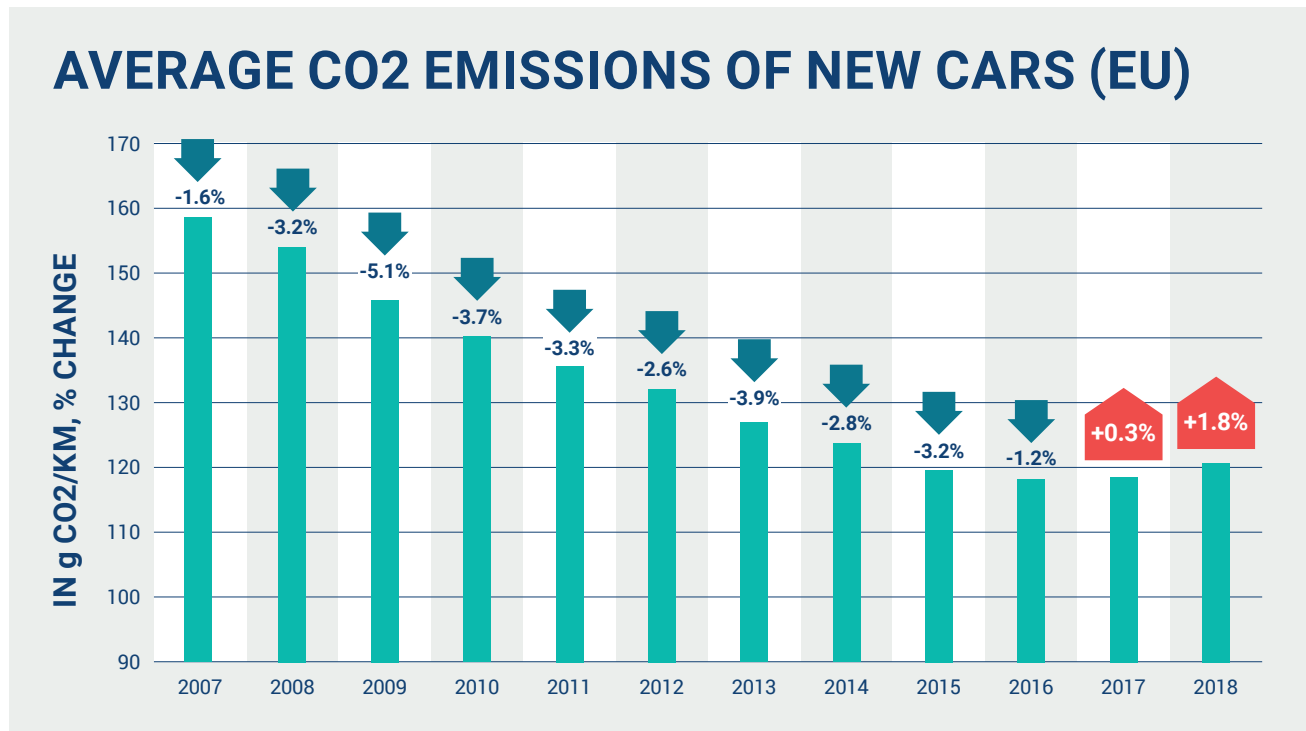
Source: IHS Markit, 2017 (latest data available)

KEY FINDINGS

- 0.2% of all passenger cars on EU roads are electrically-chargeable today.
- Hybrid electric vehicles make up 0.6% of all cars in the European Union.
- Passenger cars fuelled by natural gas (CNG) account for 0.4% of the EU car fleet.
- Other alternatively-powered vehicles account for 2.4% of all passenger cars on EU roads, of which LPG (2.3%) and the E85 ethanol-petrol mix (0.1%) make up the vast majority.

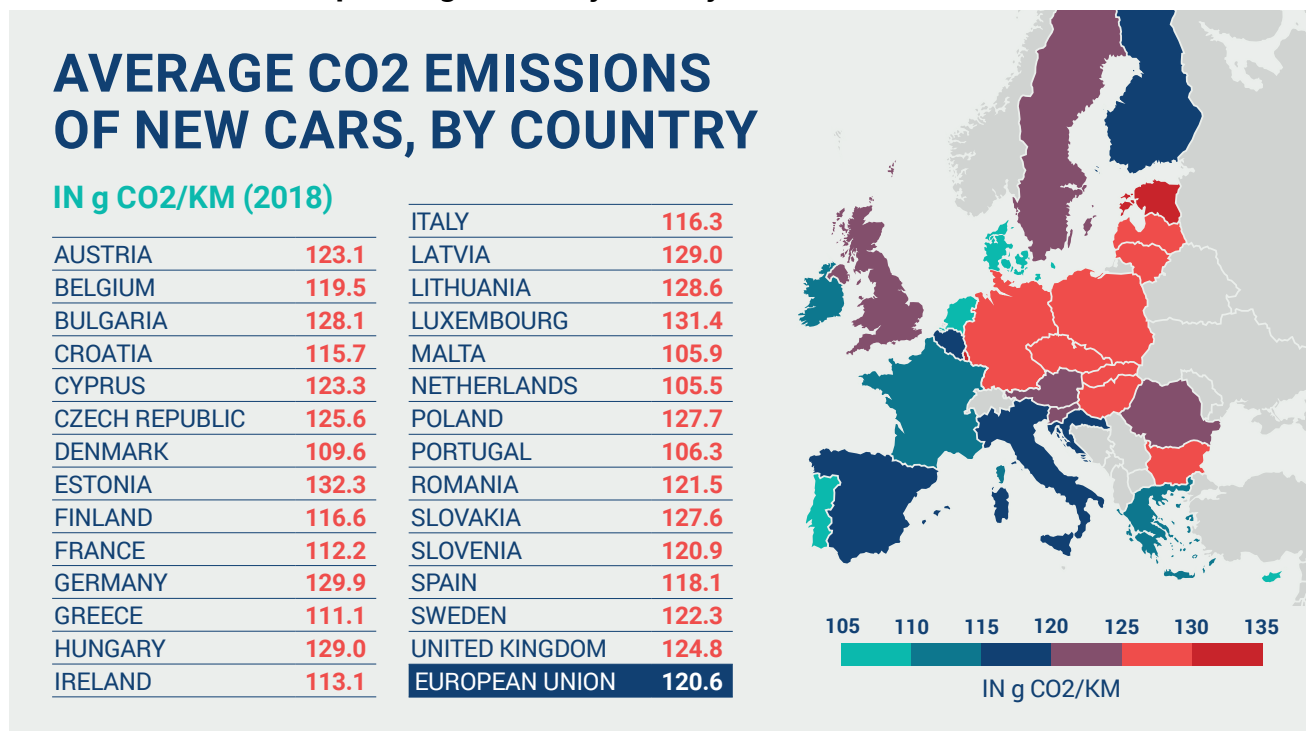
2. CO2 EMISSIONS OF NEW CARS

Trend over time in the EU28 (2007-2018)



Source: EEA, 2018

CO2 emissions of new passenger cars, by country



Source: EEA, 2018

Top 5: HIGHEST new-car CO2 emissions

1. Estonia (132.3g CO2/km)
2. Luxembourg (131.4g CO2/km)
3. Germany (129.9g CO2/km)
4. Hungary (129.0g CO2/km)
5. Latvia (129.0g CO2/km)

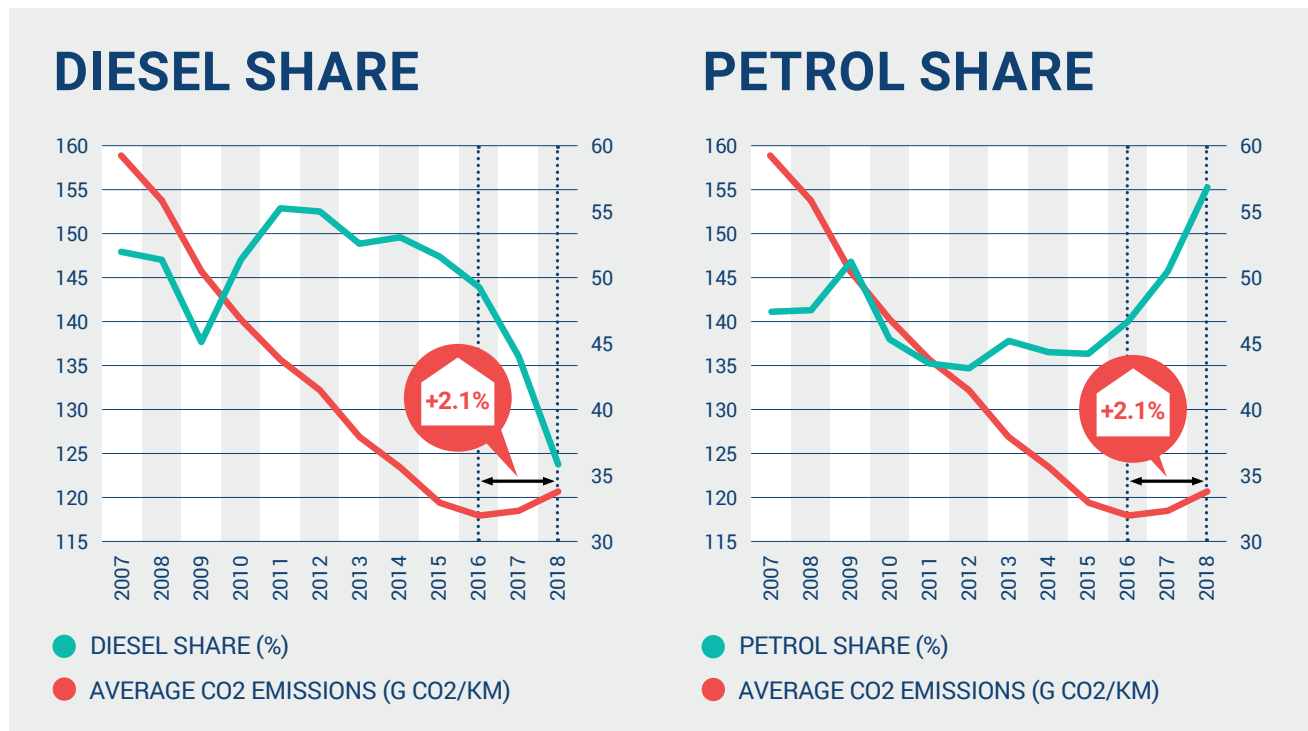
Top 5: LOWEST new-car CO2 emissions

1. Netherlands (105.5g CO2/km)
2. Malta (105.9g CO2/km)
3. Portugal (106.3g CO2/km)
4. Denmark (109.6g CO2/km)
5. Greece (111.1g CO2/km)

KEY FINDINGS

- Between 2007 and 2016, average new-car CO2 emissions recorded a steady decline, dropping from 158 to 118.1g CO2/km. This represents a drop of more than 25% over that decade.
- However, this downward trend reversed for the first time in 2017, when emissions went up slightly by 0.3% (to 118.5g CO2/km).
- 2018 was second year in a row when CO2 emissions grew. This time going up by 1.8%, reaching an EU-wide average of 120.6g CO2/km.
- Estonia has the highest average CO2 emissions from new passenger cars (132.3g CO2/km); the Netherlands has the lowest (105.5g CO2/km).

Correlation: rise in petrol / decline in diesel sales and CO2 emissions



Source: ACEA, EEA, 2018

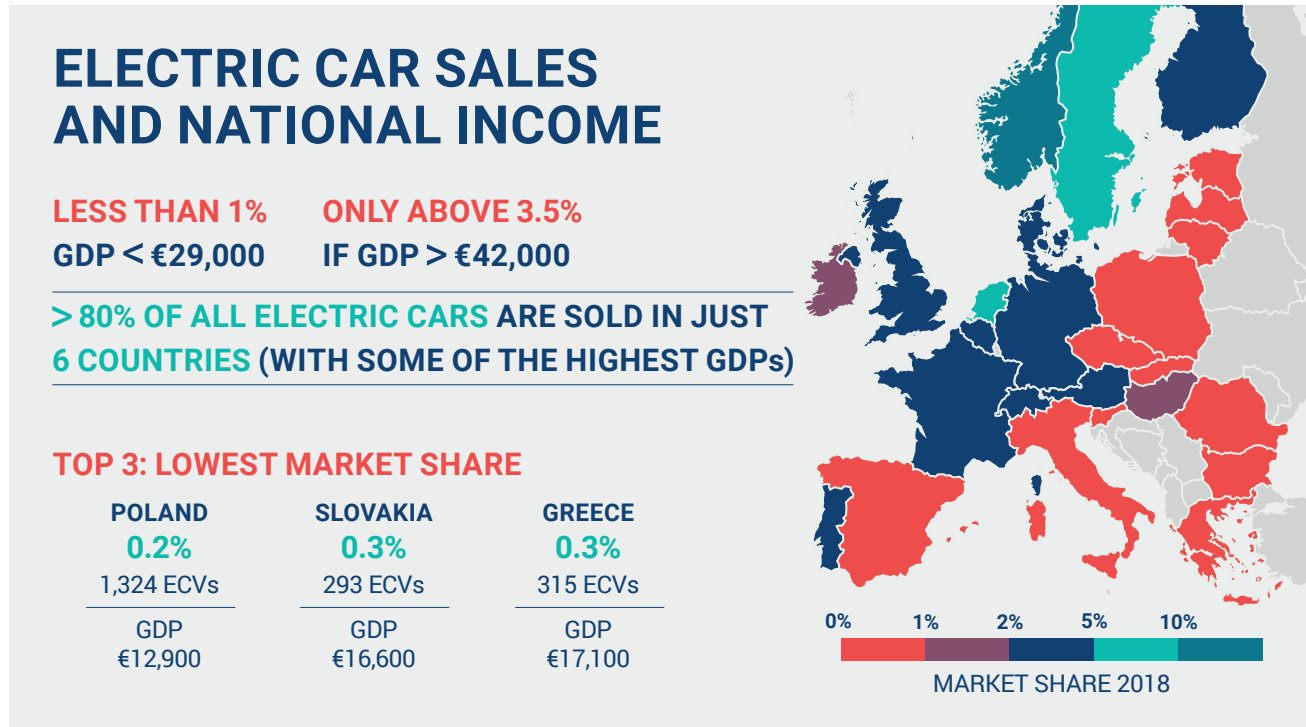
KEY FINDINGS

- There is a clear correlation between diesel/petrol sales and CO2 emissions. This is because petrol cars emit more CO2 than equivalent diesel cars.
- In 2017, petrol vehicles became the most sold car type in the EU for the first time since 2009.
- 2017 also marked the first increase (0.3%) in CO2 emissions from new cars since records began.
- 2018 saw an even bigger drop in diesel sales, and a stronger surge in demand for petrol, than 2017; resulting in a 1.8% increase of new-car CO2 emissions.

3. AFFORDABILITY

NATIONAL INCOME AND ELECTRICALLY-CHARGEABLE CARS

Correlation ECV uptake and gross domestic product (GDP) per capita, by country



'Electric car' = electrically-chargeable vehicles (battery electric vehicles + plug-in hybrid electric vehicles)
 Source: ACEA, full-year 2018

Top 5: Countries with the **LOWEST** ECV market share in the EU (and their GDP), 2018

1. Poland – 0.2% (GDP of €12,900)
2. Slovakia – 0.3% (GDP of €16,600)
3. Greece – 0.3% (GDP of €17,100)
4. Czech Republic – 0.4% (GDP of €20,500)
5. Lithuania – 0.4% (GDP of €15,900)

ECV market share of the 5 biggest EU car markets (and their GDP), 2018

1. Germany – 2.0% (GDP of €41,000)
2. United Kingdom – 2.5% (GDP of €37,600)
3. France – 2.1% (GDP of €36,200)
4. Italy – 0.5% (GDP of €29,000)
5. Spain – 11,810 ECVs (GDP of €26,200)

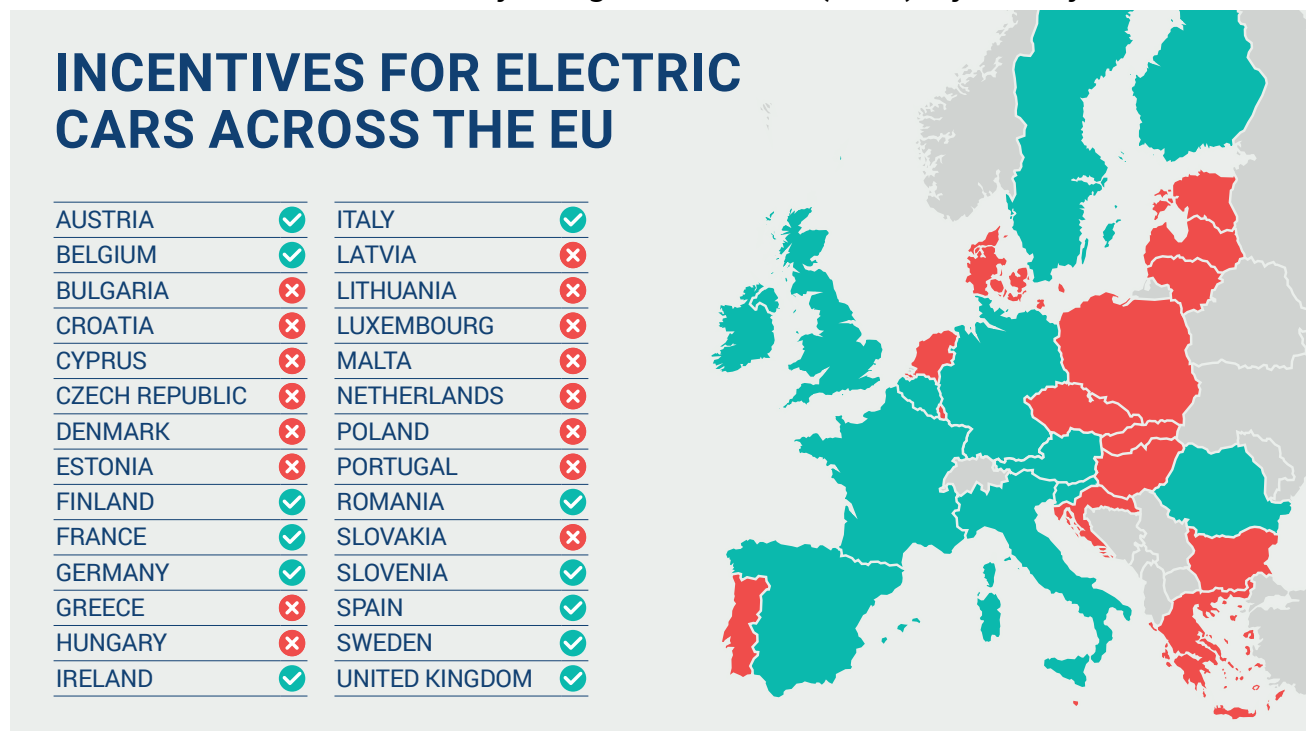
KEY FINDINGS

- The market uptake of electrically-chargeable vehicles is directly correlated to a country's GDP per capita, showing that affordability is a major barrier to consumers.
- 2.0% of new cars registered in the EU in 2018 were electrically-chargeable vehicles (ECVs).
- Half of all EU member states have an ECV market share lower than 1%.

- All countries with an ECV market share of less than 1% have a GDP below €29,000, including EU member states in Central and Eastern Europe, but also Spain, Italy and Greece.
- An ECV market share of above 3.5% only occurs in countries with a GDP per capita of more than €42,000.
- More than 80% of all electric car sales are concentrated in just six Western European countries with some of the highest GDPs.
- At €73,200, Norway's GDP is more than twice the EU average (€30,600). Likewise, its 49.1% ECV market share is an exception in Europe.
- The countries that come second and third, Sweden (8%) and the Netherlands (6.7%), have some of the highest GDPs in the EU (but far lower ECV shares than Norway).
- On the other end of the spectrum, in Latvia only 93 electric cars were sold in 2018.
- And with an ECV share of 0.2%, Poland has the lowest uptake of electric cars in the EU.
- There is a clear split between Central-Eastern and Western Europe, as well as a pronounced North-South divide (eg Greece 0.3% and Italy 0.5%).

CONSUMER PURCHASE INCENTIVES AND UPTAKE OF ECVS

Purchase incentives for electrically-chargeable vehicles (ECVs), by country



'Electric car' = electrically-chargeable vehicles (battery electric vehicles + plug-in hybrid electric vehicles)

Source: ACEA, 2019

Top 10: Countries with the **HIGHEST** ECV purchase incentives

1. Romania (up to €11,500)
2. Slovenia (up to €7,500)
3. France (up to €6,000)

4. Italy (up to €6,000)
5. Sweden (up to SEK 60,000)
6. Spain (up to €5,500)
7. Ireland (up to €5,000)
8. Germany (up to €4,000)
9. Belgium (up to €4,000)
10. United Kingdom (up to £3,500)

KEY FINDINGS

- Purchase incentives for electrically-chargeable vehicles (ECVs), and especially their monetary value, differ greatly across the European Union.
- Only 12 EU countries offer such bonus payments or premiums to buyers of ECVs.
- The majority of EU member states only grant tax reductions or exemptions (related to acquisition and ownership) for electrically-chargeable vehicles.
- A comprehensive overview of these fiscal measures can be [found here](#).
- Some countries merely offer an exemption from the annual circulation tax for electric vehicles, for example.
- Four EU member states still do not offer any tax benefits or incentives for ECVs at all.
- These four countries all have very low market shares of ECVs (ie less than 1%):
 - Croatia (N/A);
 - Estonia (0.5%);
 - Lithuania (0.4%);
 - Poland (0.2%).

4. INFRASTRUCTURE AVAILABILITY



4.1 ELECTRICALLY-CHARGEABLE VEHICLES

Both types of electrically-chargeable vehicles (ECVs) require appropriate charging infrastructure:

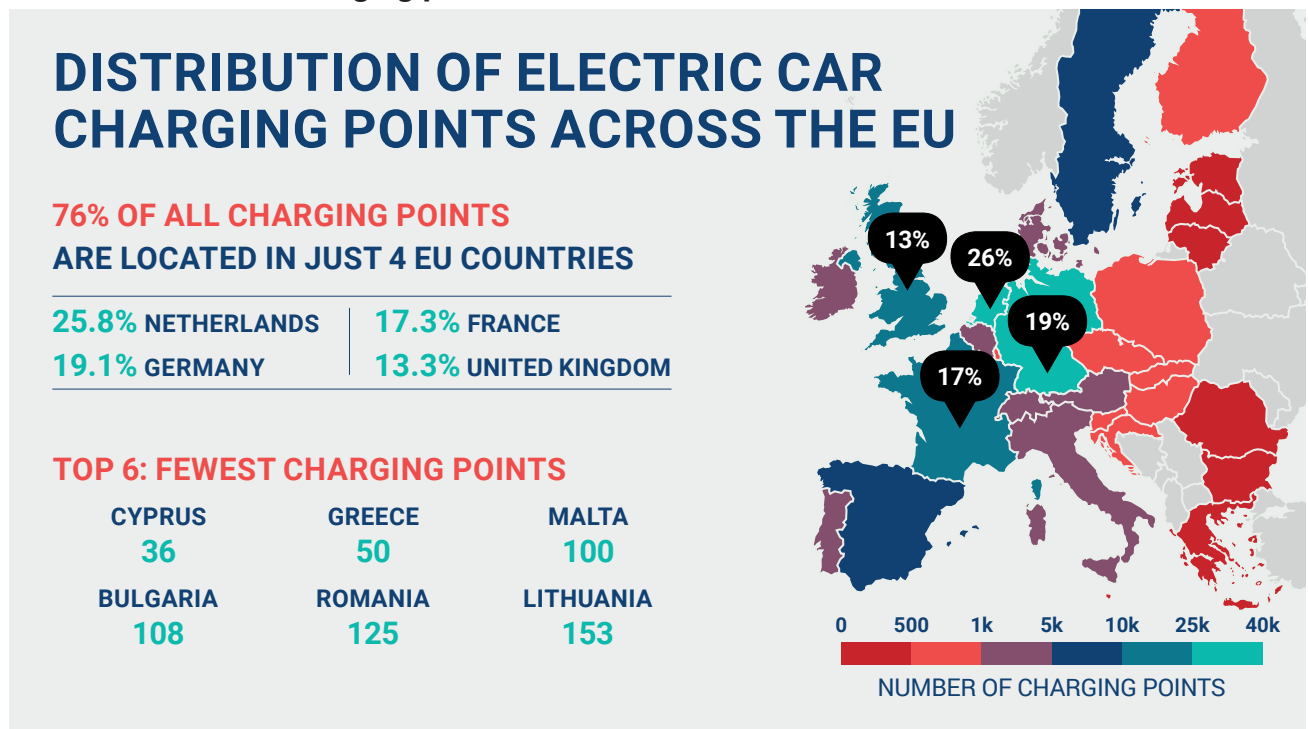
- Battery electric vehicles (BEVs), which are fully powered by an electric motor, need to plug into the electricity grid to charge their on-board battery.
- Plug-in hybrids (PHEVs), which have an electric motor that is complemented by a combustion engine, also need to charge the battery by connecting to the grid.

Charging points for ECVs per country, plus percentage of EU total

| | | | | | |
|----------------|--------|-------|----------------|----------|---------|
| Austria | 4,975 | 3.5% | Italy | 3,562 | 2.5% |
| Belgium | 3,038 | 2.1% | Latvia | 296 | 0.2% |
| Bulgaria | 108 | 0.1% | Lithuania | 153 | 0.1% |
| Croatia | 569 | 0.4% | Luxembourg | 841 | 0.6% |
| Cyprus | 36 | 0.0% | Malta | 100 | 0.1% |
| Czech Republic | 558 | 0.4% | Netherlands | 37,037 | 25.8% |
| Denmark | 2,674 | 1.9% | Poland | 836 | 0.6% |
| Estonia | 395 | 0.3% | Portugal | 1,596 | 1.1% |
| Finland | 927 | 0.6% | Romania | 125 | 0.1% |
| France | 24,850 | 17.3% | Slovakia | 507 | 0.4% |
| Germany | 27,459 | 19.1% | Slovenia | 540 | 0.4% |
| Greece | 50 | 0.0% | Spain | 5,209 | 3.6% |
| Hungary | 595 | 0.4% | Sweden | 6,420 | 4.5% |
| Ireland | 1,057 | 0.7% | United Kingdom | 19,076 | 13.3% |
| | | | | EU total | 143,589 |

Source: EAFO, full-year 2018

Distribution of ECV charging points across the EU



'Electric car' = electrically-chargeable vehicles (battery electric vehicles + plug-in hybrid electric vehicles)

Source: ACEA, EAFO, full-year 2018

Top 5: Countries with MOST ECV points

1. Netherlands (37,037)
2. Germany (27,459)
3. France (24,850)
4. United Kingdom (19,076)
5. Sweden (6,420)

Top 5: Countries with LEAST ECV points

1. Cyprus (36)
2. Greece (50)
3. Malta (100)
4. Bulgaria (108)
5. Romania (125)

Rollout of charging points for ECVs – Trend over time in the EU

| EU total | 2014 | 2015 | 2016 | 2017 | 2018 | % 14/18 |
|---------------------|--------|--------|---------|---------|---------|---------|
| ECV charging points | 34,448 | 59,200 | 119,615 | 126,503 | 143,589 | +316.8% |

Source: EAFO, 2018

KEY FINDINGS

- Although there has been a strong growth in the deployment of ECV infrastructure since 2014 (+317%, but from a low base), the total number of charging points across the entire EU (less than 144,000) falls far short of what is required.
- According to conservative estimates by the European Commission, at least 2.8 million ECV charging points will be needed by 2030. That means there should be roughly a 20-fold increase within the next 12 years.
- Of the 144,000 charging points² available across the European Union today, over 26% are located in the Netherlands (37,037), with another 19% in Germany (27,459), 17% in France (24,850) and 13% in the United Kingdom (19,076).
- The Netherlands – the country with the most infrastructure – has more than 1,000 times more charging points than the country with the least infrastructure (Cyprus, with just 36 charging points).

Correlation ECV infrastructure and surface area, by country

| | % of total EU ECV points | % of total EU area | | % of total EU ECV points | % of total EU area |
|----------------|--------------------------|--------------------|----------------|--------------------------|--------------------|
| Austria | 3.5% | 1.9% | Italy | 2.5% | 6.9% |
| Belgium | 2.1% | 0.7% | Latvia | 0.2% | 1.5% |
| Bulgaria | 0.1% | 2.5% | Lithuania | 0.1% | 1.5% |
| Croatia | 0.4% | 1.3% | Luxembourg | 0.6% | 0.1% |
| Cyprus | 0.0% | 0.2% | Malta | 0.1% | 0.0% |
| Czech Republic | 0.4% | 1.8% | Netherlands | 25.8% | 0.9% |
| Denmark | 1.9% | 1.0% | Poland | 0.6% | 7.1% |
| Estonia | 0.3% | 1.0% | Portugal | 1.1% | 2.1% |
| Finland | 0.7% | 7.7% | Romania | 0.1% | 5.4% |
| France | 17.3% | 12.6% | Slovakia | 0.4% | 1.1% |
| Germany | 19.1% | 8.1% | Slovenia | 0.4% | 0.5% |
| Greece | 0.0% | 3.0% | Spain | 3.6% | 11.5% |
| Hungary | 0.4% | 2.1% | Sweden | 4.5% | 10.3% |
| Ireland | 0.7% | 1.6% | United Kingdom | 13.3% | 5.6% |

Source: ACEA, EAFO, 2018

² Includes all types of charging points, many not suitable for fast charging (eg ordinary, low-capacity power sockets).

Correlation ECV infrastructure and surface area, by country

ELECTRIC CAR CHARGING INFRASTRUCTURE VERSUS AREA, PER COUNTRY

● AREA (% OF EU TOTAL) ● CHARGING POINTS (% OF EU TOTAL)



'Electric car' = electrically-chargeable vehicles (battery electric vehicles + plug-in hybrid electric vehicles)

Source: ACEA, EAFO, 2018

ECV market share / charging points per 100 km of road*, by country

| | ECV share | Charging points per 100 km | | ECV share | Charging points per 100 km |
|----------------|-----------|----------------------------|----------------|-----------|----------------------------|
| Austria | 2.5% | 3.5 | Italy | 0.5% | 1.4 |
| Belgium | 2.4% | 2.0 | Latvia | 0.6% | 0.5 |
| Bulgaria | 0.6% | 0.5 | Lithuania | 0.4% | 0.2 |
| Czech Republic | 0.4% | 0.4 | Netherlands | 6.7% | 28.0 |
| Denmark | 2.1% | 3.6 | Poland | 0.2% | 0.2 |
| Estonia | 0.5% | 0.7 | Portugal | 3.4% | 11.2 |
| Finland | 4.7% | 1.2 | Romania | 0.5% | 0.1 |
| France | 2.1% | 2.3 | Slovakia | 0.3% | 1.1 |
| Germany | 2.0% | 11.9 | Slovenia | 0.9% | 1.4 |
| Greece | 0.3% | 0.0 | Spain | 0.9% | 0.8 |
| Hungary | 1.5% | 0.3 | Sweden | 8.0% | 3.0 |
| Ireland | 1.6% | 1.1 | United Kingdom | 2.5% | 4.5 |

Source: EAFO, Eurostat, ERF, 2018

* Includes motorways, main and national roads, secondary and regional roads.

Top 5: MOST charging points/100km of road

1. Netherlands (28.0)
2. Luxembourg (27.3)
3. Germany (11.9)
4. Portugal (11.2)
5. United Kingdom (4.5)

Top 5: LEAST charging points/100km of road

1. Greece (0.0)
2. Romania (0.1)
3. Lithuania (0.2)
4. Poland (0.2)
5. Cyprus (0.3)

KEY FINDINGS

- Four countries covering 27% of the EU's total surface area – the Netherlands, Germany, France and the UK – account for 76% of all EV charging points in the EU.
- On the other end of the spectrum, a vast country like Romania – roughly six times bigger than the Netherlands – only counts 125 charging points, or 0.1% of the EU total.
- Almost all EU member states with less than 1 charging point per 100 km of road have an ECV market share of under 1%.



4.2 FUEL CELL VEHICLES (HYDROGEN)

Hydrogen (H2) refuelling points per country, plus percentage of EU total

| | | | | | |
|----------------|----|-------|----------------|----|-------|
| Austria | 2 | 4.3% | Italy | 3 | 6.4% |
| Belgium | 2 | 4.3% | Latvia | - | |
| Bulgaria | - | | Lithuania | - | |
| Croatia | - | | Luxembourg | - | |
| Cyprus | - | | Malta | - | |
| Czech Republic | - | | Netherlands | 3 | 6.4% |
| Denmark | 7 | 14.9% | Poland | - | |
| Estonia | - | | Portugal | - | |
| Finland | 1 | 2.1% | Romania | - | |
| France | 3 | 6.4% | Slovakia | - | |
| Germany | 13 | 27.7% | Slovenia | - | |
| Greece | - | | Spain | 3 | 6.4% |
| Hungary | - | | Sweden | 2 | 4.3% |
| Ireland | - | | United Kingdom | 8 | 17.0% |
| | | | EU total | 47 | |

Source: EAFO, full-year 2018

Top 5: Countries with MOST hydrogen points

1. Germany (13)
2. United Kingdom (8)
3. Denmark (7)
4. France (3)
5. Italy (3)

Rollout of hydrogen (H2) refuelling points – Trend over time in the EU

| EU total | 2014 | 2015 | 2016 | 2017 | 2018 | % 16/18 |
|---------------------|------|------|------|------|------|---------|
| H2 filling stations | 0 | 0 | 42 | 47 | 47 | +12.3% |

Source: EAFO, 2018

KEY FINDINGS

- There were just 47 hydrogen filling stations available across 11 EU countries in 2018.
- 17 EU member states did not have a single hydrogen filling station.
- Over 25% of all filling stations for fuel cell cars are located in Germany.



4.3 NATURAL GAS VEHICLES (CNG + LNG)

CNG + LNG refuelling points per country, plus percentage of EU total

| | | | | | |
|----------------|-----|-------|----------------|-------|-------|
| Austria | 161 | 4.8% | Italy | 1,239 | 36.8% |
| Belgium | 101 | 3.0% | Latvia | - | |
| Bulgaria | 102 | 3.0% | Lithuania | 3 | 0.1% |
| Croatia | 2 | 0.1% | Luxembourg | 6 | 0.2% |
| Cyprus | - | | Malta | - | |
| Czech Republic | 174 | 5.2% | Netherlands | 197 | 5.9% |
| Denmark | 17 | 0.5% | Poland | 29 | 0.9% |
| Estonia | 10 | 0.3% | Portugal | 16 | 0.5% |
| Finland | 44 | 1.3% | Romania | 2 | 0.1% |
| France | 81 | 2.4% | Slovakia | 11 | 0.3% |
| Germany | 863 | 25.7% | Slovenia | 6 | 0.2% |
| Greece | 11 | 0.3% | Spain | 78 | 2.3% |
| Hungary | 13 | 0.4% | Sweden | 183 | 5.4% |
| Ireland | - | | United Kingdom | 15 | 0.4% |
| | | | EU total | 3,364 | |

Source: EAFO, full-year 2018

Top 5: Countries with **MOST** CNG/LNG stations

1. Italy (1,239)
2. Germany (863)
3. Netherlands (197)
4. Sweden (183)
5. Czech Republic (174)

Top 5: Countries with **LEAST** CNG/LNG stations

1. Cyprus (0)
2. Ireland (0)
3. Latvia (0)
4. Malta (0)
5. Romania (2)

Rollout of CNG + LNG refuelling points – Trend over time in the EU

| EU total | 2014 | 2015 | 2016 | 2017 | 2018 | % 16/18 |
|--------------------|-------|-------|-------|-------|-------|---------|
| CNG + LNG stations | 2,862 | 3,041 | 3,202 | 3,236 | 3,364 | +17.5% |

Source: EAFO, 2018

KEY FINDINGS

- There are some 3,400 natural gas filling stations in the EU, up 17.5% since 2014.
- Nearly two-thirds of all CNG and LNG filling points in the EU are concentrated in two countries alone: Italy (37%) and Germany (26%).
- Four EU member states do not have a single natural gas filling station (Cyprus, Ireland, Latvia and Malta).



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