

# ACE MOBILITY DASHBOARD

A COMPLETE AND UP-TO-DATE VIEW  
OF THE DUTCH AUTOMOTIVE SECTOR



**ACE**

automotive  
center of  
expertise

*together we create  
the future of mobility*



## PREFACE

# ACE MOBILITY DASHBOARD

The automotive sector is flourishing like never before. This is what the brand new dashboard developed by ACE Mobility clearly shows. There is a lot of information and data available about the industry, but there is not one overview of the complete Dutch automotive industry. This Automotive Dashboard lists current facts and figures on five themes and gives you a complete overview of the Dutch automotive industry.

There is a lot of topical data available in the automotive sector. Independent research parties such as CBS, Bovag and RAI issue a plethora of data. But the way this information is published, is rather fragmentary. So what does the overall picture look like?

### Making connections

The Automotive Centre of Expertise, ACE Mobility wants to make connections between these different publications. 'We collate the facts and figures for each theme and supplement them with our own data.' The themes chosen were sustainability, politics, mobility, economy and human capital: 'Issues that are of concern to the automotive sector in the 2020s.'

### Themes

Apart from sharing facts and figures, ACE Mobility draws conclusions on the themes and places the data

in the right context. 'What do these facts and figures tell us about the current state of the market and projections?'

### Trends

The aim is to update the dashboard annually. 'This will allow us to show trends as from next year. Is employment increasing or decreasing? Will more or fewer electric cars be sold? And what about the number of IP applications by the Dutch automotive sector? These are some of the trends we will be watching'

**We hope you enjoy reading this  
Automotive Dashboard!**

Kind regards,

***Stefan Kraaijvanger and Niels Winter***





OVERVIEW

# A COMPLETE AND UP-TO-DATE VIEW OF AUTOMOTIVE SECTOR

# HUMAN CAPITAL ENOUGH SKILLED PEOPLE AT WORK IN THE AUTOMOTIVE INDUSTRY: THAT'S THE CHALLENGE

## The European Automotive labour market is booming:

The European automotive industry generates an annual turnover of €906 billion and this is 7.5% of the overall added value generated by the European industry.

Therefore, the automotive sector employs 12.7 million people, of which 2.6 million jobs are directly linked to the automotive sector, such as jobs at garages, dealers, leasing companies and so on. In addition, 10.2 million jobs are indirectly linked to the automotive sector, such as manufacturing, suppliers and jobs related to freight transport.

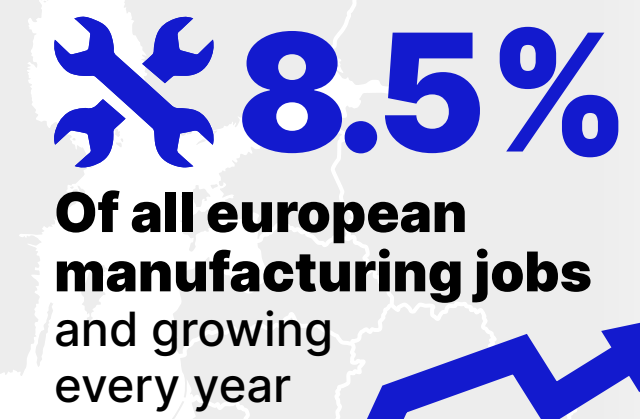
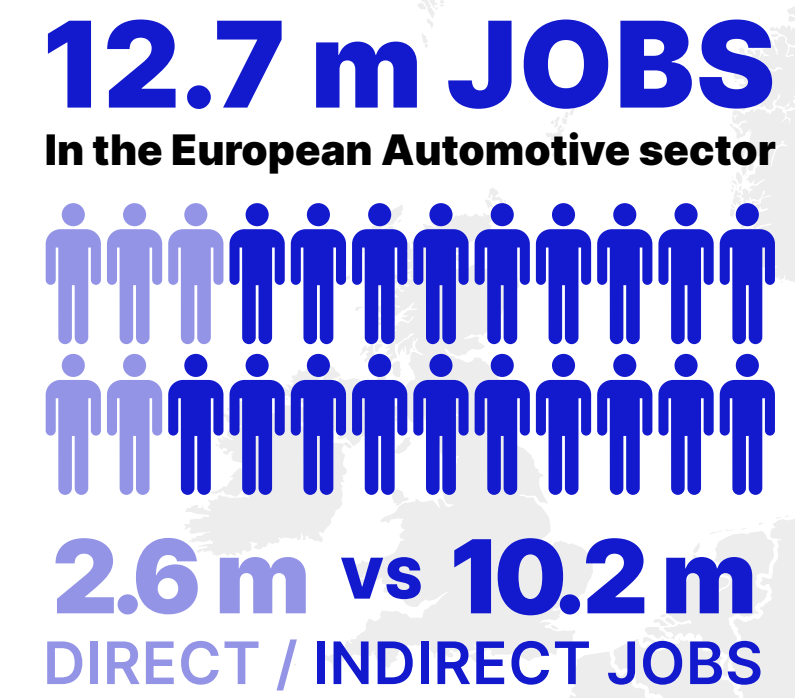
As a result, the European automotive sector is responsible for 8.5% of all manufacturing jobs in Europe; this proportion grew over the period 2015-2020. During that period, the number of jobs in the overall automotive sector increased by 1.1%. The 'Automobile Use' category, which includes sales, maintenance, leasing and rental, accounted for the highest growth in this period, at 2.3%.

## A growing automotive sector means more employees needed

The European automotive industry struggles with a tight labour market: there are more job vacancies than people available. Moreover, the demand for employees in the automotive industry is changing; with innovations like electric and automated driving, the industry is also looking for people with the right knowledge and skills for these new developments. Take for example the implementation of electric vehicles: the European Union states that by 2030, electric cars will have a 40% market share and by 2035, all passenger vehicles will be zero-emission. The Just Transition coalition claims that this transition alone will require retraining and reskilling programmes for 2.4 million employees in Europe. To make sure that current employees have the sufficient knowledge and skills, several retraining programmes are being drawn up at European level. The Automotive Skills Alliance aims to retrain 5% of the total workforce within the sector every year. This concerns 730,000 people in Europe annually. The retraining program is estimated to cost about €10,000 per employee, or €7.3 billion annually in Europe.

**THERE ARE 1.800.000 AUTOMOTIVE COMPANIES IN EUROPE**

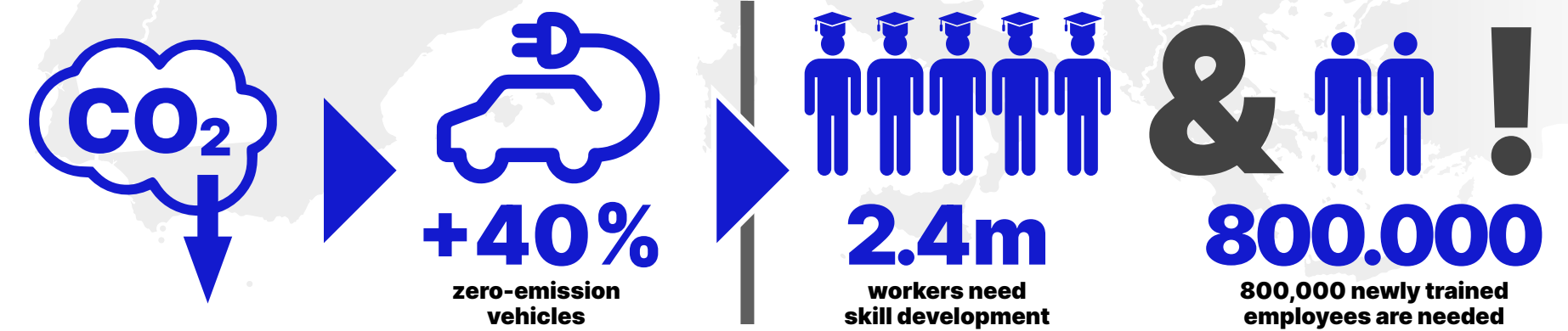
Providing:



Resulting in an added value of:



2030 European policy results in:







# HUMAN CAPITAL ENOUGH SKILLED PEOPLE AT WORK IN THE AUTOMOTIVE INDUSTRY: THAT'S THE CHALLENGE

## Human Capital in the Netherlands

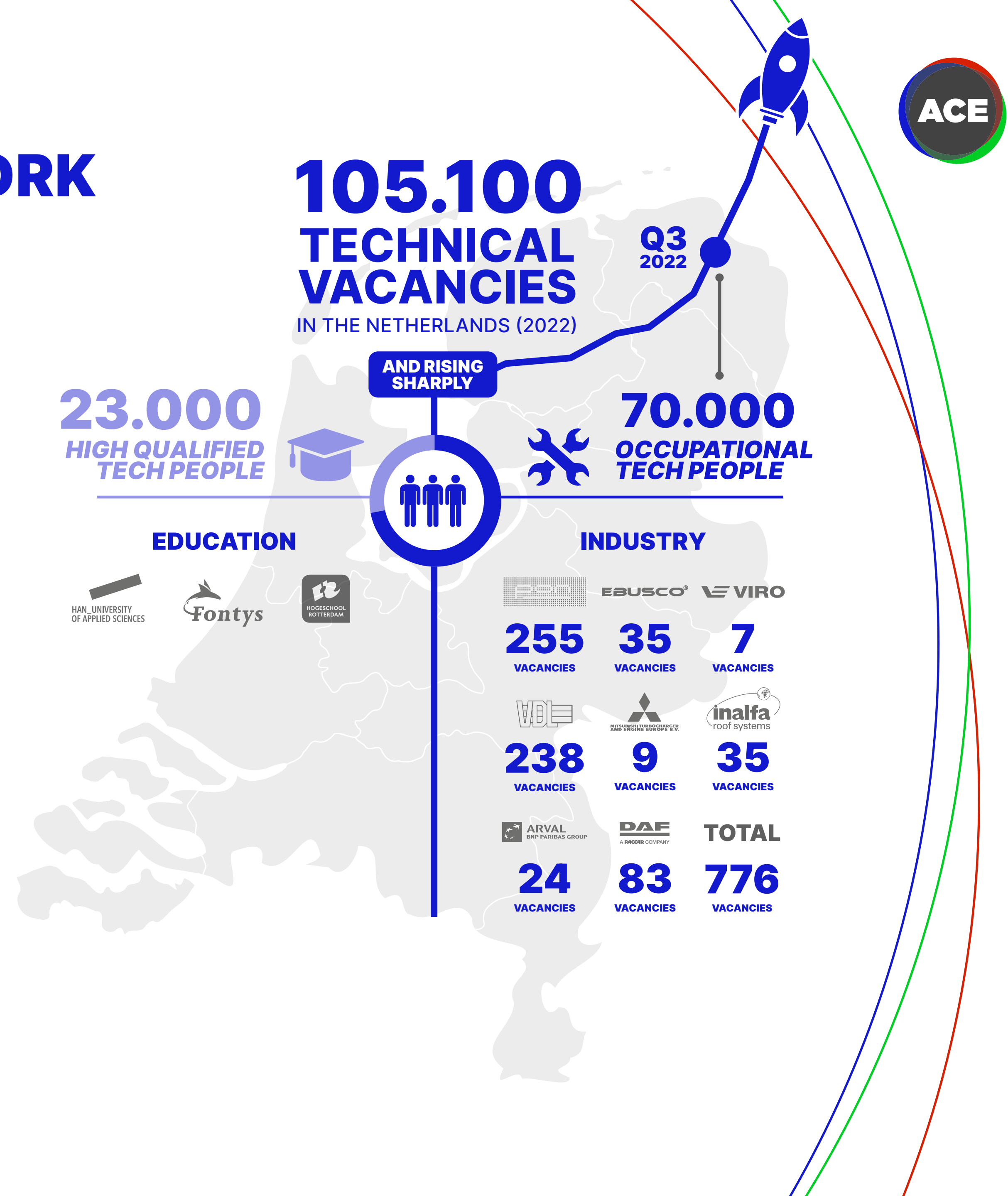
The development of the automotive labour market is also evident for the industry in the Netherlands. In 2021, the technical sector published 105,100 vacancies, of which 70,000 were at professional level 2 and 23,000 vacancies were for higher technical qualifications.

This accounted for over a quarter of open vacancies in the Netherlands (source: UWV). In terms of higher technical qualifications (university of applied sciences and above), vacancies are mainly for engineers and project leaders (source: Fontys labour market study). Regarding the Dutch car and motorcycle sector, the number of vacancies in 2022 is the highest since 1997. The number of vacancies rose strongly from 2020 onwards, eventually reaching a high of 9,800 vacancies within the car and motorbike industry.

Clearly, both in the technical sector and the direct car and motorbike sector, therefore, there is strong demand for new employees. A number of Dutch ACE partners admits that they have a lot of open job

vacancies at the moment. These partners are looking in particular for new employees in Engineering & Manufacturing, followed by employees in commerce and management. Moreover, among these 8 partners, there are already 776 vacancies available in 2022 Q3. This is a challenge faced by many companies in the automotive sector.

Furthermore, retraining engineers to keep up with innovation, is very important for the Dutch automotive sector: €29.5 million is being spent on retraining car mechanics every year to keep up with new developments. This does not include other technical staff in the Dutch automotive industry, which means that retraining programmes for the Dutch automotive sector will be very important. Realising a Dutch Human Capital Action Agenda can be a step towards a national automotive learning community, where the industry and knowledge institutions strive for retraining the employees of the Dutch automotive sector.







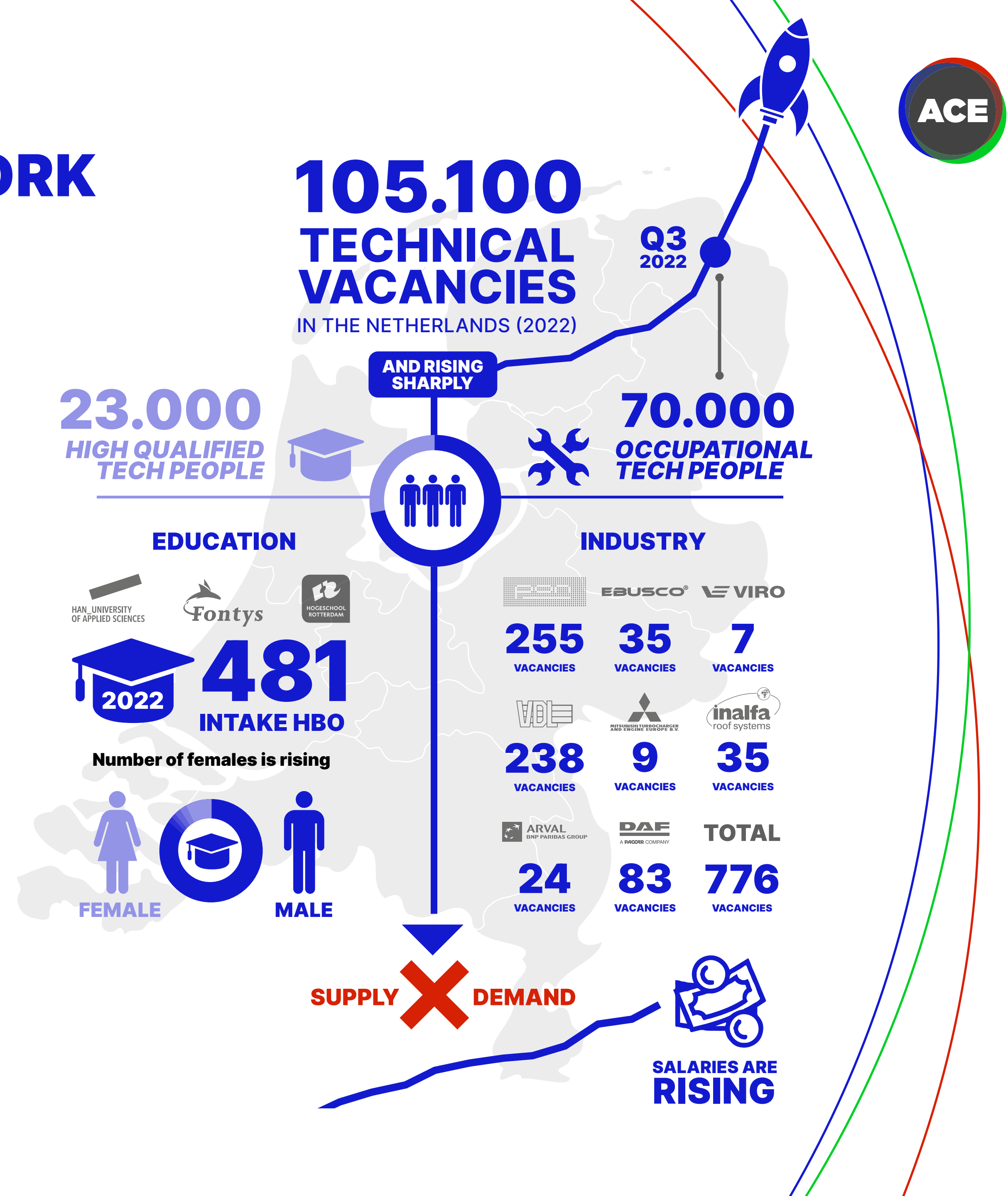
# HUMAN CAPITAL ENOUGH SKILLED PEOPLE AT WORK IN THE AUTOMOTIVE INDUSTRY: THAT'S THE CHALLENGE

## More students and more salary for young professionals

Not only a number of challenges occur, but there are also some positive trends going on in the automotive sector. There is an influx of new employees coming from the automotive engineering courses of three universities of applied sciences in the Netherlands: Hogeschool Arnhem en Nijmegen, Fontys Hogescholen and Hogeschool Rotterdam. The intake of automotive engineering students has been increasing over the past 10 years, with Fontys in particular rising fast, while HAN has performed consistently over a 10-year period. For some years now, the Netherlands can also count on a new influx of students being trained as business administrators in the automotive sector. This group of students will fill the vacancies in the field of commerce and management in the industry.

The Automotive and Mobility programme also has the highest ratio of female students. This is a positive development, as efforts have been made for many years to include female employees in the automotive sector. In other programmes, both at university of applied sciences and university level, the ratio of women remains very low at between 3-6%.

The steady growth in the number of automotive students could possibly have a direct relationship with the salary of future automotive engineers. An overview shows the development of salary of university of applied sciences Automotive Engineering students over the next 16 years, who are currently starting the program. From the moment they enter the workforce, expected in 2026, their salaries will increase by €900 in 10 years. Also, the salary of an automotive engineer has been above the modal salary from the start.





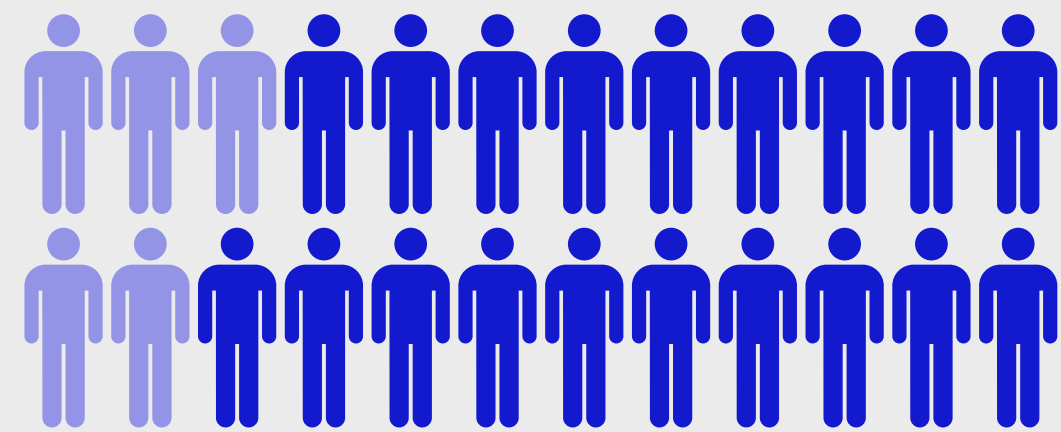


# 12.7 MILLION JOBS IN THE EUROPEAN AUTOMOTIVE INDUSTRY

The European Automotive industry accounts for 12.7 million direct and indirect jobs (2019). Striking: Automotive (pre-covid) still fastest growth in automobile use.

Source: ACEA Pocket Guide 2022

## 12.7 MILLION JOBS



### 2.6 m vs 10.2 m DIRECT / INDIRECT JOBS

TYPE	NUMBER OF JOBS
<b>Total jobs Automotive Europe</b>	12.700.000
<b>Direct jobs</b>	2.600.000
<b>Indirect jobs</b>	10.200.000

## 12.7 MILLION JOBS

3.5 m manufacturing jobs

DIRECT MANUFACTURING	2,556
Motor vehicles	1,124
Bodies (coachwork), trailers and semi-trailers	161
Parts and accessories	1,270

INDIRECT MANUFACTURING	920
Rubber tyres and tubes, retreading and rebuilding of rubber tyres	129
Computers and peripheral equipment	53
Electric motors, generators and transformers	249
Bearings, gears, gearing and driving elements	237
Cooling and ventilation equipment	252

9.2 m non-manufacturing jobs

AUTOMOBILE USE	4,041
Sale of motor vehicles	1,443
Maintenance and repair of motor vehicles	1,375
Sale of motor vehicle parts and accessories	637
Retail sale of automotive fuel in specialised stores	407
Renting and leasing of motor vehicles	178

TRANSPORT	4,536
Other passenger land transport	1,325
Freight transport by road	3,211

CONSTRUCTION	660
Roads and motorways	620
Bridges and tunnels	40






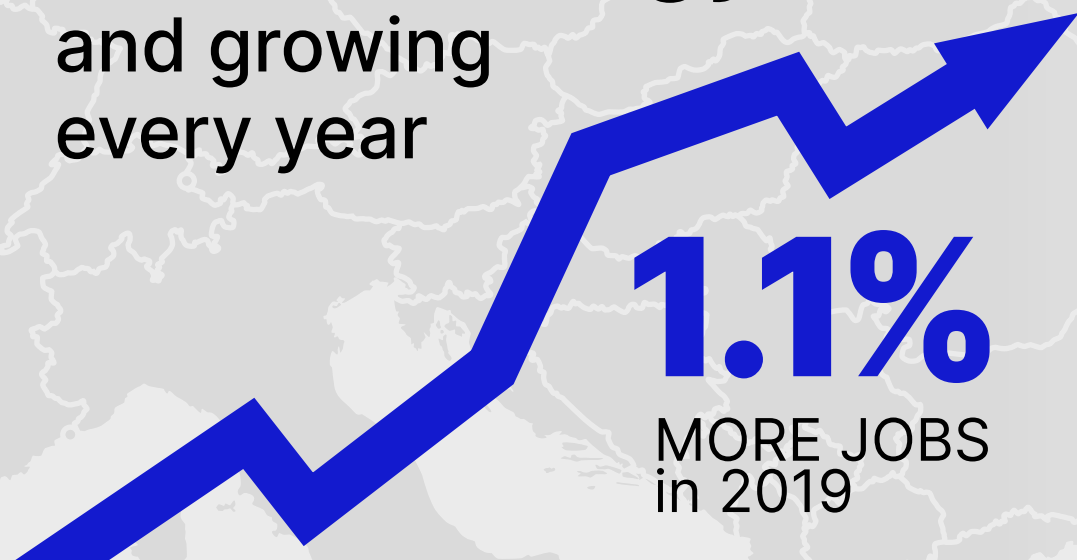
# THE AUTOMOTIVE INDUSTRY IS DIRECTLY RESPONSIBLE FOR 8.5% OF ALL EUROPEAN MANUFACTURING JOBS.

Source: ACEA Pocket Guide 2022

	2015	2016	2017	2018	2019	DIFFERENCE (%) 2018/2019
<b>Direct manufacturing</b>	2.282.219	2.325.011	2.440.720	2.571.359	2.555.502	-0,62
<b>Indirect manufacturing</b>	829.749	823.201	878.774	908.747	919.829	1,2
<b>Automobile use</b>	3.668.769	3.789.494	3.888.807	3.947.518	4.040.957	2,3
<b>Transport</b>	3.715.235	4.136.627	4.341.044	4.483.090	4.535.599	1,2
<b>Construction</b>	610.684	578.368	633.423	665.863	660.240	-0,9
<b>Total</b>	11.106.656	11.652.701	12.182.768	12.576.577	12.712.127	1,1

 **8.5%**

**Of all european manufacturing jobs and growing every year**





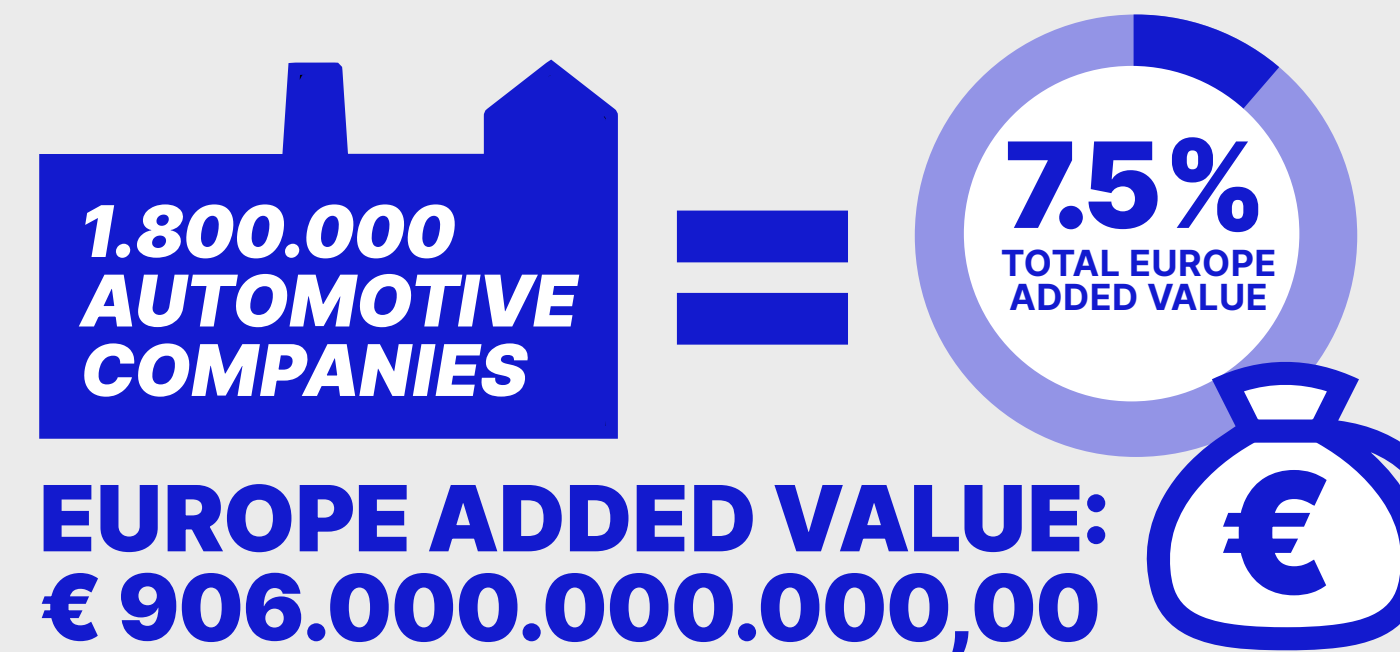
# AUTOMOTIVE INDUSTRY IS RESPONSIBLE FOR 7.5% OF THE TOTAL ADDED VALUE IN EUROPE

Currently around 15 million people work in automotive industrial value chain (automotive, rail and shipping) and within the Automotive industry in Europe. The ambition of The Automotive Skills Alliance is to enable 5% of people employed in the automotive sector to up-skill/re-skill every year, in order to tackle the industrial transition within the automotive ecosystem.

[Source: Automotive Skills Alliance 2021](#)

<b>TOTAL NUMBER OF EMPLOYEES 2021</b>	<b>14.600.000</b>
<b>Annual staff retraining</b>	5%
<b>Staff retrained per year</b>	730000
<b>Estimated cost per employee</b>	€ 10.000,00
<b>Total cost per year Europe</b>	€ 7.300.000.000,00
<b>Number of mechanics Netherlands</b>	59.000
<b>Annual retraining</b>	5%
<b>Cost of retraining mechanics</b>	€ 29.500.000,00

[Source: UWV 2020](#)



<b>EUROPE ADDED VALUE</b>	<b>€ 906.000.000.000,00</b>
<b>Added value of total Europe</b>	7.5%
<b>Number of companies Europe</b>	1.800.000

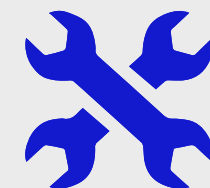


# VACANCIES IN THE NETHERLANDS

Source: Fontys labourmarket study 2022

	2021
Total number of technical vacancies Netherlands	105.100
Of which at occupational level 2	70.000
Higher qualified tech people	23.000

**23.000**  
HIGH QUALIFIED  
TECH PEOPLE



**70.000**  
OCCUPATIONAL  
TECH PEOPLE

**105.100**  
**TECHNICAL  
VACANCIES**  
IN THE NETHERLANDS (2022)

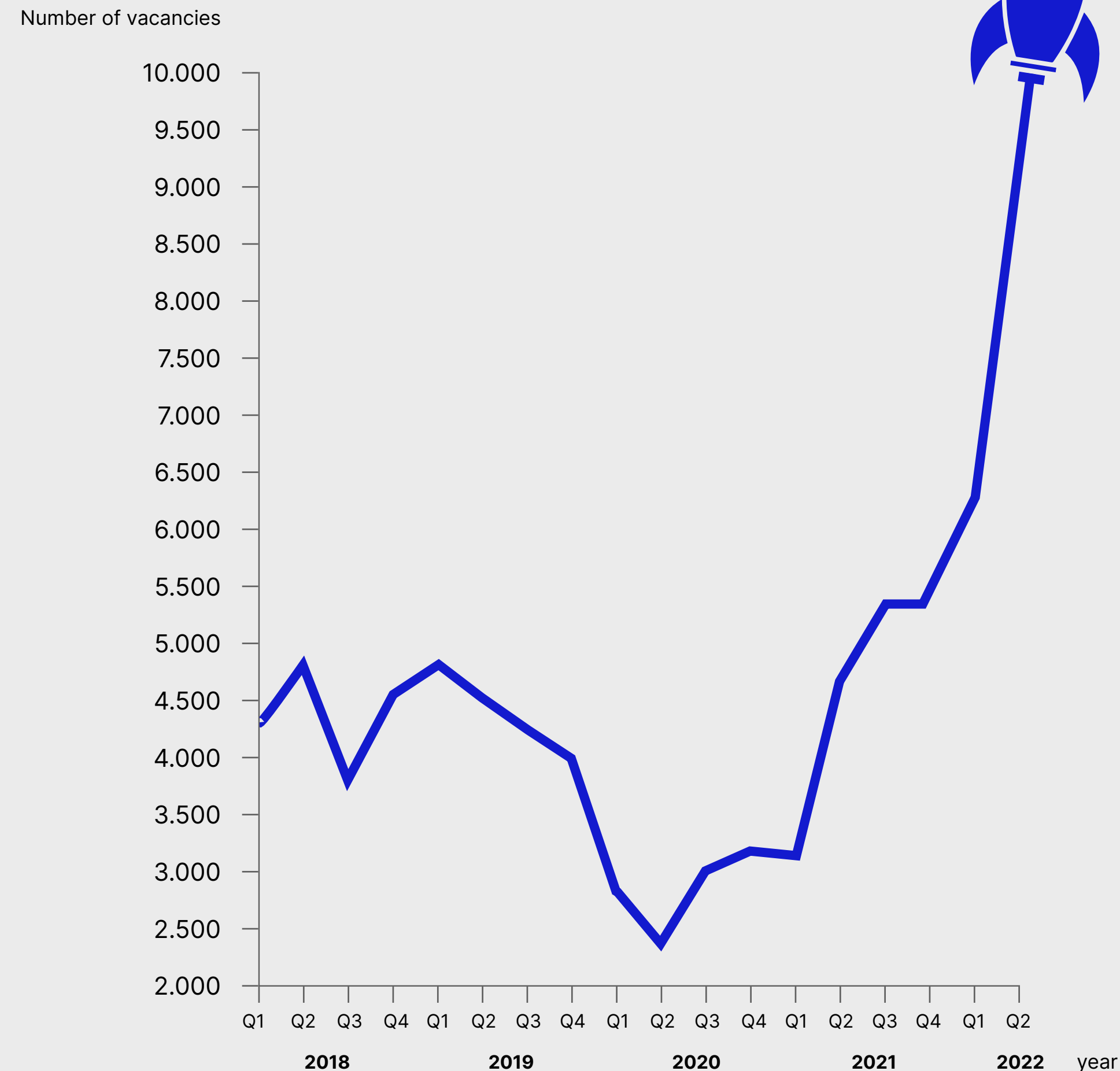




# STAFF SHORTAGE IN AUTOMOTIVE SECTOR UP SHARPLY

The number of vacancies in the car and motorbike sector soared: highest number since 1997. After 2020. sharp rise in number of vacancies.

QUARTER	NUMBER OF VACANCIES
2018 Q1	4.300
2018 Q2	4.900
2018 Q3	3.900
2018 Q4	4.600
2019 Q1	4.800
2019 Q2	4.600
2019 Q3	4.300
2019 Q4	4.000
2020 Q1	2.800
2020 Q2	2.300
2020 Q3	3.000
2020 Q4	3.200
2021 Q1	3.100
2021 Q2	4.600
2021 Q3	5.300
2021 Q4	5.300
2022 Q1	6.200
2022 Q2	9.800



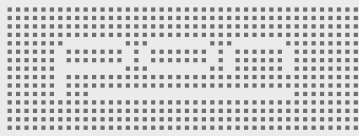
Source: CBS 2022





# VACANCIES AT ACE PARTNERS 2022 Q3

PARTNER	ENGINEERING & MANUFACTURING	COMMERCIAL/ MANAGEMENT	DIGITAL, TECHNOLOGY & DATA	MARKETING & COMMUNICATION	INTERNSHIP/ GRADUATION	MANUFACTURE	TOTAL
PON	130	63	38	15	8	1	255
Ebusco	22	7	3	3	0	0	35
VIRO	7	0	0	0	0	0	7
VDL	174	85	35	0	4	30	328
MTEE	8	1	0	0	0	0	9
Inalfa	8	0	0	0	6	21	35
ARVAL	0	12	4	3	5	0	24
DAF	39	0	7	13	24	0	83
<b>Total</b>	<b>388</b>	<b>168</b>	<b>87</b>	<b>34</b>	<b>47</b>	<b>52</b>	<b>776</b>



**255**  
VACANCIES



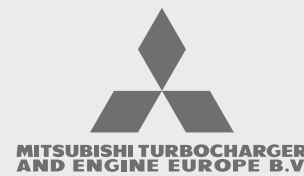
**35**  
VACANCIES



**7**  
VACANCIES



**238**  
VACANCIES



**9**  
VACANCIES



**35**  
VACANCIES



**24**  
VACANCIES



**83**  
VACANCIES

**TOTAL**

**776**  
VACANCIES

Source: [website pages companies 2022](#)





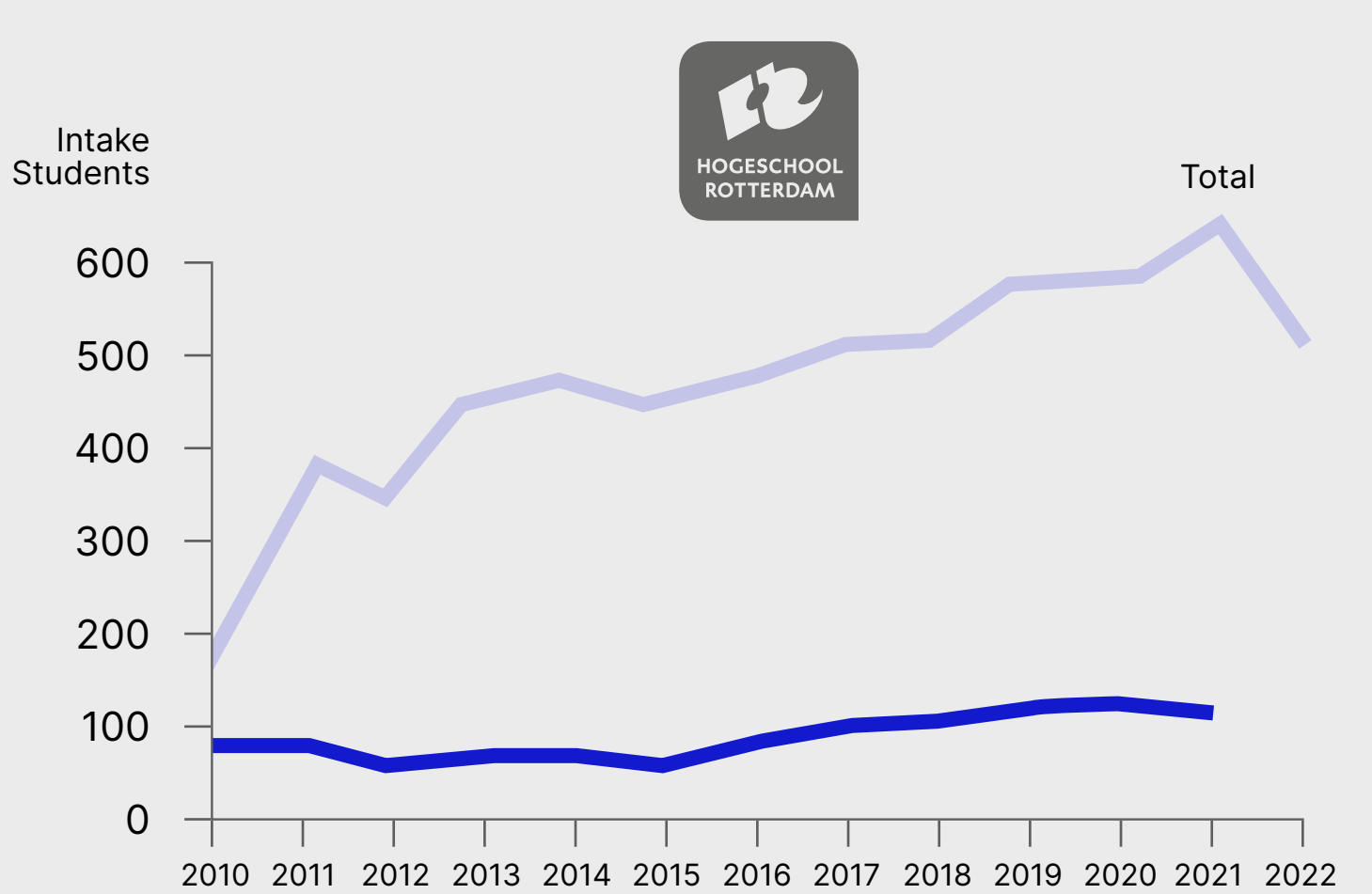
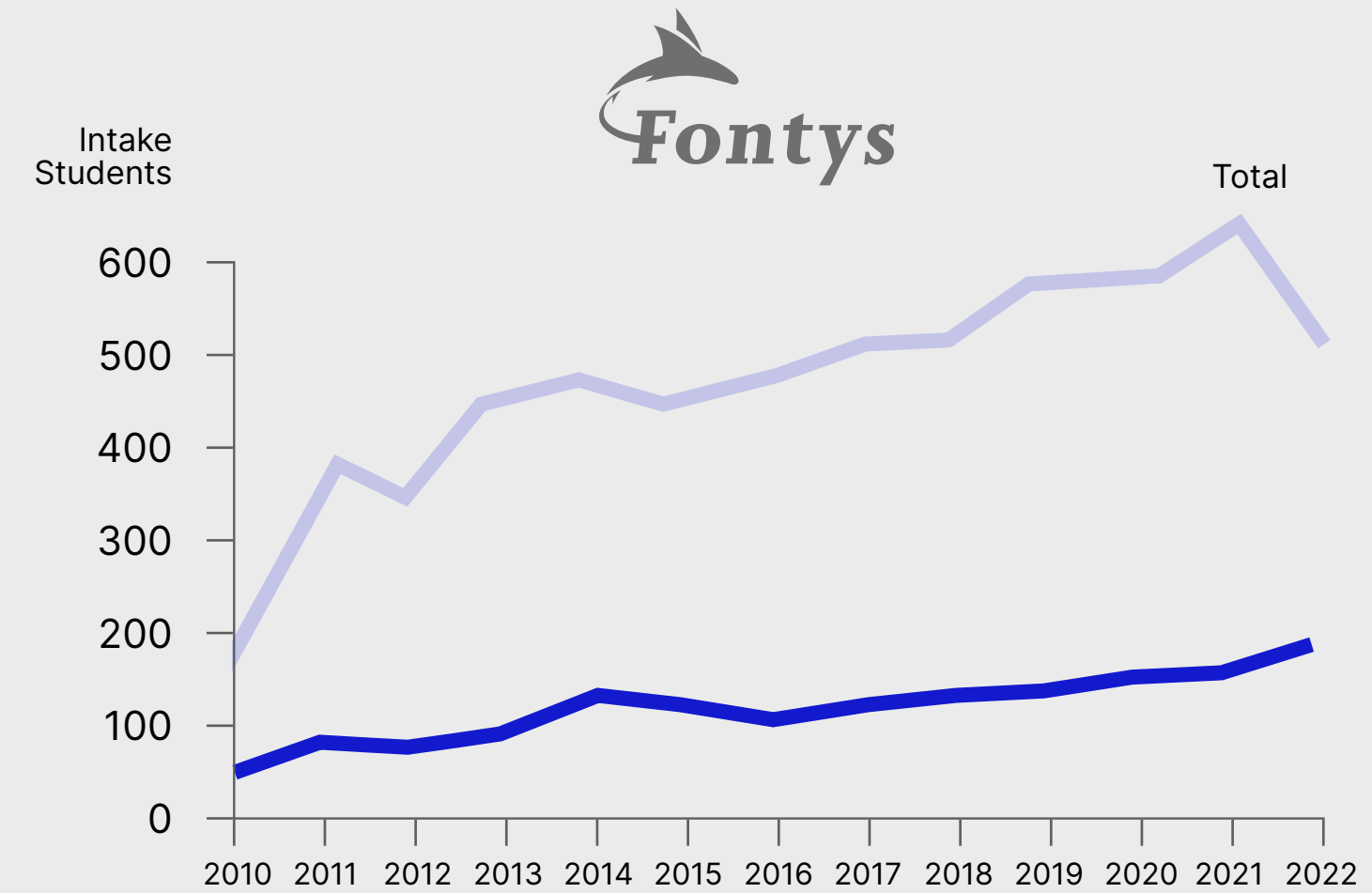
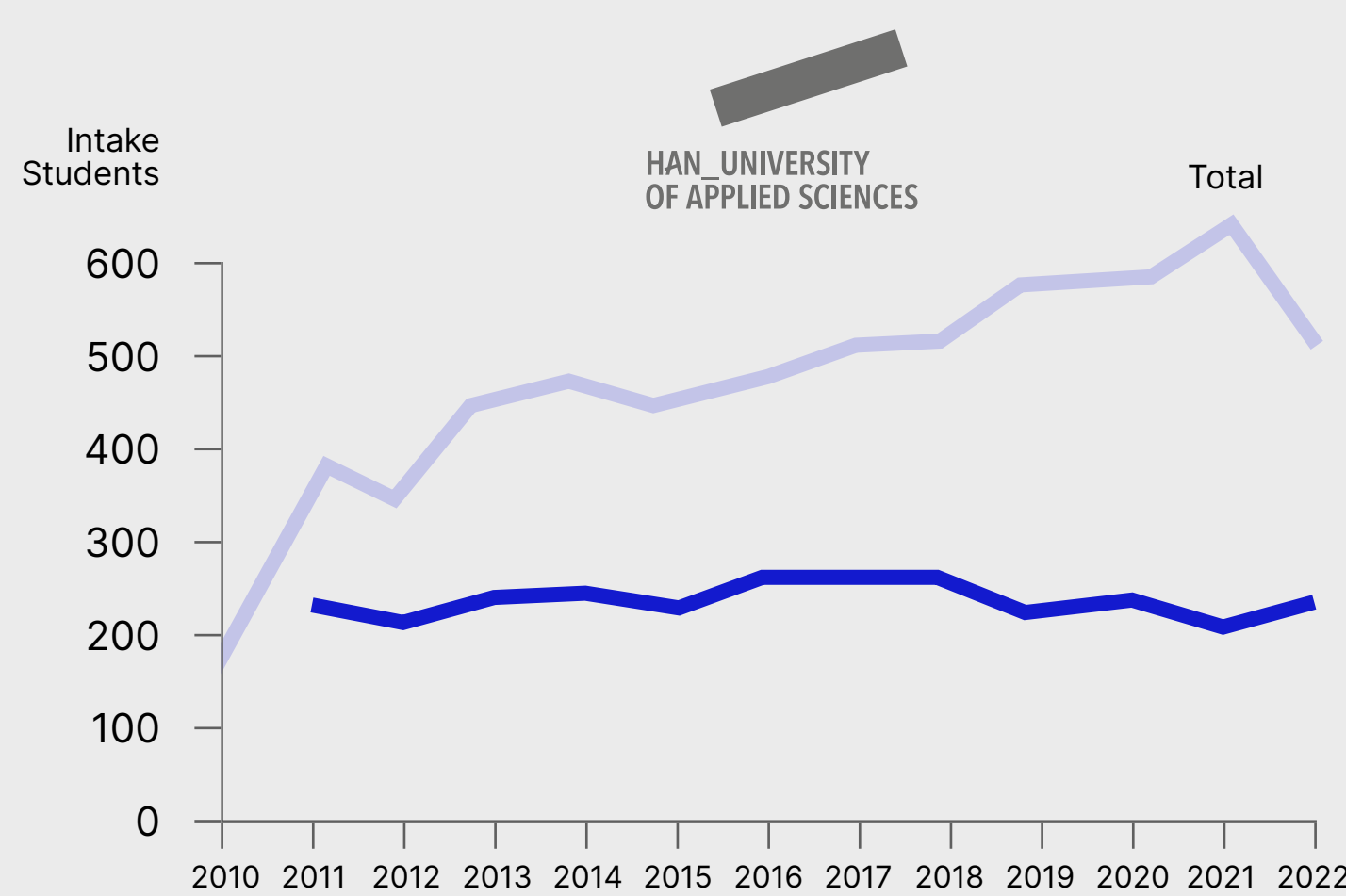
# INTAKE HBO 2010-2021 (FULL-TIME)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>HAN</b>		231	214	257	265	244	262	267	262	227	231	214	249
<b>Fontys</b>	66	80	77	95	121	116	101	112	120	139	137	177	203
<b>Hogeschool Rotterdam</b>	84	81	63	87	86	81	98	110	118	124	133	110	
<b>Automotive &amp; Mobility Management</b>										57	59	70	29
<b>Total</b>	<b>150</b>	<b>392</b>	<b>354</b>	<b>439</b>	<b>472</b>	<b>441</b>	<b>461</b>	<b>489</b>	<b>500</b>	<b>547</b>	<b>560</b>	<b>571</b>	<b>481</b>



# 481

INTAKE HBO



Source: Han University of Applied Sciences and Fontys Hogescholen 2022

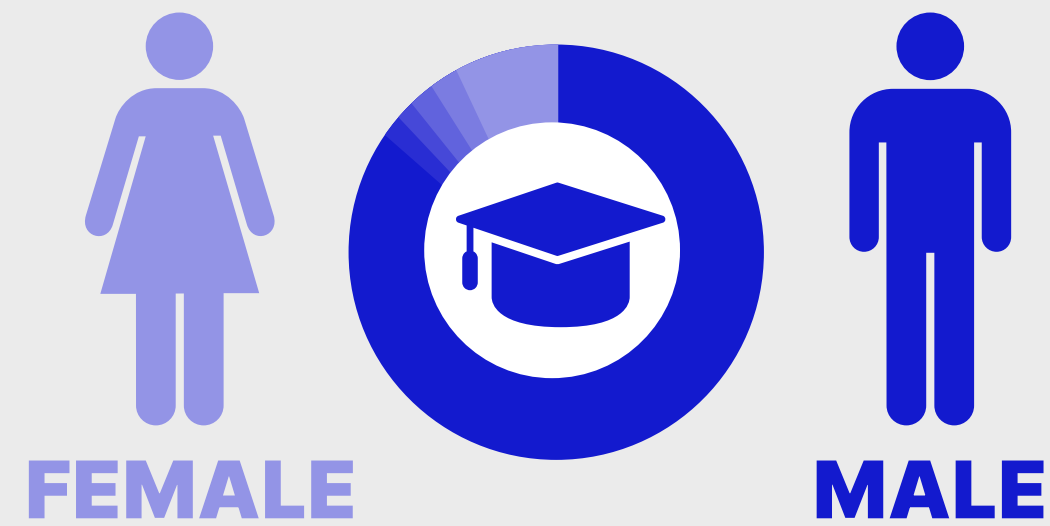


# MALE / FEMALE RATIO 2021 PROGRAMMES

	MALE	FEMALE
TU/e Automotive Technology Master	96%	4%
HAN Automotive Bachelor	96%	4%
HR Automotive Bachelor	97%	3%
Fontys Automotive Bachelor	94%	6%
Fontys Automotive & Mobility	85%	15%

[Source: Studiekeuze.nl 2022](https://www.studiekeuze.nl)

## NUMBER OF FEMALES IS RISING



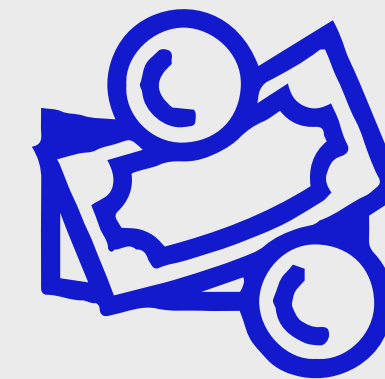
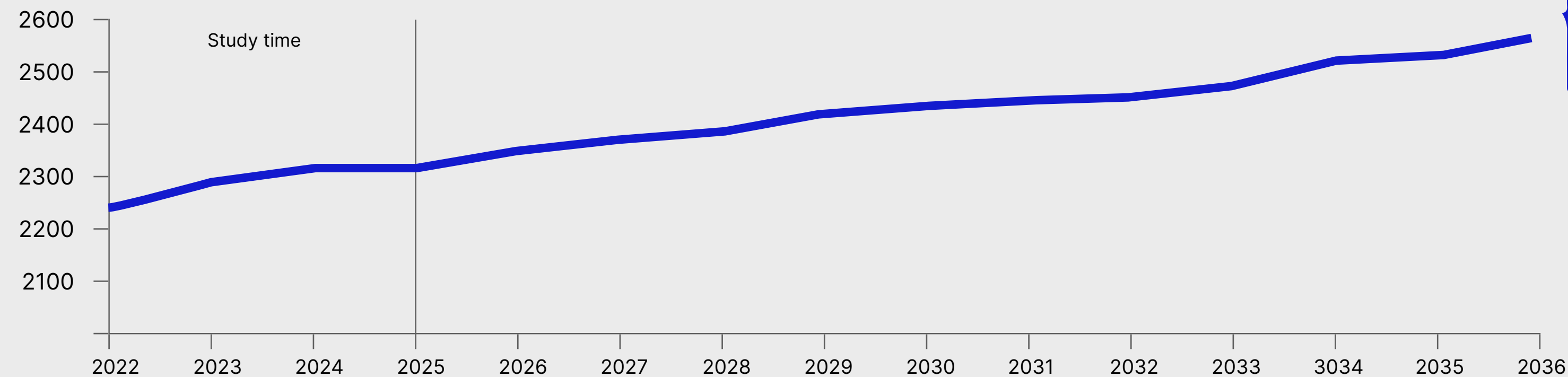
# STARTING SALARY AND SALARY DEVELOPMENT AUTOMOTIVE ENGINEERING (HBO BACHELOR)

SALARY (€)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
<b>Low</b>					2.015,00	2.084,00	2.157,00	2.232,00	2.310,00	2.383,00	2.469,00	2.538,00	2.622,00	2.710,00	2.801,00
<b>Average</b>					2.229,00	2.313,00	2.393,00	2.477,00	2.565,00	2.657,00	2.755,00	2.857,00	2.965,00	3.079,00	3.197,00
<b>High</b>					2.452,00	2.546,00	2.646,00	2.751,00	2.862,00	2.979,00	3.103,00	3.233,00	3.372,00	3.519,00	3.674,00
<b>Modal salary</b>	2.267,00	2.290,00	2.311,00	2.331,00	2.351,00	2.370,00	2.390,00	2.410,00	2.430,00	2.449,00	2.469,00	2.488,00	2.508,00	2.528,00	2.547,00
<b>Minimum wage</b>	1.584,00	1.613,00	1.642,00	1.666,00	1.687,00	1.709,00	1.731,00	1.754,00	1.777,00	1.801,00	1.825,00	1.849,00	1.874,00	1.900,00	1.927,00

Study time

Source: opleiding.com 2022

Modal salary (€)



## SALARY RISES



# BY 2030 NEWLY TRAINED EMPLOYEES ARE NEEDED FOR EUROPE'S ELECTRIC MOBILITY AMBITIONS

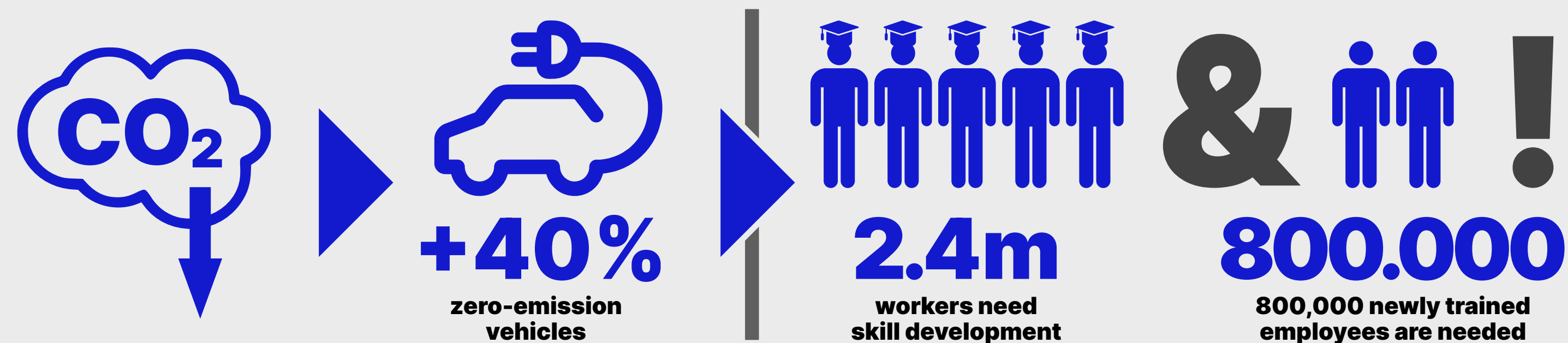
By 2030, a market share of more than 40% zero-emission vehicles (compared to 6% in 2020) is projected to meet the proposed revised CO2 emissions standards for cars. The transition of the automotive sector towards zero-emission and digital mobility is already significantly impacting around 15 million Europeans employed, directly and indirectly, in the automotive value chain. At the same time, automotive is struggling to attract and recruit qualified people, notably young people and women, for new and emerging jobs.

Recent research among passenger car production for EVs concluded that the transition in the passenger car segment alone requires retraining + skills development among 2.4 million workers in Europe. In addition, the European Battery Alliance argues that 800,000 newly trained employees are needed for Europe's electric mobility ambitions. [Source: JT Coalition 2021](#)

Cars account for about 20% of Europe's current CO2 emissions. Achieving the climate goals of the Paris Agreement and the European Green Deal will require the transformation of the automotive industry. [Source: JT Coalition 2021](#)

Today there are almost 14 million jobs in this sector in the EU. This makes it a key industry for the EU as a whole, and particularly in Central and Eastern Europe. The described changes threaten jobs and the current role of the sector. [Source: JT Coalition 2021](#)

## 2030 EUROPEAN POLICY RESULTS IN:



MOBILITY

# WE ARE TRAVELLING MORE AND MORE KILOMETRES ON DUTCH MOTORWAYS

There has been a marked increase in the number of kilometres travelled on Dutch motorways. In 2021, congestion rose by almost 20% to 28.4 million hours of travel time lost, even though many of the COVID-measures were still in place. The first reports of 2022 already show that traffic congestion is increasing significantly.

Remarkably, busy traffic conditions persist also outside rush hours. This can be explained by the mix of working from home and in the office, allowing people more flexible work starts. The cause of the vast majority of traffic jams is high traffic volume (61.4%), followed by accidents at 19.1%.

Also, the number of passenger cars in the Netherlands has increased by over 360,000 cars to 8.9 million cars since 2019. The 2019 record (70.9 million hours of driving time lost) is therefore expected to be surpassed in 2022.

Not only congestion increasing, the number of road victims is also rising rapidly. Indeed, the second quarter of 2022 saw more victims than ever before in the second quarter. And the first three quarters of 2022 showed an almost 25% increase year-on-year. According to the Dutch Traffic Safety Association, 95% of all traffic accidents are caused by human error.



2021 **+20%**  
**28.4 m\***  
**HOURS OF CONGESTION**

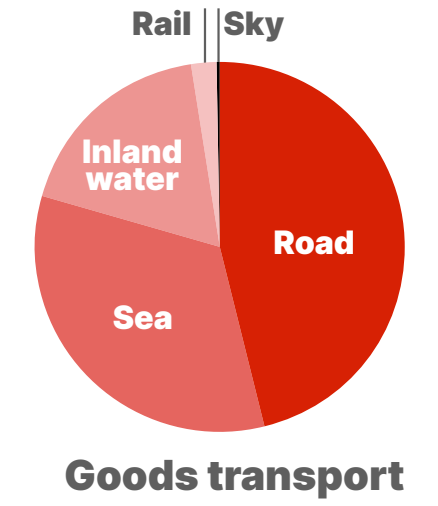
*\*expected 70.9 m hours in 2022*

**REASONS:**

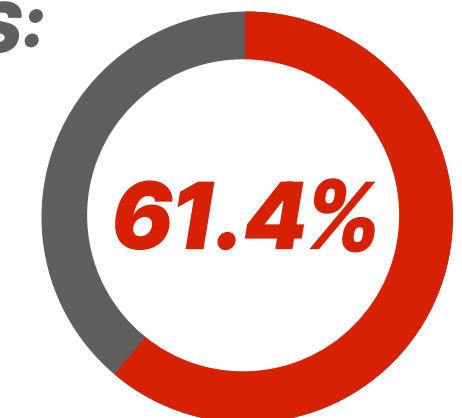
**+360.000 CARS**  
 to 8.9 million cars

**≤15% SWITCH**  
 to public transport

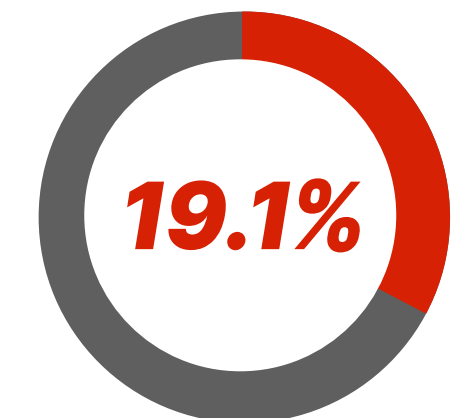
**773 BILLION TON GOODS**  
 Transported by road



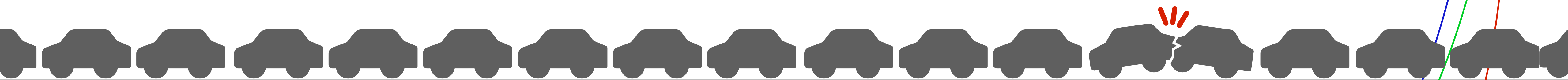
**CAUSES:**



**Of congestion is caused by regular rush hour traffic**



**Of congestion is caused by accidents**







# MOBILITY NETHERLANDS AS A MOBILITY COUNTRY

## Public transport

Where travel time losses due to significant congestion are only increasing, we are not yet really seeing commutes switching to public transport. Half of all commuter kilometres are travelled in passenger cars. On top of this, almost 20% are travelled as passengers. Train, bus, tram and metro together account for less than 15% of passenger kilometres.

## Fuel/energy carriers

There is no longer a price difference between petrol and diesel gasoline. Diesel is sometimes even more expensive. This also impacts the Dutch car fleet. Diesel cars numbers (1.08 million in 2021) have been declining since 2018 and this trend will only accelerate in the years ahead. By contrast, petrol cars numbers (7.06 million in 2021) are rising steadily, but the fastest rise is still the electric car (0.53 million in 2021).

## Goods transport in the Netherlands

Despite its major ports, the vast majority of goods are transported by road (773 billion tonnes). Incidentally, sea shipping does account for a large share (558 billion tonnes), especially when inland shipping (306 billion tonnes) is added. 36 billion tonnes of goods are transported by rail and 2 billion tonnes by air.

## Shared mobility:

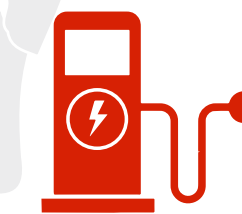
On average, cars are stationary 90% of the time in the Netherlands. Therefore, car sharing would be a logical development. Meanwhile, nearly a million Dutch have signed up to a car sharing service. However, only 200,000 people have used a shared car at least once in the past three years. This equates to 2% of licenced drivers. [Source: AD 2021](#)



**22.000.000 BIKES**  
MORE BIKES THAN PEOPLE  
(17.000.000)



**INFRASTRUCTURE NETWORK**  
EUROPES SECOND LARGEST  
INFRASTRUCTURENETWORK



**85.453 PUBLIC CHARGING POINTS**  
HIGHEST NUMBER OF PUBLIC  
CHARGING POINTS IN EUROPE



**8.900.000 CARS**  
93 CARS FOR  
100 HOUSEHOLDS



**INFRASTRUCTURE NETWORK**  
EUROPES SECOND LARGEST  
INFRASTRUCTURENETWORK



**TRAINS ARE ON TIME**  
BUSIEST TRAIN TRACKS OF EUROPE  
(94% OF TRAINS ON TIME)



**14% MORE SHARED CARS**  
IN THE NETHERLANDS  
IN 2021

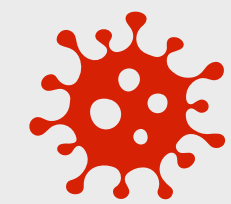
### NETHERLANDS AS A MOBILITY COUNTRY

Number of bicycles	22 million	(Population: 17 million )
Number of cars	8.9 million	93 cars per 100 households
Charging points	85453	Most public electric charging points in Europe
Trains on time	94%	Europe's busiest railway network

# TRAFFIC JAM INFORMATION NETHERLANDS

Number of kilometres of traffic jams Netherlands  
Average travel time lost (Speed below 50 km/h)

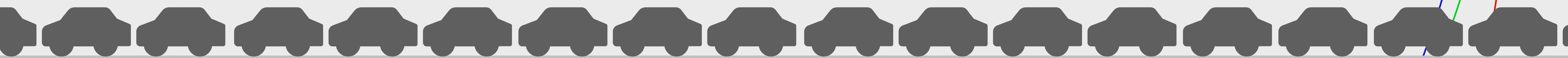
[Source Rijkswaterstaat 2021](#)



TRAVEL TIME LOST	2000	2015	2016	2017	2018	2019	2020	2021
Number of hours (millions)	30,8	36,1	40,6	41,2	43,2	47,4	14,5	17,2
Annual growth	0,0%	26,7%	12,5%	1,4%	5,5%	9,1%	-69,4%	18,9%
Number of hours (millions)	44,1	55,6	61,4	63,1	66,3	70,9	23,7	28,4
Annual growth	0,0%	22,3%	10,6%	2,7%	5,1%	7,0%	-66,6%	19,7%



**2021 +20%**  
**28.4 m\***  
**HOURS OF CONGESTION**  
*\*expected 70.9 m hours in 2022*

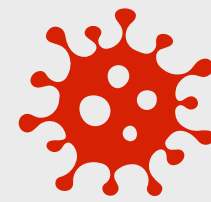




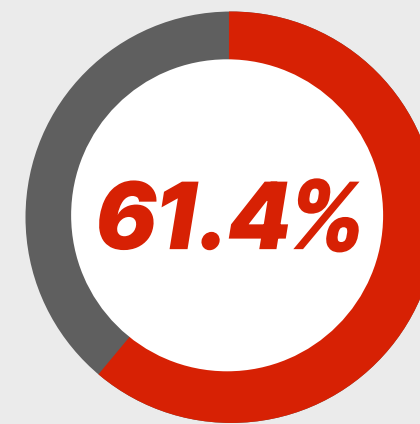
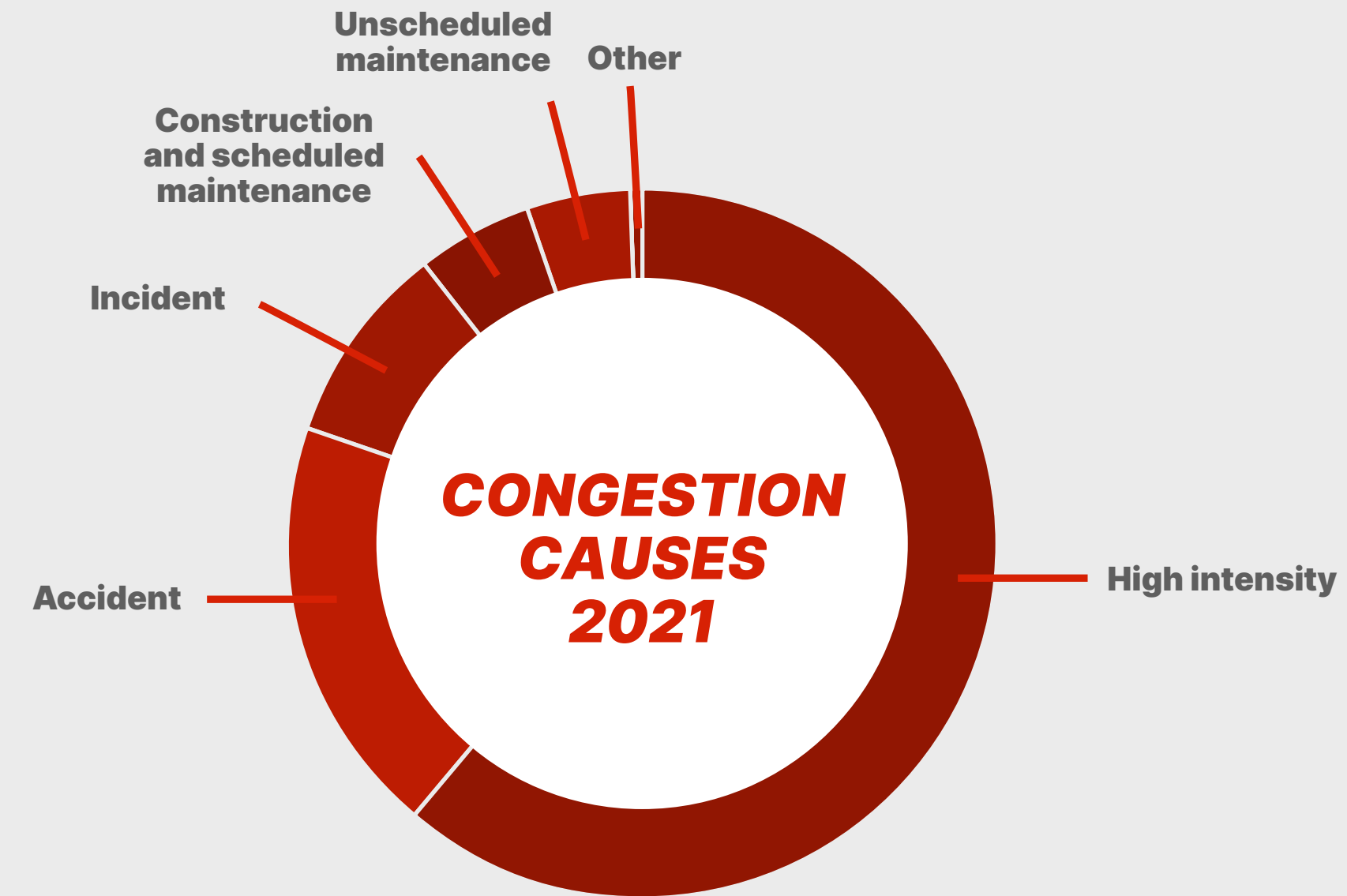
# CONGESTION CAUSES

In 2021, 61.4 % of traffic jams were caused by regular rush-hour traffic (high intensity). This again makes it the biggest cause of congestion. The proportion of congestion caused by accidents was 19.1%, and 9.3% was due to incidents.

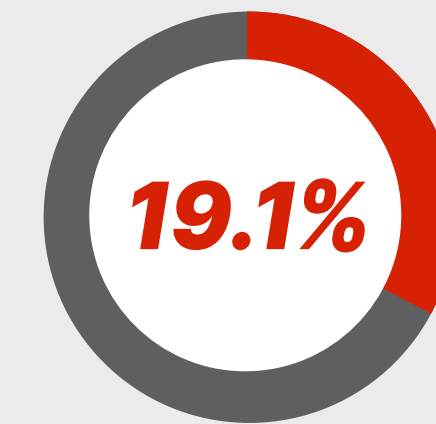
[Source Rijkswaterstaat 2021](#)



YEAR	2016	2017	2018	2019	2020	2021
High intensity	71,3%	70,1%	69,3%	72,7%	59,0%	61,4%
Accident	17,9%	18,3%	19,4%	16,3%	21,4%	19,1%
Incident	6,1%	6,9%	7,3%	5,8%	10,6%	9,3%
Construction and scheduled maintenance	2,2%	2,5%	2,3%	2,8%	6,2%	5,2%
Unscheduled maintenance	1,7%	1,4%	1,4%	1,1%	2,1%	4,7%
Event	0,2%	0,2%	0,2%	1,2%	0,2%	0,0%
Weather conditions	0,1%	0,5%	0,1%	0,0%	0,0%	0,1%
Other causes	0,5%	0,2%	0,1%	0,1%	0,6%	0,3%
Total	100%	100%	100%	100%	90%	100%

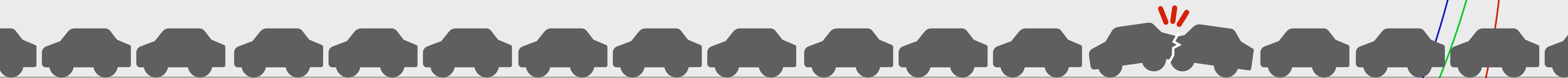


Of congestion is caused by regular rush hour traffic



Of congestion is caused by accidents

**BIGGEST CAUSES**





# AVERAGE NUMBER OF KILOMETRES DRIVEN BY DUTCH MOTOR VEHICLES

Average number of kilometres driven by Dutch motor vehicles per vehicle (delivery vans, passenger cars, heavy goods vehicles and other vehicles) in the period 2010 -2020

[Source CBS 2022](#)

X MILLION KMS	2010	2011	2012	2013	2014	2015	2016	2017*	2018*	2019	2020
<b>Passenger cars</b>	102307,6	102956,4	103122,1	103211,2	103699,1	105088,9	107708,1	108936,1	110185,0	112305,3	9834000
<b>Delivery vans</b>	17287,3	17056,1	16649,0	16309,2	16295,5	16544,3	17144,3	17668,4	18411,9	18995,1	1787000
<b>Trucks + tractors</b>	7192,9	7113,1	7007,9	6617,3	6620,1	6923,4	7330,9	7436,1	7393,8	7590,5	9350
<b>other vehicles</b>	5626,0	5700,3	5670,9	5627,5	5581,7	5572,6	5654,3	5801,3	5850,1	5926,1	6,1
<b>Total</b>	132413,8	132825,9	132449,9	131765,2	132196,4	134129,2	137837,6	139842,0	141840,8	144817,0	11630356,1



**CARS**  
9834000 KMS  
x million kms



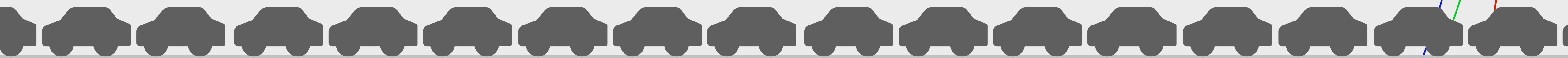
**VANS**  
1787000 KMS  
x million kms



**TRUCKS**  
9350 KMS  
x million kms

**OTHER**  
6.1 KMS  
x million kms

**TOTAL**  
**11.630.356.100.000 KM'S**





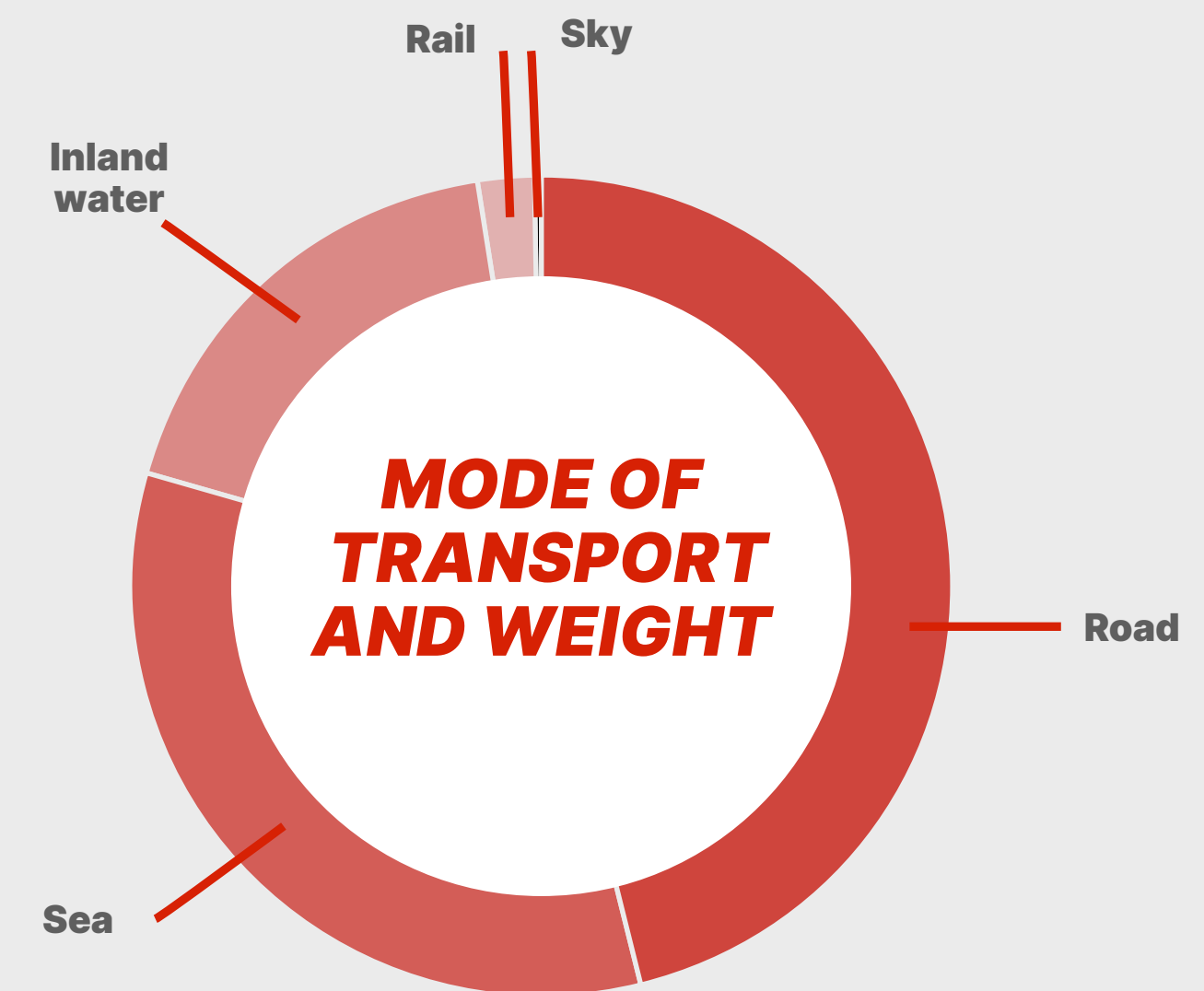
# DUTCH TRANSPORT SECTOR EMISSIONS

Amount of goods transported in the Netherlands in the past twenty years in billion tonnes for the modes of transport sea shipping, inland shipping, road transport, rail transport and air transport. And share by mode of transport in 2020 in billion tonnes

[Source CBS 2021](#)

YEAR	DOMESTIC TRANSPORT	TRANSPORT INTO THE NETHERLANDS	TRANSPORT ABROAD	TOTAL
2010	0,63	0,58	0,51	1,72
2011	0,63	0,57	0,49	1,69
2012	0,61	0,58	0,51	1,7
2013	0,62	0,57	0,53	1,72
2014	0,63	0,58	0,53	1,75
2015	0,63	0,6	0,55	1,78
2016	0,65	0,6	0,55	1,8
2017	0,66	0,61	0,56	1,83
2018	0,68	0,62	0,54	1,84
2019	0,69	0,62	0,54	1,86
2020	0,7	0,58	0,52	1,8

MODE OF TRANSPORT	WEIGHT TRANSPORTED (BILLION TONNES)
Sea shipping	558
Inland shipping	306
Road transport	773
Rail transport	36
Air transport	2



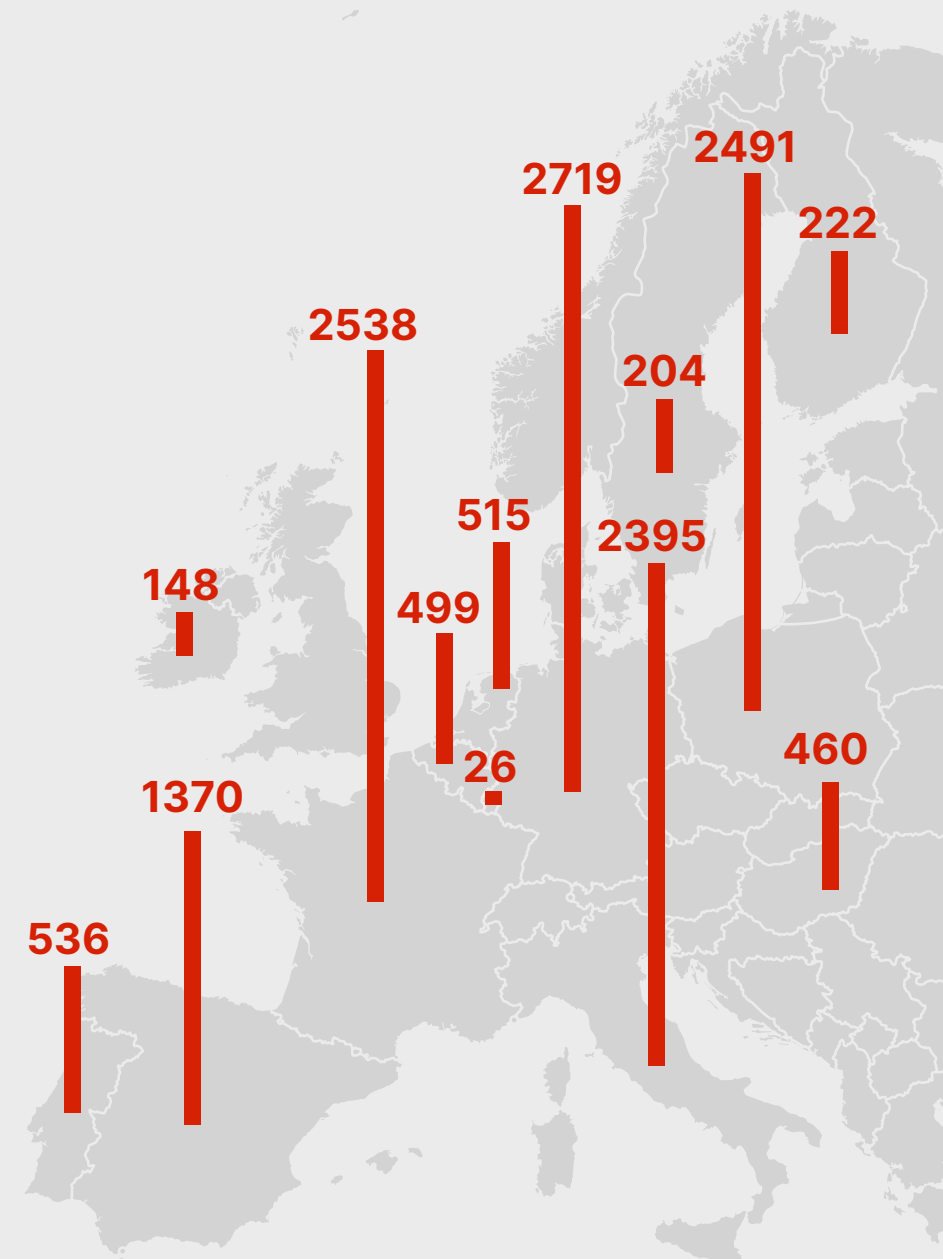
# ROAD DEATHS



## EUROPE

COUNTRY	DEATHS 2020
Netherlands	515
Sweden	204
Finland	222
Ireland	148
Belgium	499
Luxembourg	26
Germany	2719
France	2538
Spain	1370
Portugal	536
Croatia	237
Poland	2491
Hungary	460
Italy	2395

Source: ACEA Pocket Guide 2022



## NETHERLANDS

Social costs of road accidents deaths were €17 billion by 2020 [Source: SWOV 2021](#)

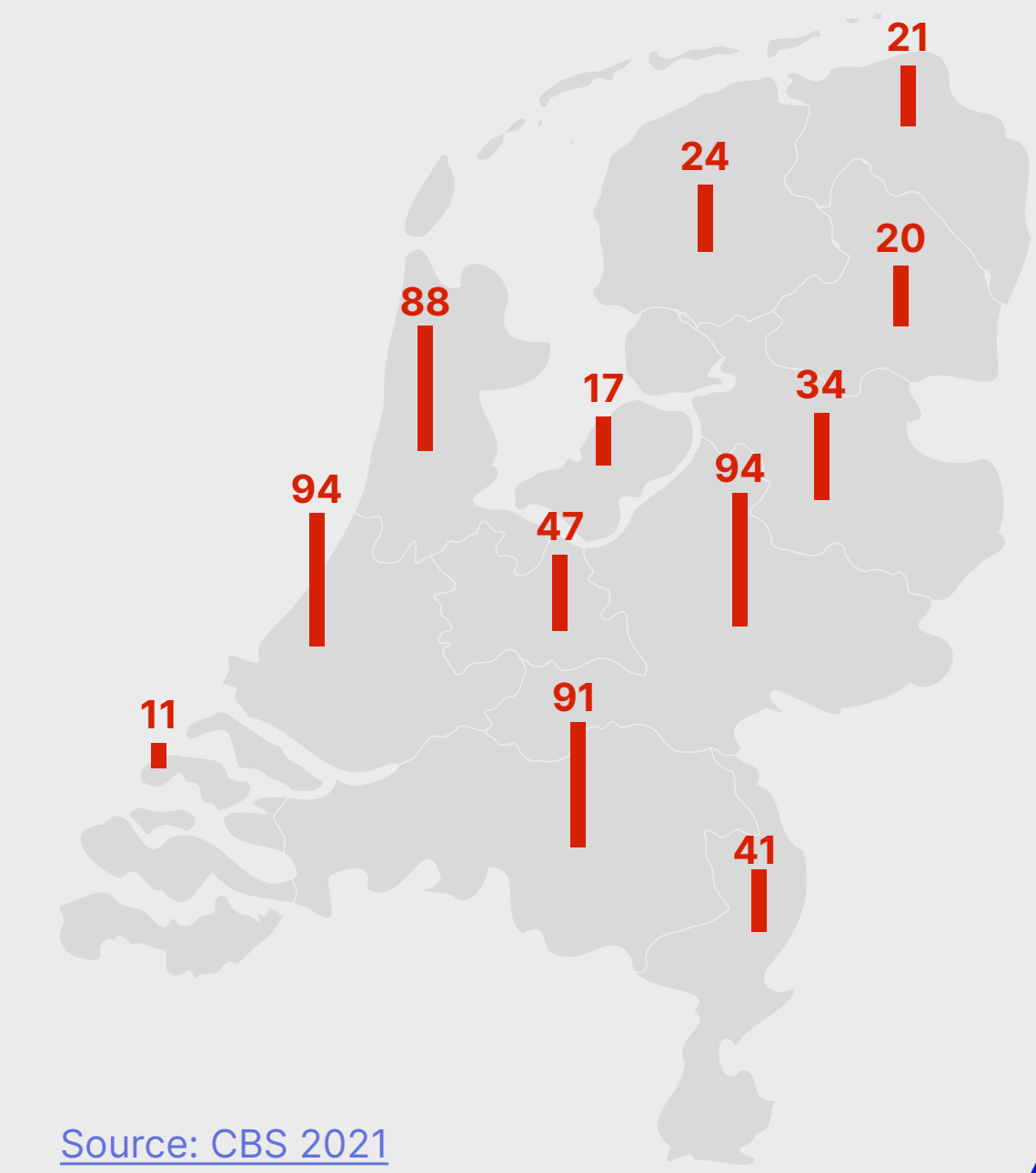
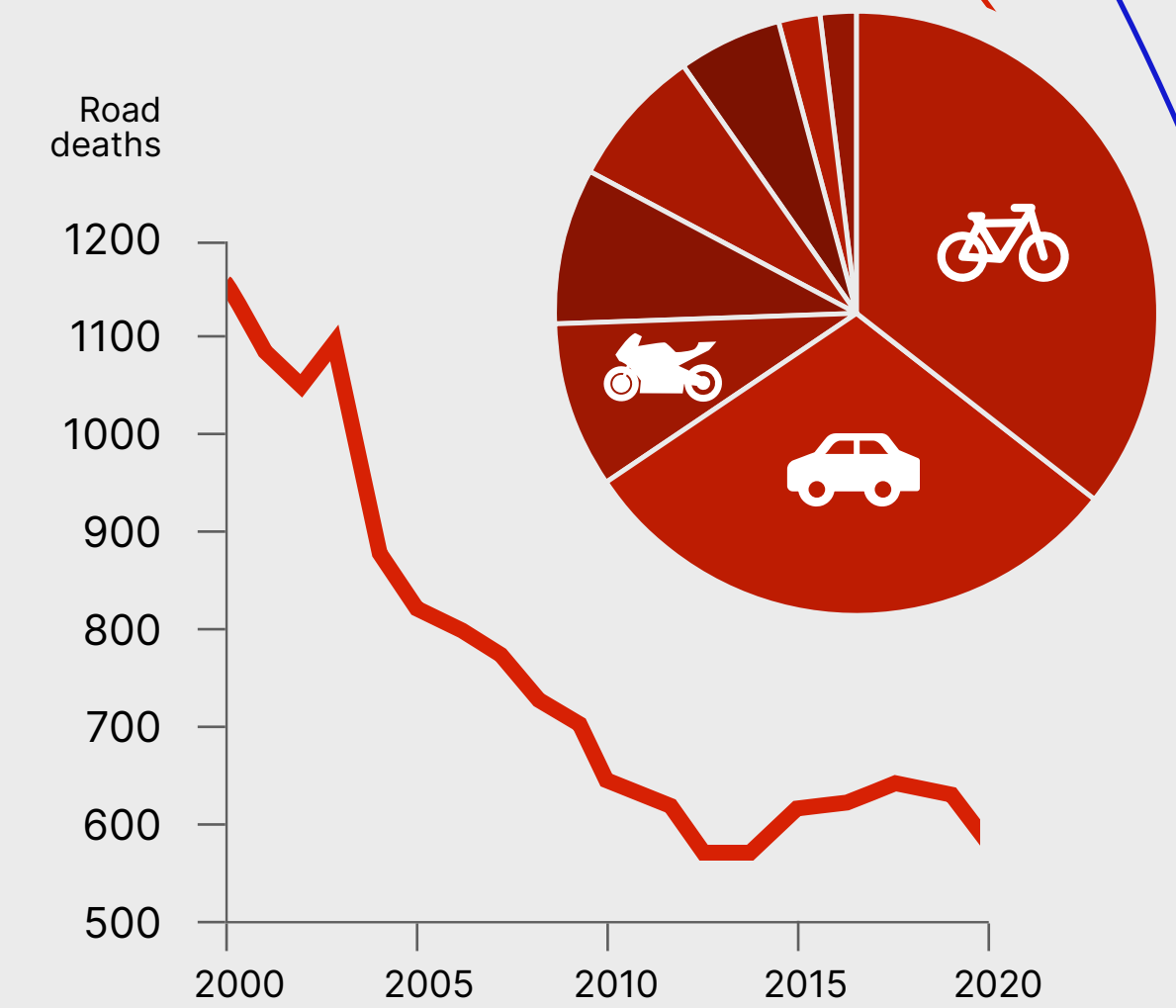
YEAR	DEATHS
2000	1166
2001	1083
2002	1066
2003	1088
2004	881
2005	817
2006	811
2007	791
2008	750
2009	720
2010	640
2011	661
2012	650
2013	570
2014	570
2015	621
2016	629
2017	613
2018	678
2019	661
2020	610
2021	582

TRANSPORT MODE	DEATHS
Bicycle	207
Passenger cars	175
Motorbike	52
Motorised bicycle	49
pedestrian	43
Mobility scooter	32
Delivery van/truck	14
Other	10

PROVINCE	DEATHS
South Holland	94
Gelderland	94
Noord-Brabant	91
North Holland	88
Utrecht	47
Limburg	41
Overijssel	34
Friesland	24
Groningen	21
Drenthe	20
Flevoland	17
Zeeland	11



Source: CBS 2021



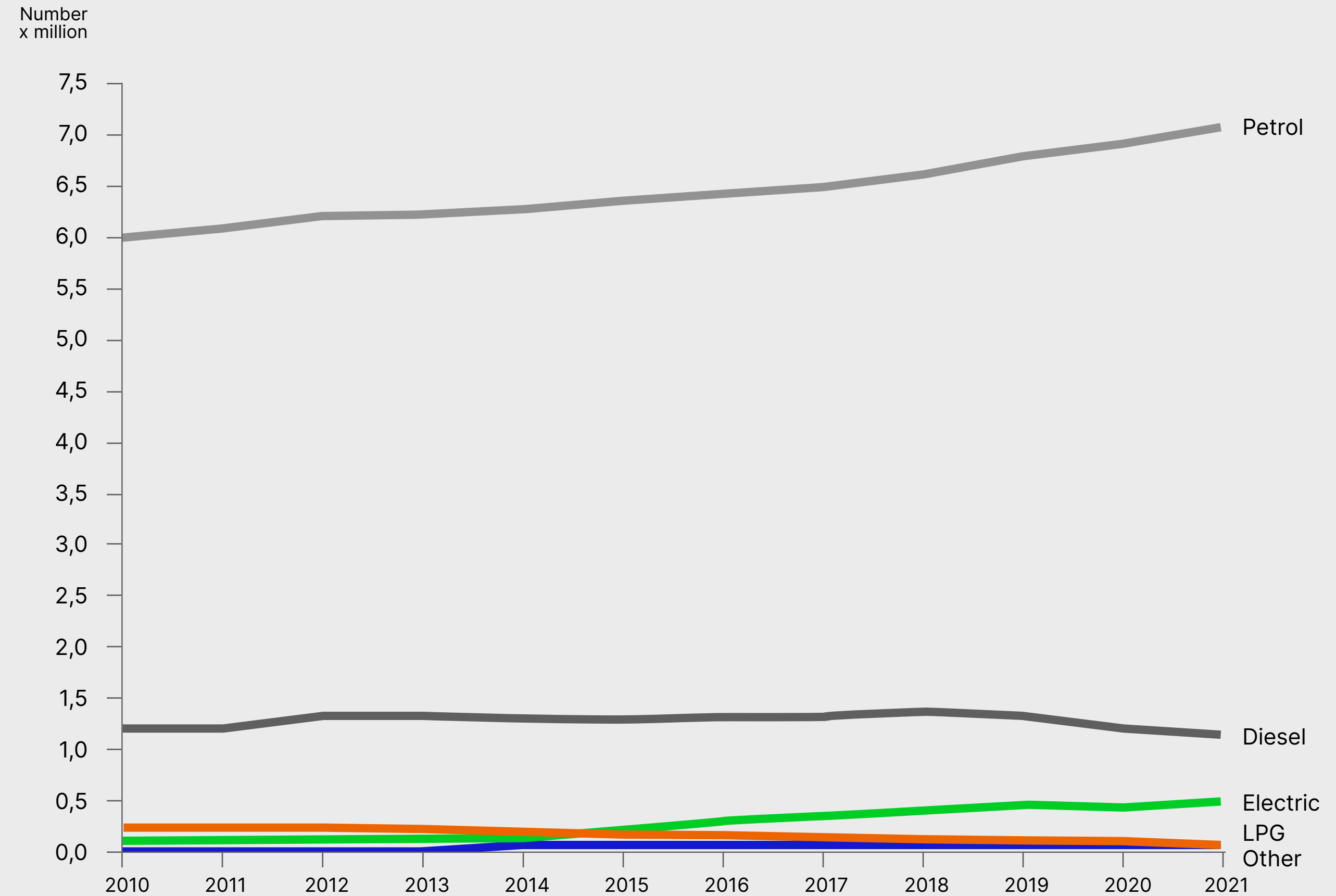


# COMPOSITION OF DUTCH VEHICLE FLEET

By energy carrier 2010-2021 Passenger vehicles

Source CBS 2021

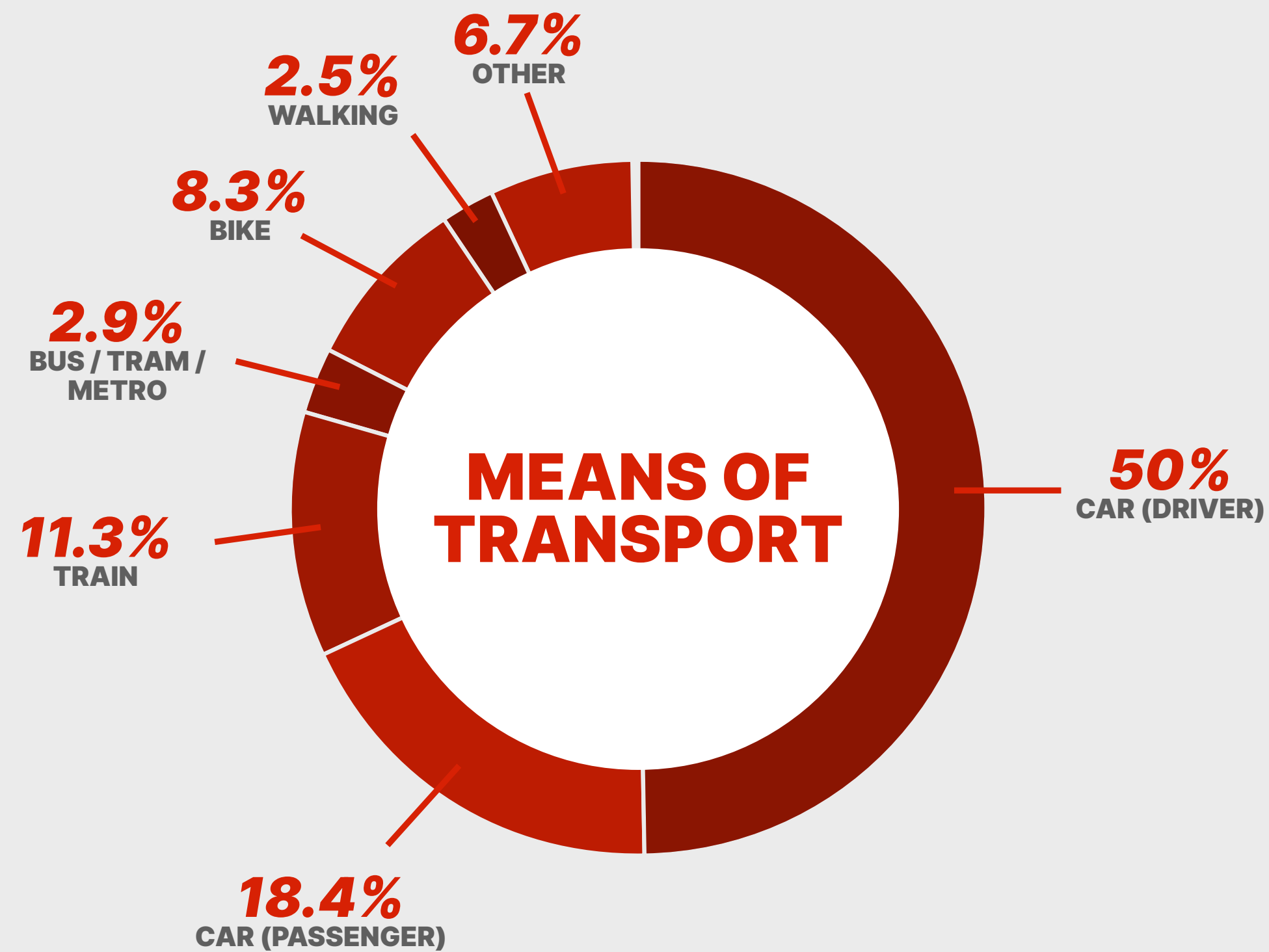
YEAR	PETROL X MILLION	DIESEL X MILLION	LPG X MILLION	ELECTRICITY X MILLION	OTHER X MILLION
2010	6,07	1,29	0,22	0,04	0
2011	6,17	1,3	0,21	0,06	0
2012	6,25	1,33	0,2	0,07	0
2013	6,28	1,34	0,2	0,09	0,01
2014	6,29	1,32	0,19	0,13	0,01
2015	6,33	1,31	0,17	0,16	0,01
2016	6,4	1,32	0,15	0,21	0,01
2017	6,51	1,31	0,14	0,25	0,01
2018	6,65	1,31	0,13	0,27	0,01
2019	6,8	1,28	0,12	0,31	0,01
2020	6,95	1,19	0,12	0,4	0,01
2021	7,06	1,08	0,11	0,53	0,01



# PUBLIC TRANSPORTATION

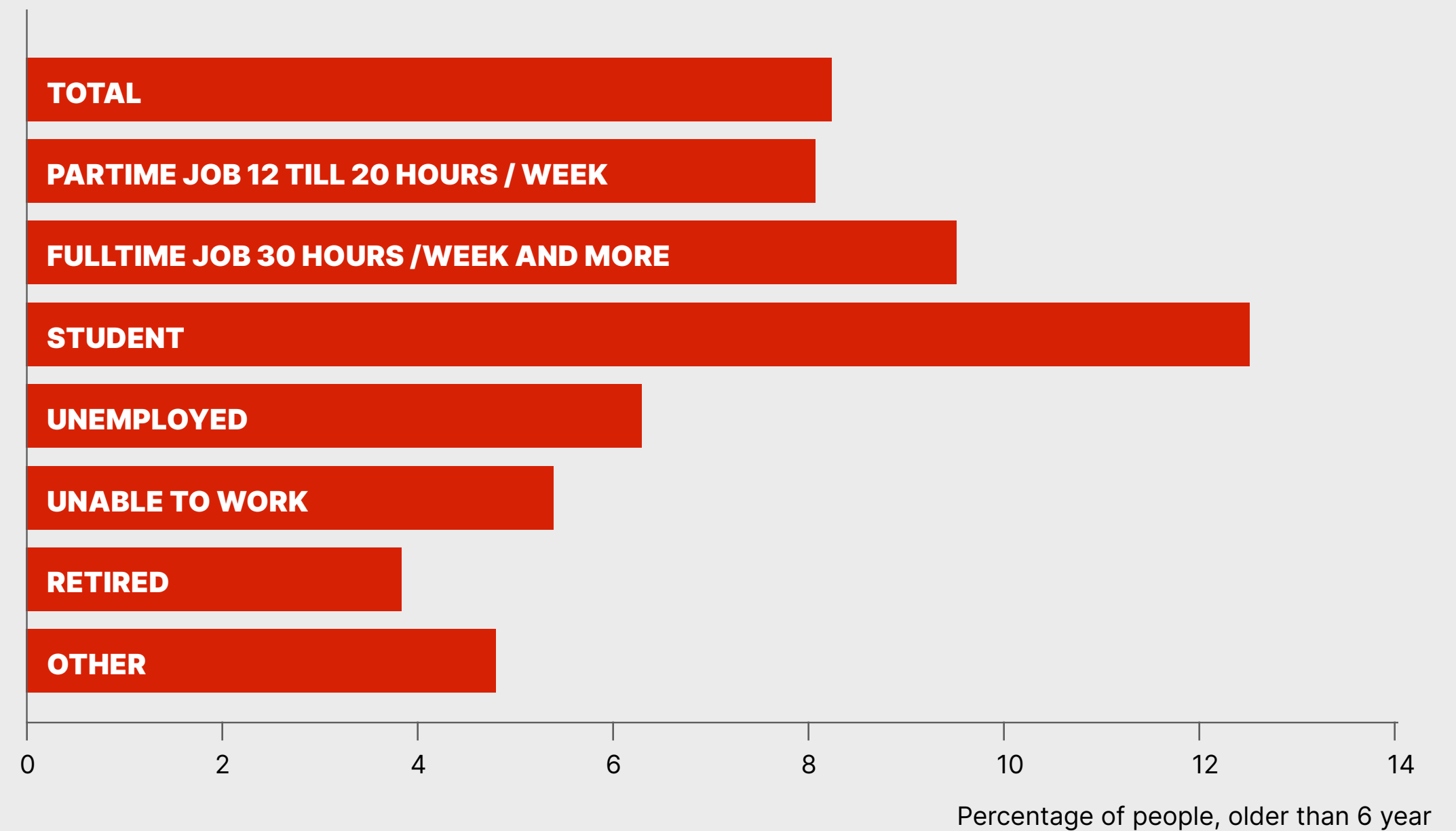
Number of passenger kilometers by mode of transportation, persons age 6 years or older

[Source CBS 2020](#)



Public Transport users divided into participation within society 2019

[Source CBS 2020](#)



## What kind of people use public transportation?

Among schoolchildren and students, the proportion of public transport users was relatively high: 13% of them used a bus, streetcar, metro or train at least once on an average day. Among students with OV season tickets, this was as high as 41%. There were also relatively many public transport participants who work 30 hours or more weekly. Among pensioners, the proportion of public transport users is the lowest rated at 4%.

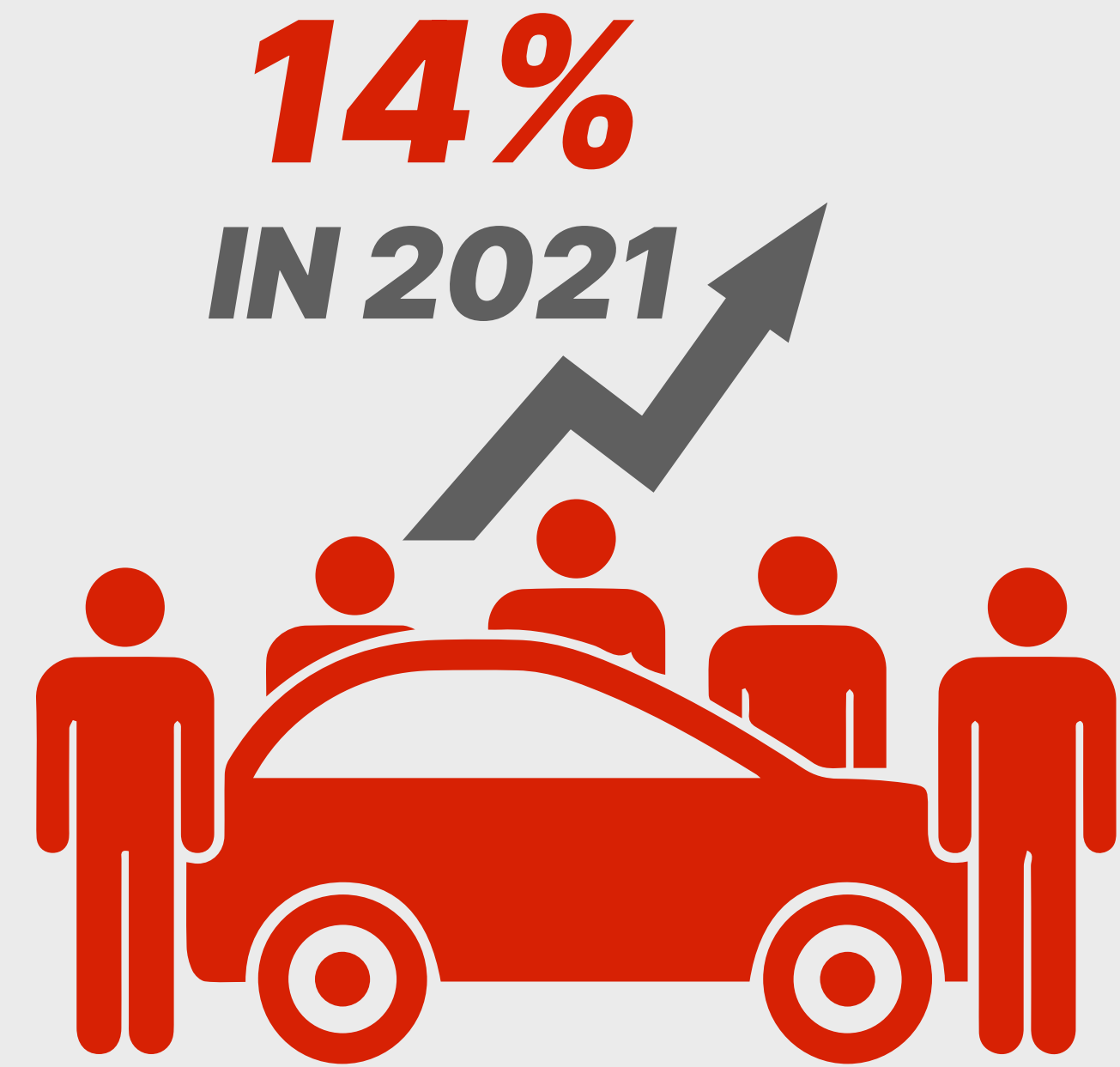
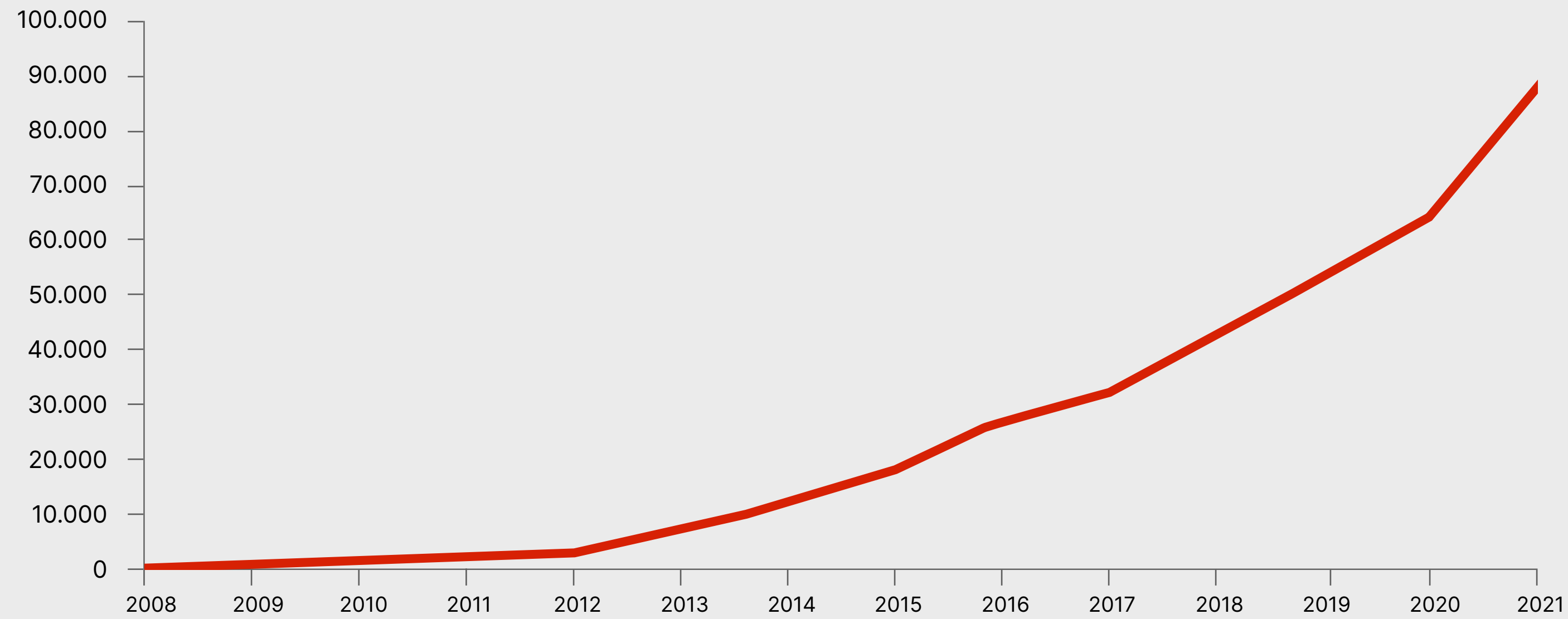


# NUMBER OF SHARED CARS IN THE NETHERLANDS

The Netherlands has 87,000 shared cars at the moment. In a year time, more than 13,000 shared cars have been added to the MaaS-community. The national growth in the number of shared cars continues and is even accelerating.

[Ministerie van Infrastructuur en Waterstaat 2021](#)

Number of shared cars



# POLITICS

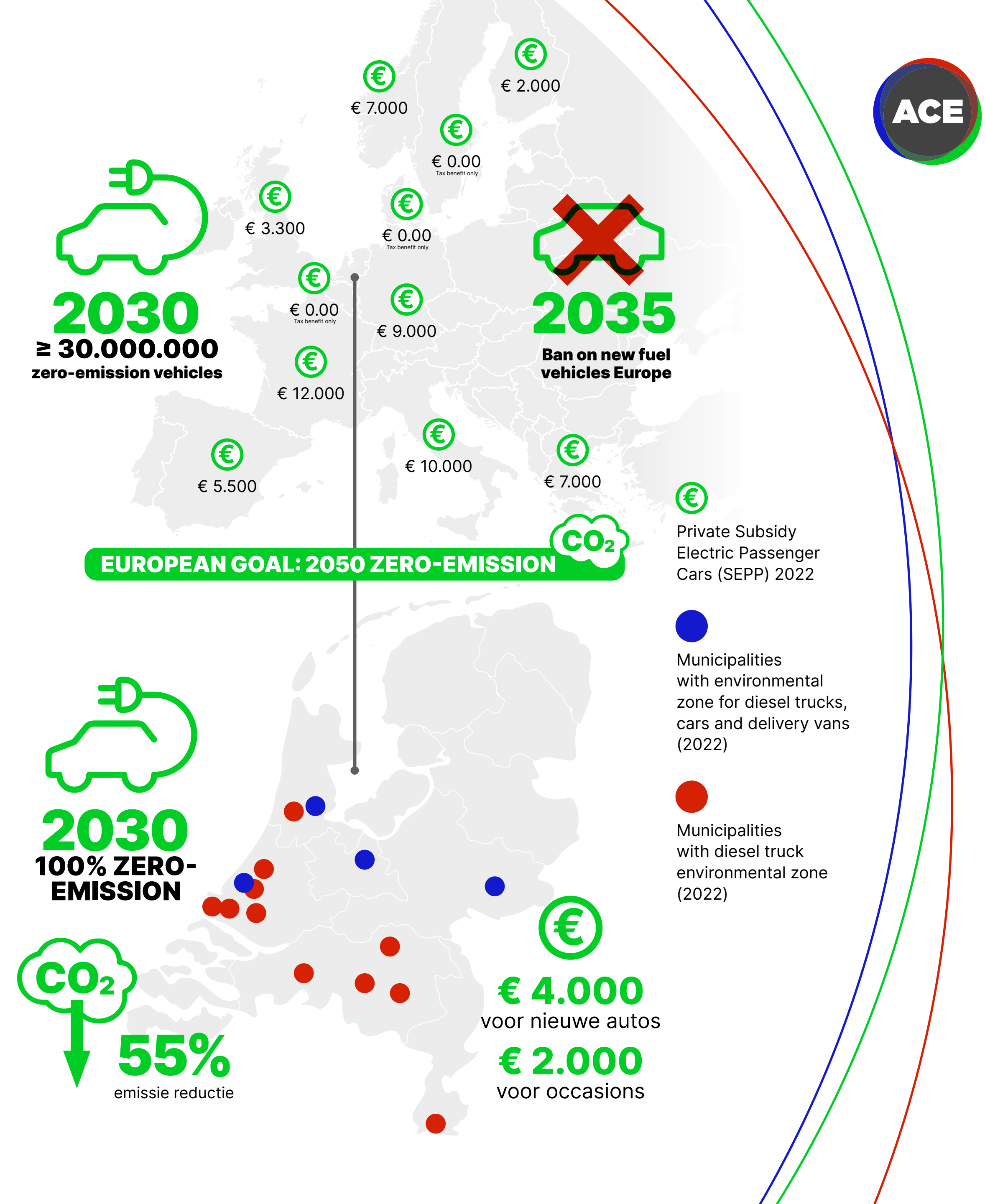
## INVEST IN SMART AND SUSTAINABLE MOBILITY

From 2035, no vehicle will be allowed to be sold in Europe that is not zero-emission. That is what the European Union has decided. To achieve this, Europe has set a target of at least 30 million zero-emission vehicles in Europe by 2030, followed by a ban on new fossil fuel vehicles by 2035, to eventually achieve that all vehicles on public roads in Europe are zero-emission.

The Dutch government also Supports this vision, aiming for all new cars to be zero-emission by 2030, with a minimum road traffic emissions reduction of 55% by 2030 (2021 coalition agreement). To accelerate this transition to zero-emission vehicles, SEPP funding has been created by the Netherlands government: the Electric Passenger Car Subsidy for Private Individuals, in which €4000 is made available for new vehicles and €2000 for used cars. All other measures in the coalition agreement are shown here.

Is this Dutch purchase subsidy unique in Europe? Certainly not. 10 European countries grant purchase subsidies, with France and Italy offering the highest subsidies, €12,000 and €10,000 respectively.

In addition, the Netherlands aims to create more environmental zones and to lower parking fees for zero-emission vehicles. This is overseen by municipalities. By 2022, four cities in the Netherlands will have environmental zones for cars and vans:





# POLITICS

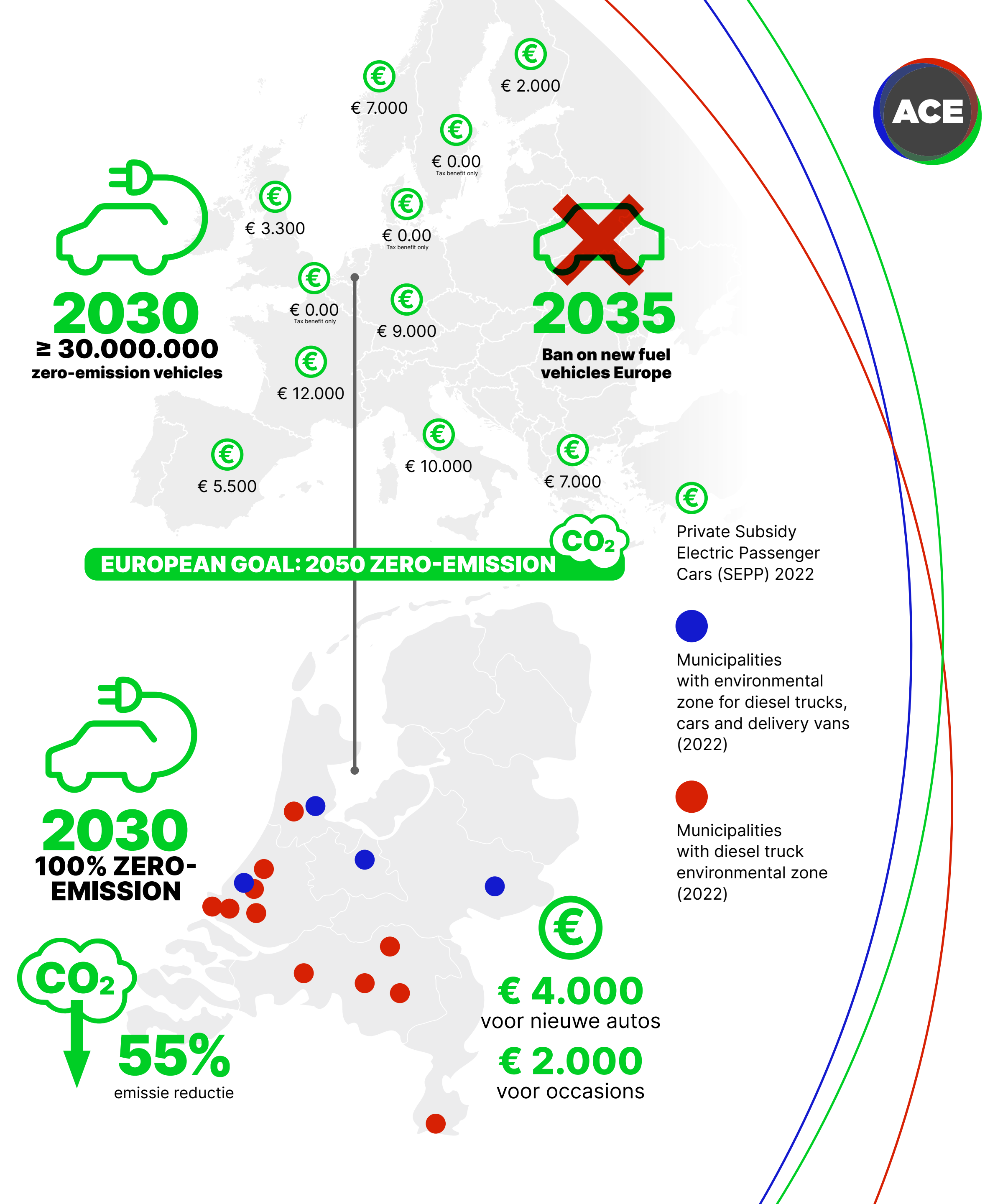
## INVEST IN SMART AND SUSTAINABLE MOBILITY

Amsterdam, Arnhem, The Hague and Utrecht. There is an environmental zone for diesel trucks in 14 cities. These municipalities have purple environmental zones where diesel trucks must be at least emission class 6. From 1 January 2025, municipalities may introduce zero-emission zones for trucks. Only electric trucks that do not emit pollutants are allowed in these zones.

Furthermore, road safety remains an important item on the Dutch political agenda. The chapter on mobility describes the trends in the number of road

victims in the Netherlands. This table sets out the investments in roads and road safety the government intends to make in the next few years.

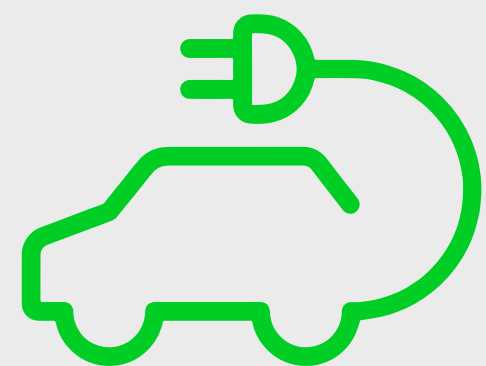
In the next table, we zoom in on the investments earmarked for smart and sustainable mobility. The conclusion is that the government is investing in smart and sustainable mobility, but is slowly scaling these investments down leading up to 2026. In particular, subsidies for sustainable mobility and electric transport will be slowly revised downwards between 2021 and 2026.



# EUROPE EMISSION IN 2050

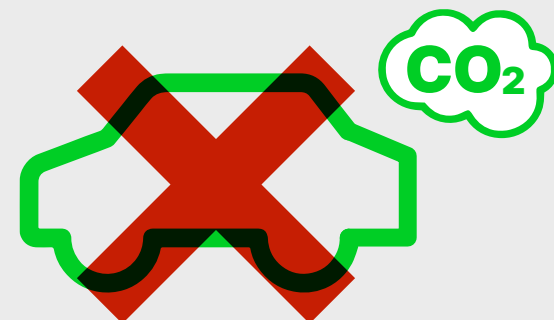
## EUROPA DOELSTELLINGEN OP WEG NAAR ZERO EMISSIE

in 2030	30 million zero-emission vehicles
in 2035	Ban on new fuel vehicles Europe
in 2050	All vehicles zero-emission



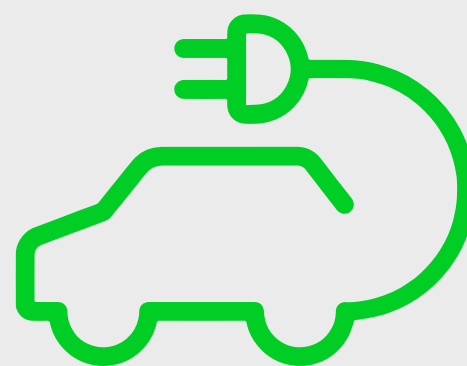
**2030**

**≥ 30.000.000**  
zero-emission vehicles



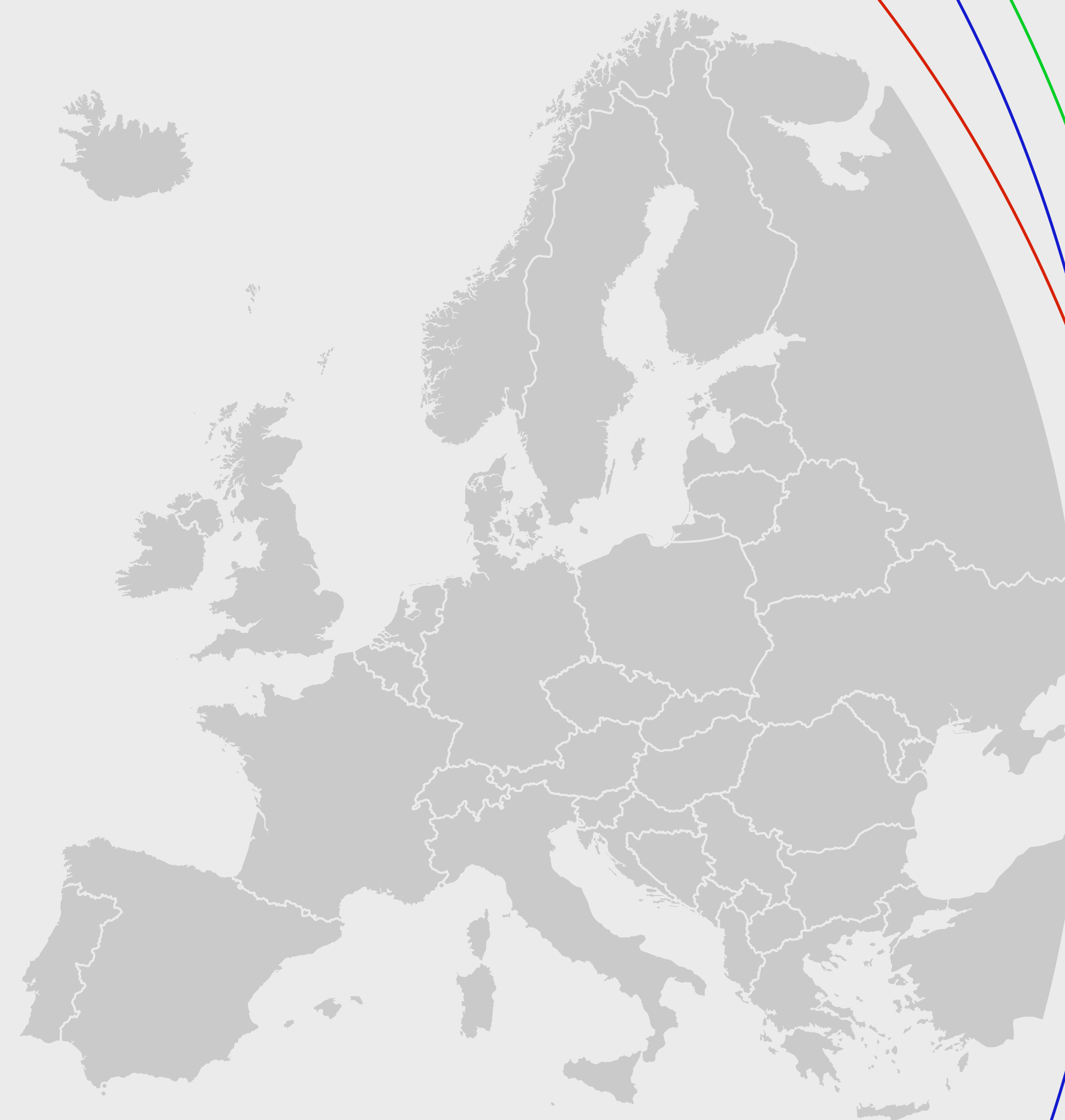
**2035**

**BAN ON NEW FUEL  
VEHICLES EUROPE**



**2050**

**100% ZERO-  
EMISSION**



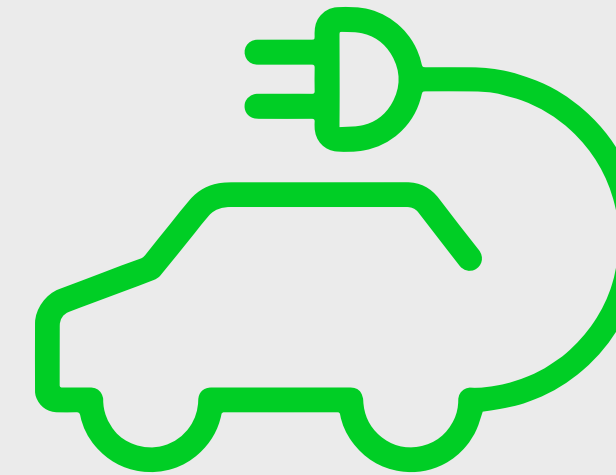


# GOVERNMENT AGREEMENT 2021



GOVERNMENT AGREEMENT 2021	
Private Subsidy Electric Passenger Cars (SEPP) for new car	€ 4.000,00
Private Subsidy Electric Passenger Cars (SEPP) for used car	€ 2.000,00
2022 addition to income rate	16%
Addition to income rate phased up to 22% in 2026	22%
Road pricing: pay according to use	2030
€1.25 billion extra per year for infrastructure management and maintenance	
Government invests in mobility hubs with different forms of mobility, such as train, (shared) car, (shared) bike or metro	
Infrastructure design, construction and maintenance take into account self-driving vehicles and required systems	
Aim for all new cars to be zero-emission.	2030
Establish environmental zones and let municipalities set lower parking fees for zero-emission vehicles	
Co-financing from government for municipal and provincial investments in infrastructure and bicycle parking facilities	100 million
55% emission reduction in the Netherlands	2030
Kilometre charge for trucks (vehicles heavier than 3,500 kg) Approx. 25 cents per kilometre	2026

[Source: Rijksoverheid 2021](#)



**€ 4.000**

Private Subsidy Electric Passenger Cars (SEPP) for new car



**€ 2.000**

Private Subsidy Electric Passenger Cars (SEPP) for used car

# EV SUBSIDY DEVELOPMENT

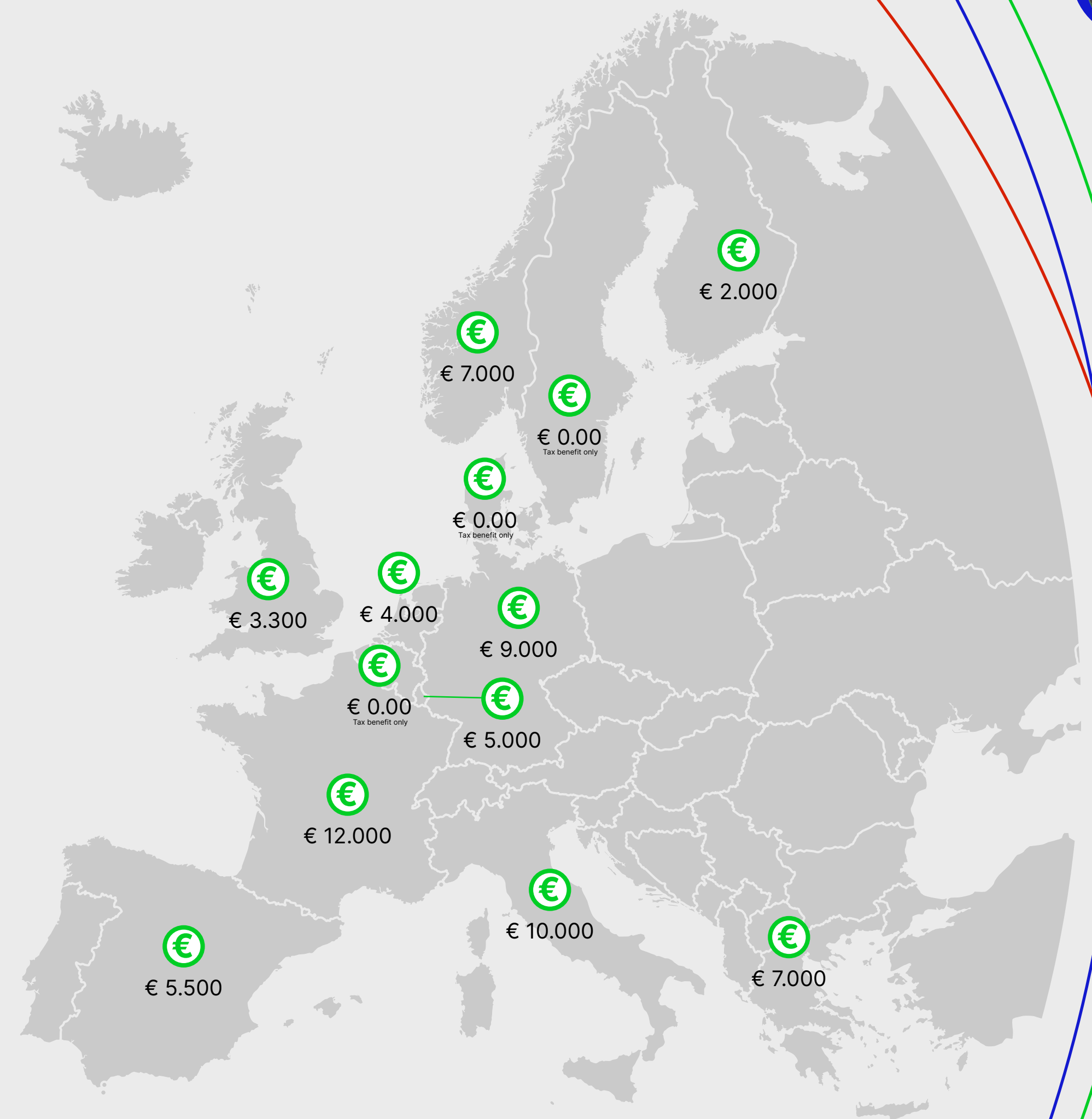
The success of EVs (battery electric) is driven by several factors, one of which is the financial policy factor

## MAXIMUM PURCHASE SUBSIDY NEW ALL-ELECTRIC CARS 2022

<b>France</b>	€ 12.000,00
<b>Germany</b>	€ 9.000,00
<b>Italy</b>	€ 10.000,00
<b>Netherlands</b>	€ 4.000,00
<b>Greece</b>	€ 7.000,00
<b>Sweden</b>	€ 6.000,00
<b>Spain</b>	€ 5.500,00
<b>Luxembourg</b>	€ 5.000,00
<b>United Kingdom</b>	€ 3.300,00
<b>Finland</b>	€ 2.000,00
<b>Belgium</b>	€ 0,00 Tax benefit only
<b>Denmark</b>	€ 0,00 Tax benefit only
<b>Norway</b>	€ 0,00 Tax benefit only

[Source: The Wallbox Team 2022](#)

€ Private Subsidy Electric Passenger Cars (SEPP) 2022



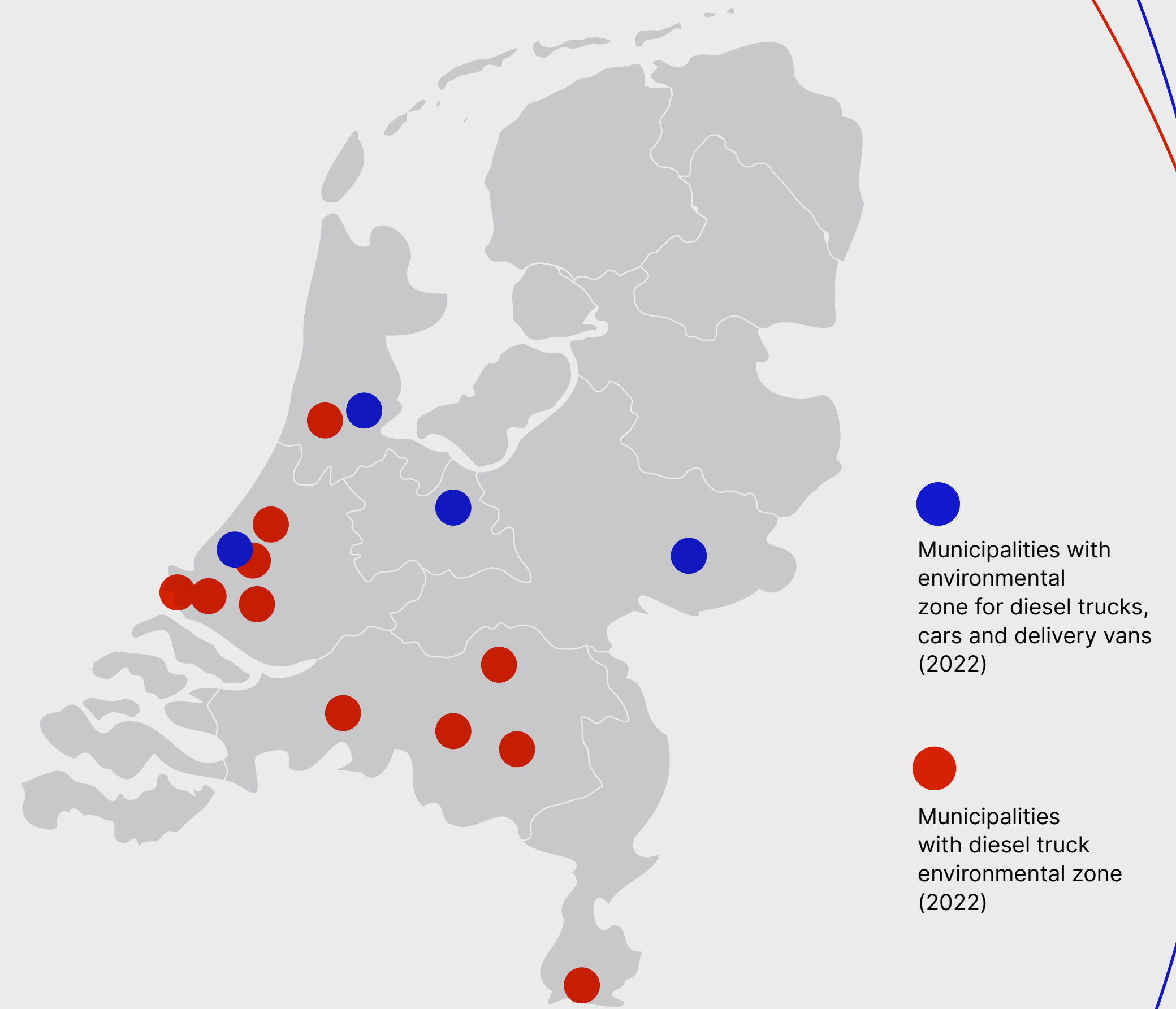
# ENVIRONMENTAL ZONES BY 1 JANUARY 2022 IN THE NETHERLANDS

Currently, 15 municipalities in the Netherlands have an environmental zone for diesel trucks. These municipalities have purple environmental zones where diesel trucks must be at least emission class 6.

Four municipalities have environmental zones for diesel-powered cars and delivery vans. From 1 January 2025, municipalities may introduce zero-emission zones for trucks. Only electric trucks that do not emit pollutants are allowed in these zones.

[Source: Rijksoverheid 2022](#)

MUNICIPALITIES WITH DIESEL TRUCK ENVIRONMENTAL ZONE	MUNICIPALITIES WITH ENVIRONMENTAL ZONE FOR CARS AND DELIVERY VANS
Amsterdam	Amsterdam
Arnhem	Arnhem
Breda	Den Haag
Delft	Utrecht
The Hague	
Eindhoven	
Haarlem	
Leiden	
Maastricht	
Maasvlakte Rotterdam	
Rijswijk	
Rotterdam	
s' Hertogenbosch	
Tilburg	
Utrecht	



- Municipalities with environmental zone for diesel trucks, cars and delivery vans (2022)
- Municipalities with diesel truck environmental zone (2022)



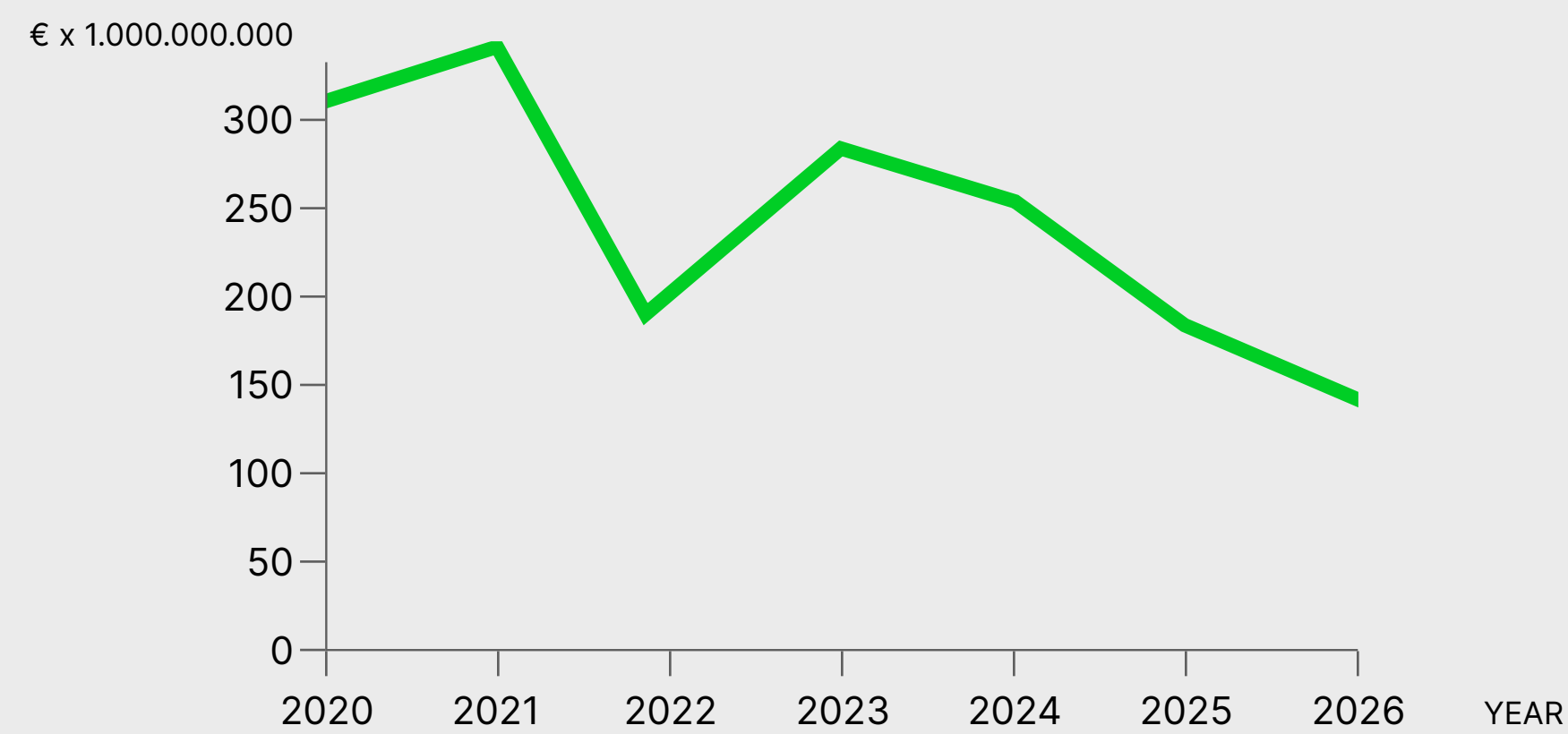


# GOVERNMENT INVESTMENT IN ROADS AND ROAD SAFETY 2022

## SUB-THEMES:

Sub-themes condition of infrastructure, mobility, sustainable mobility, road safety.

YEAR	INVESTMENT
2020	€ 281.913.000,00
2021	€ 303.772.000,00
2022	€ 181.069.000,00
2023	€ 254.039.000,00
2024	€ 239.883.000,00
2025	€ 176.853.000,00
2026	€ 113.983.000,00



[Source: Ministerie van Infrastructuur & Waterstaat 2022](#)

# GOVERNMENT DISTRIBUTION OF INVESTMENT IN SMART AND SUSTAINABLE MOBILITY 2022

	2020	2021	2022	2023	2024	2025	2026
<b>Smart and sustainable mobility</b>	€ 34.187.000,00	€ 13.851.000,00	€ 143.603.000,00	€ 208.921.000,00	€ 229.979.000,00	€ 191.337.000,00	€ 110.921.000,00
<b>Contracts</b>	€ 71.000,00	€ 33.811.000,00	€ 83.112.000,00	€ 151.727.000,00	€ 173.727.000,00	€ 147.273.000,00	€ 69.367.000,00
<b>Innovation and intelligent transport systems</b>	€ -	€ 10.434.000,00	€ 8.539.000,00	€ 6.894.000,00	€ 3.400.000,00	€ 154.000,00	€ 155.000,00
<b>Sustainable mobility</b>	€ -	€ 12.540.000,00	€ 11.408.000,00	€ 10.833.000,00	€ 10.272.000,00	€ 9.377.000,00	€ 9.397.000,00
<b>Climate agreement reservation</b>	€ -	€ 1.090.000,00	€ 54.742.000,00	€ 126.404.000,00	€ 156.414.000,00	€ 134.299.000,00	€ 56.300.000,00
<b>traffic emissions</b>	€ -	€ 3.714.000,00	€ 4.077.000,00	€ 3.244.000,00	€ 3.287.000,00	€ 3.089.000,00	€ 3.167.000,00
<b>other tasks</b>	€ -	€ 6.333.000,00	€ 4.346.000,00	€ 4.347.000,00	€ 354.000,00	€ 354.000,00	€ 357.000,00
<b>Subsidies</b>	€ 11.809.000,00	€ 69.011.000,00	€ 49.860.000,00	€ 48.895.000,00	€ 47.213.000,00	€ 35.632.000,00	€ 35.612.000,00
<b>Sustainable mobility</b>	€ -	€ 1.440.000,00	€ 1.436.000,00	€ 1.335.000,00	€ 863.000,00	€ 632.000,00	€ 612.000,00
<b>Electric transport</b>	€ 11.809.000,00	€ 38.900.000,00	€ 10.200.000,00	€ 3.300.000,00	€ 2.000.000,00	€ -	€ -
<b>Nitrogen source-directed measures</b>	€ -	€ -	€ 20.000.000,00	€ 5.782.000,00	€ 5.782.000,00	€ 5.782.000,00	€ 5.782.000,00
<b>Other subsidies</b>	€ -	€ 28.671.000,00	€ 18.224.000,00	€ 9.260.000,00	€ 4.350.000,00	€ -	€ -
<b>Contributions to agencies</b>	€ -	€ 18.216.000,00	€ 6.750.000,00	€ 7.404.000,00	€ 8.039.000,00	€ 7.432.000,00	€ 5.933.000,00
<b>Contribution to RWS Agency</b>	€ -	€ 2.528.000,00	€ 1.679.000,00	€ 1.679.000,00	€ 1.679.000,00	€ 1.679.000,00	€ 1.679.000,00
<b>Contribution to Nea Agency</b>	€ -	€ 5.630.000,00	€ 4.705.000,00	€ 5.359.000,00	€ 5.994.000,00	€ 5.387.000,00	€ 3.888.000,00
<b>Contribution to RFO Agency</b>	€ -	€ 10.058.000,00	€ 366.000,00	€ 366.000,00	€ 366.000,00	€ 366.000,00	€ 366.000,00
<b>Contribution to local authorities</b>	€ 22.307.000,00	€ 16.489.000,00	€ 3.881.000,00	€ 1.000.000,00	€ 1.000.000,00	€ 1.000.000,00	€ -
<b>Sustainable mobility</b>	€ -	€ 6.966.000,00	€ 375.000,00	€ -	€ -	€ -	€ -
<b>Mobility and areas</b>	€ 22.307.000,00	€ 9.523.000,00	€ 3.506.000,00	€ 1.000.000,00	€ 1.000.000,00	€ 1.000.000,00	€ -
<b>Contribute to national and international organisations</b>	€ -	€ 200.000,00	€ -	€ -	€ -	€ -	€ -
<b>Contributions to ZBOs/RWTs</b>	€ -	€ 424.000,00	€ -	€ -	€ -	€ -	€ -

Source: Ministerie van Infrastructuur & Waterstaat 2022

# SUSTAINABILITY

## OVERALL EMISSIONS FROM ROAD TRAFFIC HAVE BEEN ON THE RISE?! TYRE WEAR IS THE NEWEST ISSUE.

In the Netherlands, emissions of particulate matter, nitrogen oxides and carbon dioxide per vehicle kilometre are much lower in 2020 compared to 1990 emissions. This is partly due to the use of improved technology in vehicles, making vehicles more fuel-efficient (less carbon dioxide), while also emitting fewer nitrogen oxides and particulates.

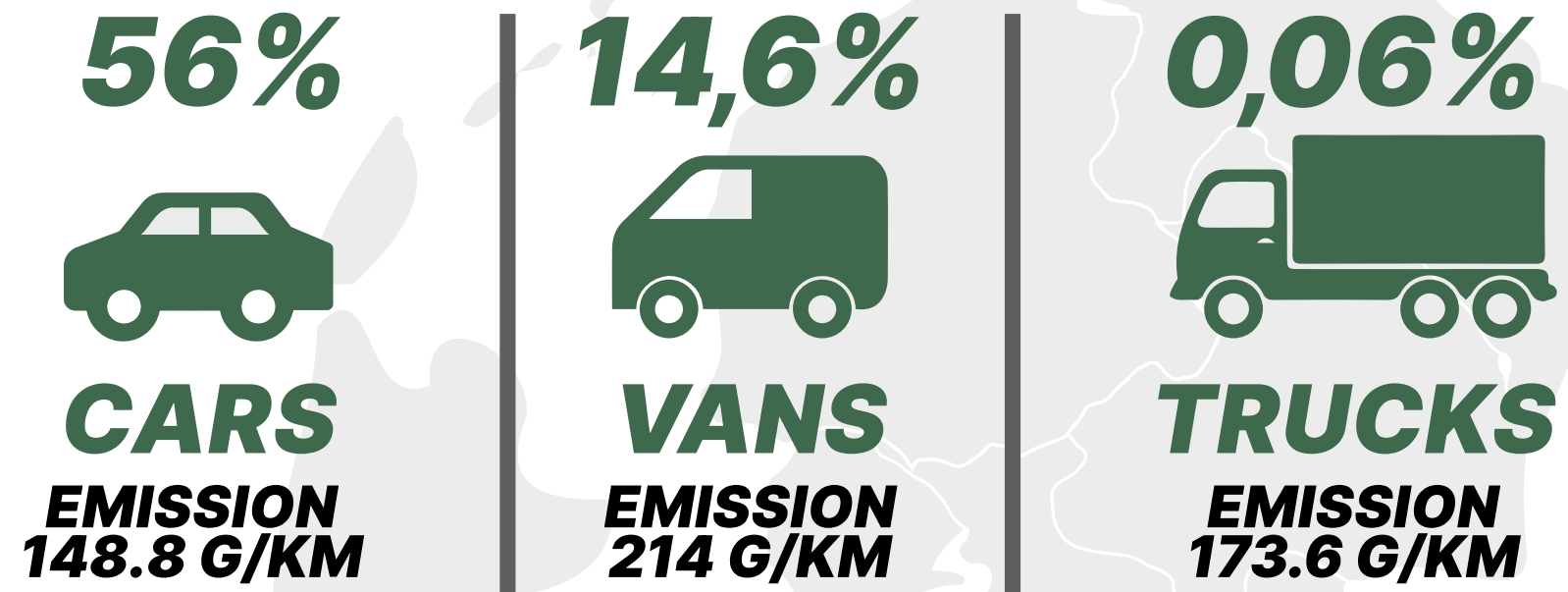
This table shows an overview of the trend in the number of kilometres driven by vehicles on public roads and, consequently, the trend in emissions between 2010 and 2020. In particular, the amount of nitrogen oxides emitted fell significantly, almost reduced by one half from 114 to 60 million kilograms of nitrogen oxides.

Zooming in on the types of vehicles responsible for emissions, passenger cars are responsible for the largest share of emissions. Delivery vans and trucks are the next two largest emitters of carbon dioxide, nitrogen oxides and particulates.

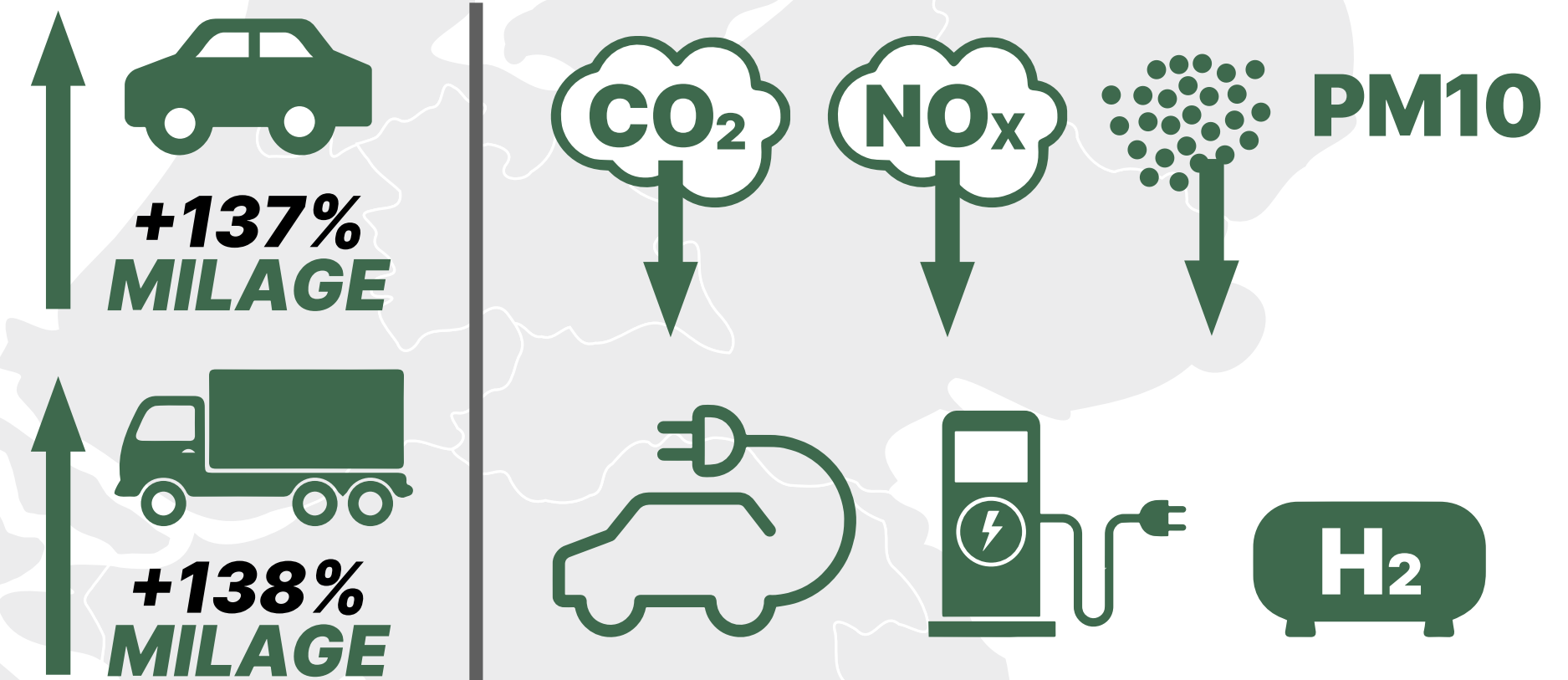
Translated into emissions per km by vehicle type, delivery vans are responsible for the most kilograms of emissions per km (CO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub>), followed by trucks and passenger vehicles.

People frequently talk about carbon dioxide and nitrogen oxide emissions, but particulate matter also plays an important role in emissions. Particulates, or particulate matter, is a collective term for tiny airborne dust particles up to 10 micrometres in diameter. Some particulates in vehicle emissions are so tiny that they can enter the human body. According to RIVM, airborne particulate

### TRADITIONALLY MOST POLLUTING:

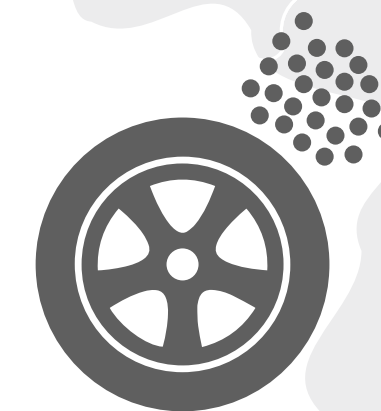


### CARS ARE GETTING CLEANER (CO<sub>2</sub>, NO<sub>x</sub> AND PM<sub>10</sub>)



### INSIGHT: THE NEW ISSUE:

**16.2x more**



**Particulates from tyre wear**  
than the legally permitted amount of particulates from emissions.



# SUSTAINABILITY

## OVERALL EMISSIONS FROM ROAD TRAFFIC HAVE BEEN ON THE RISE?! TYRE WEAR IS THE NEWEST ISSUE.

matter can cause asthma attacks, shortness of breath and coughing, and is also detrimental to the cardiovascular system. RIVM estimates that 7,000 to 12,000 people die annually due as a result of particulate matter emissions. [Source: RIVM 2018](#)

Road vehicles also emit particulate matter; this happens in two ways: particulate matter generated during combustion, which is released into the atmosphere through the exhaust, and particulate matter caused by tyre wear. In this context, we refer to particulate matter of up to 10 micrometres (PM10). Particulate matter released through fuel combustion has decreased significantly since 1990.

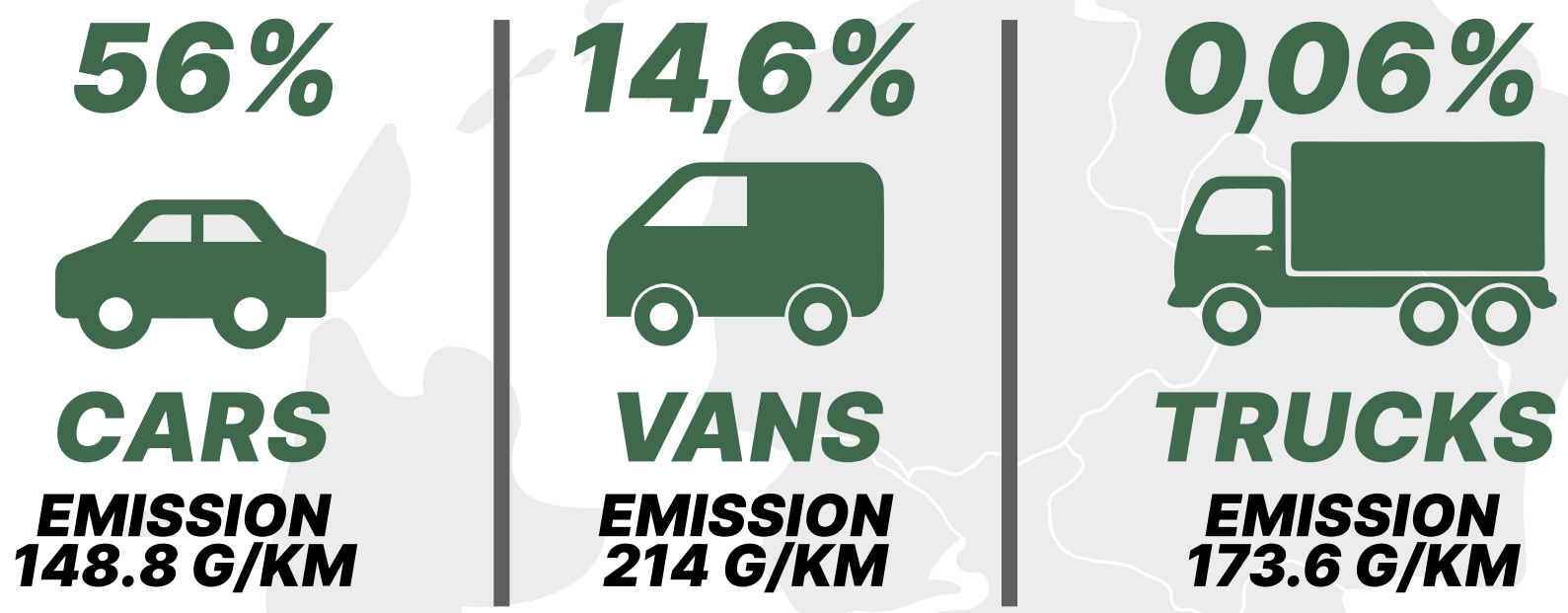
This table shows the current concentration of particulate emissions compared to the 1990 total: total particulate emissions have fallen by 84% over 20 years - a very positive development. However, the impact of particulate matter created by tyre wear is increasing. Emission Analytics states that car tyres on an electric vehicle produce up to a thousand times more particulate matter than exhaust fumes.

This new ratio is partly caused by the potential additional tyre wear that electric vehicles generate. According to Pirelli, electric vehicles cause 30% faster tyre wear than conventional vehicles. [Source: Pirelli](#)

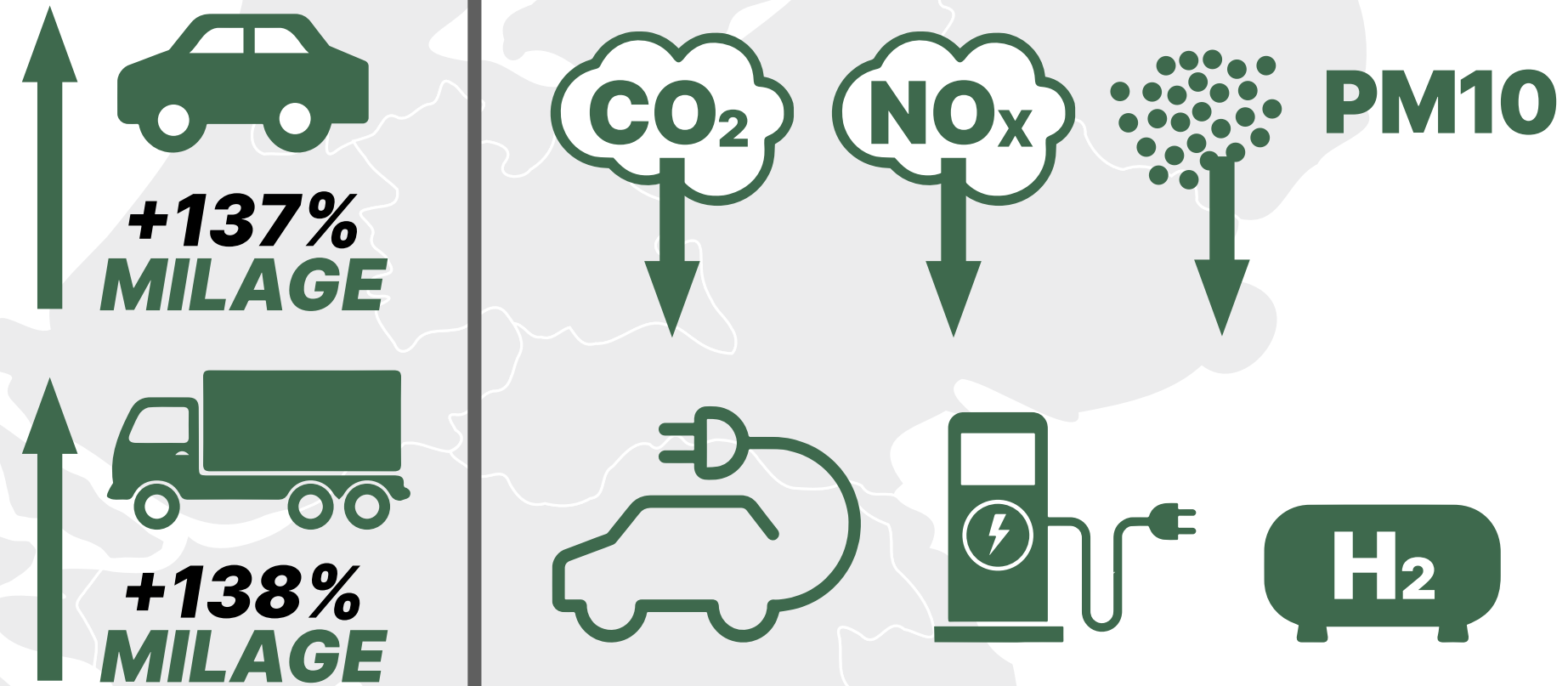
In addition, driving behaviour plays a significant role in how fast car tyres wear. The overview in this table shows that the amount of tyre wear exceeds the maximum allowable amount of particulate matter in exhaust fumes for every mode of transport. But it also shows the difference in tyre wear between aggressive driving and normal driving: aggressive driving causes 78 times more particulate matter to be released into the atmosphere than normal driving.

Furthermore, TNO states that 3.2% of all particulate matter released through tyre wear can be prevented by driving with the correct tyre pressure. [Source: TNO](#)

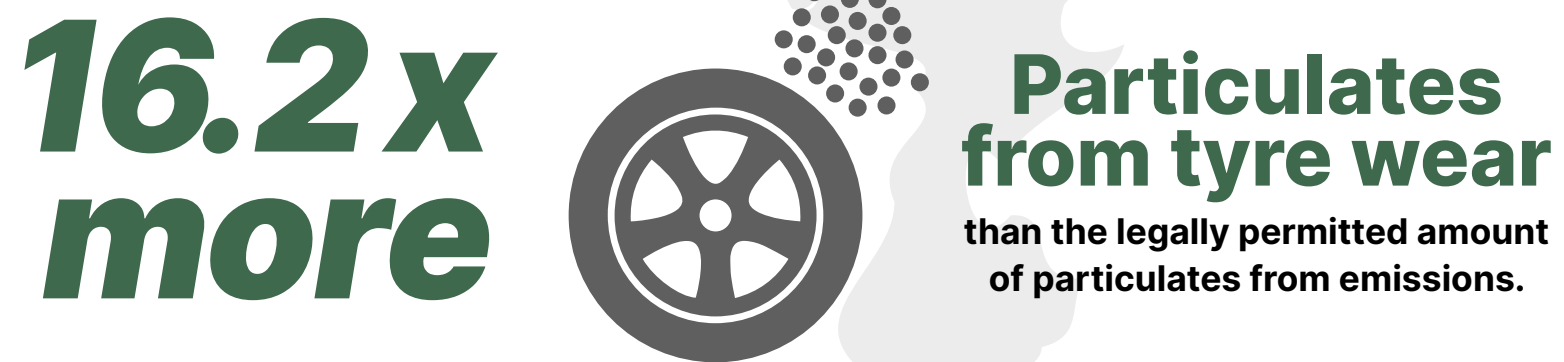
### TRADITIONALLY MOST POLLUTING:



### CARS ARE GETTING CLEANER (CO2, NOX AND PM10)



### INSIGHT: THE NEW ISSUE:



# SUSTAINABILITY

## OVERALL EMISSIONS FROM ROAD TRAFFIC HAVE BEEN ON THE RISE?! TYRE WEAR IS THE NEWEST ISSUE.

The mobility chapter describes that there will be 530,000 electric vehicles on Dutch roads by 2021, compared to 40,000 in 2010. This development can be partly attributed to the purchase subsidy referred to in the [Politics chapter](#), and to increasing charging infrastructure in the Netherlands: by 2021, there were 85,453 public and semi-public charging points in the Netherlands, including 2,577 fast charging points.

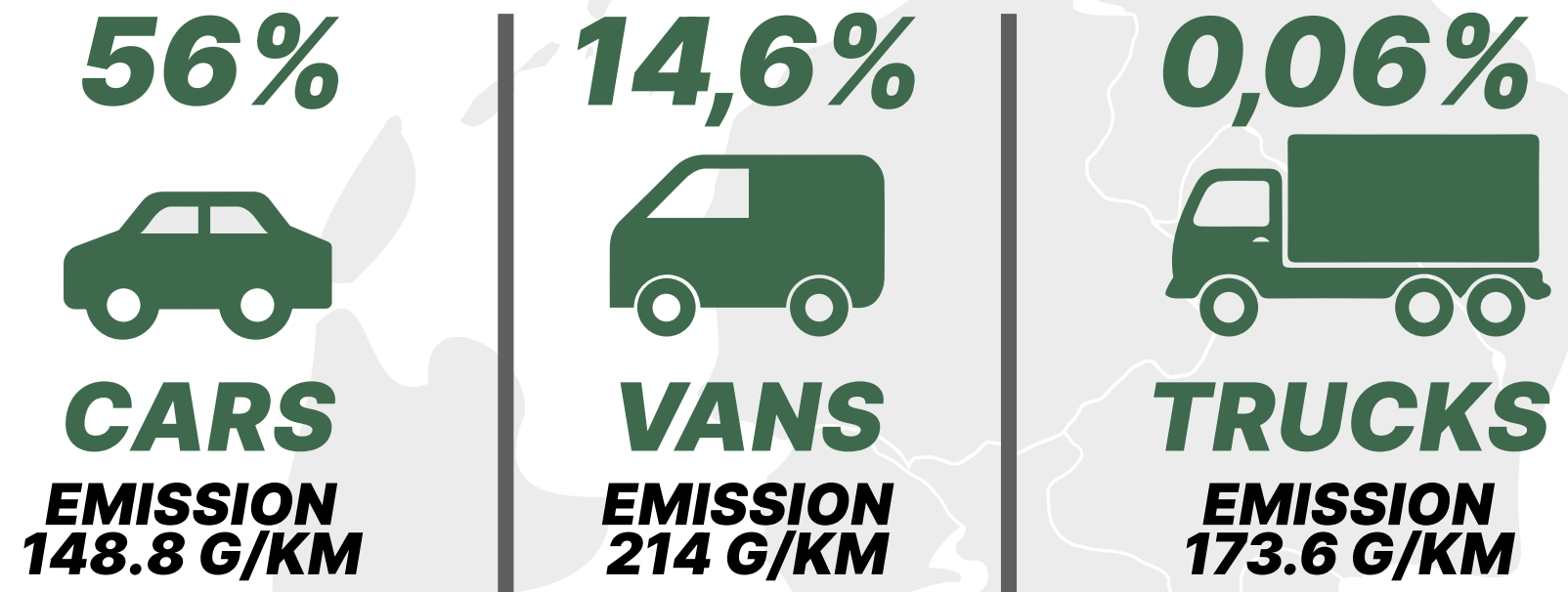
In five years, there has been an increase of over 51,000 charging points. Compared to other European countries, the Netherlands is in second place in terms of the number of charging points, with Norway coming first in 2020.

This table shows the ways in which people acquire electric cars. In 2021, 35% of electric cars in the Netherlands were purchased privately compared to 27% that were leased.

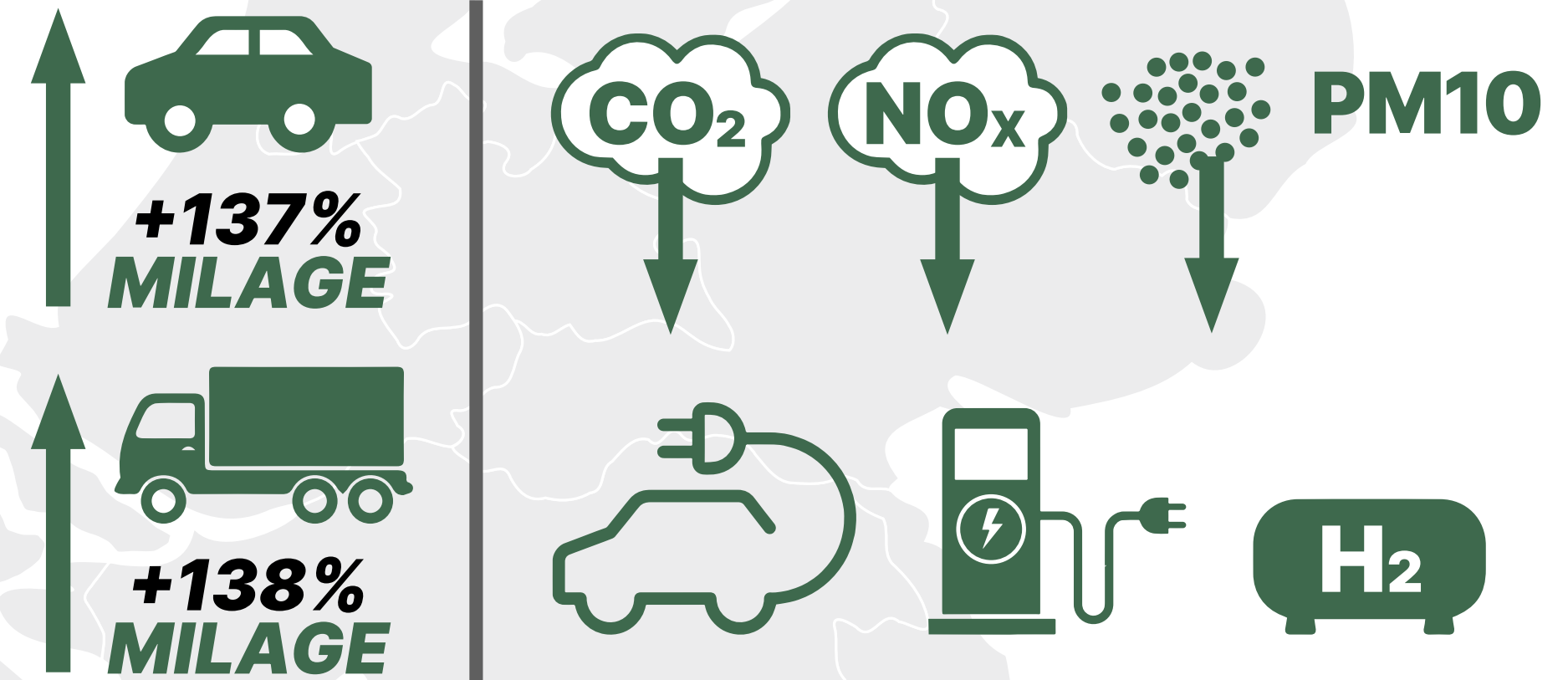
This table shows the number of hydrogen charging points in 2022. There are 15 public hydrogen filling stations in the Netherlands.

All things considered, the composition of the Dutch car fleet is changing and each year there are more cars that emit less or no greenhouse gas and particulate matter. Despite this, overall emissions from road traffic have been on the rise for the past five years, as our fleet continues to grow and people drive more and more. For our climate and environment, we need to start taking into account not only greenhouse gases and particulate matter in exhaust fumes, but also particulate matter created by tyre wear.

### TRADITIONALLY MOST POLLUTING:



### CARS ARE GETTING CLEANER (CO2, NOX AND PM10)



### INSIGHT: THE NEW ISSUE:

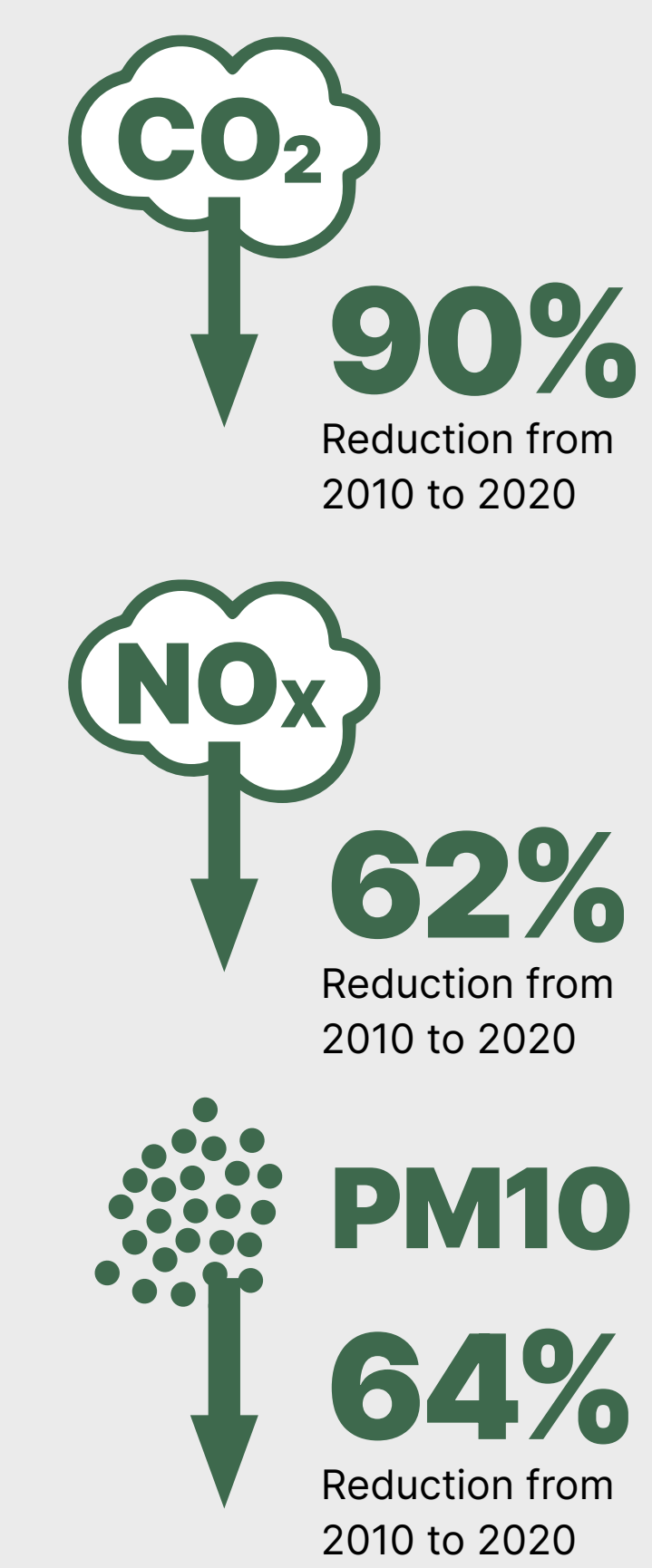


# ROAD TRAFFIC: VOLUME DEVELOPMENT AND ENVIRONMENTAL PRESSURE

Emissions of particulate matter, nitrogen oxides and carbon dioxide in the Netherlands are lower in 2020 than in 1990, despite the increase in road traffic. This is partly due to improved technology in vehicles, making vehicles more fuel-efficient (less carbon dioxide) and also causing lower nitrogen oxide and particulate emissions. Evolution of emissions and mileage 1990-2020 (1990 = 100)

Source: CLO 2022

YEAR	VEHICLE KM (MILLION KM)	CARBON DIOXIDE (BILLION KG)	NITROGEN OXIDES (MILLION KG)	PARTICULATE MATTER (PM10) (MILLION KG)
2010	132413,8	32,9	114	36
2011	132825,9	32,9	109	34
2012	132449,9	31,4	104	31
2013	131765,2	30,6	96	28
2014	132196,4	28,7	91	26
2015	134129,2	28,8	89	26
2016	137837,6	29,1	85	25
2017	139842	29,8	83	25
2018	141840,8	30,1	77	24
2019	144817	29,5	71	23
2020	126170	25,3	60	20





# ROAD TRAFFIC EMISSIONS BY VEHICLE TYPE

## CARBON DIOXIDE (CO<sub>2</sub>) ROAD TRAFFIC TOTAL (MILLION KG)

Passenger cars	14614,81
Motorbikes	278,78
Mopeds and microcars	171,05
Delivery vans	3810,55
Trucks	1613,89
Tractors	4936,97
Autobuses	395,14
Special vehicles	249,53

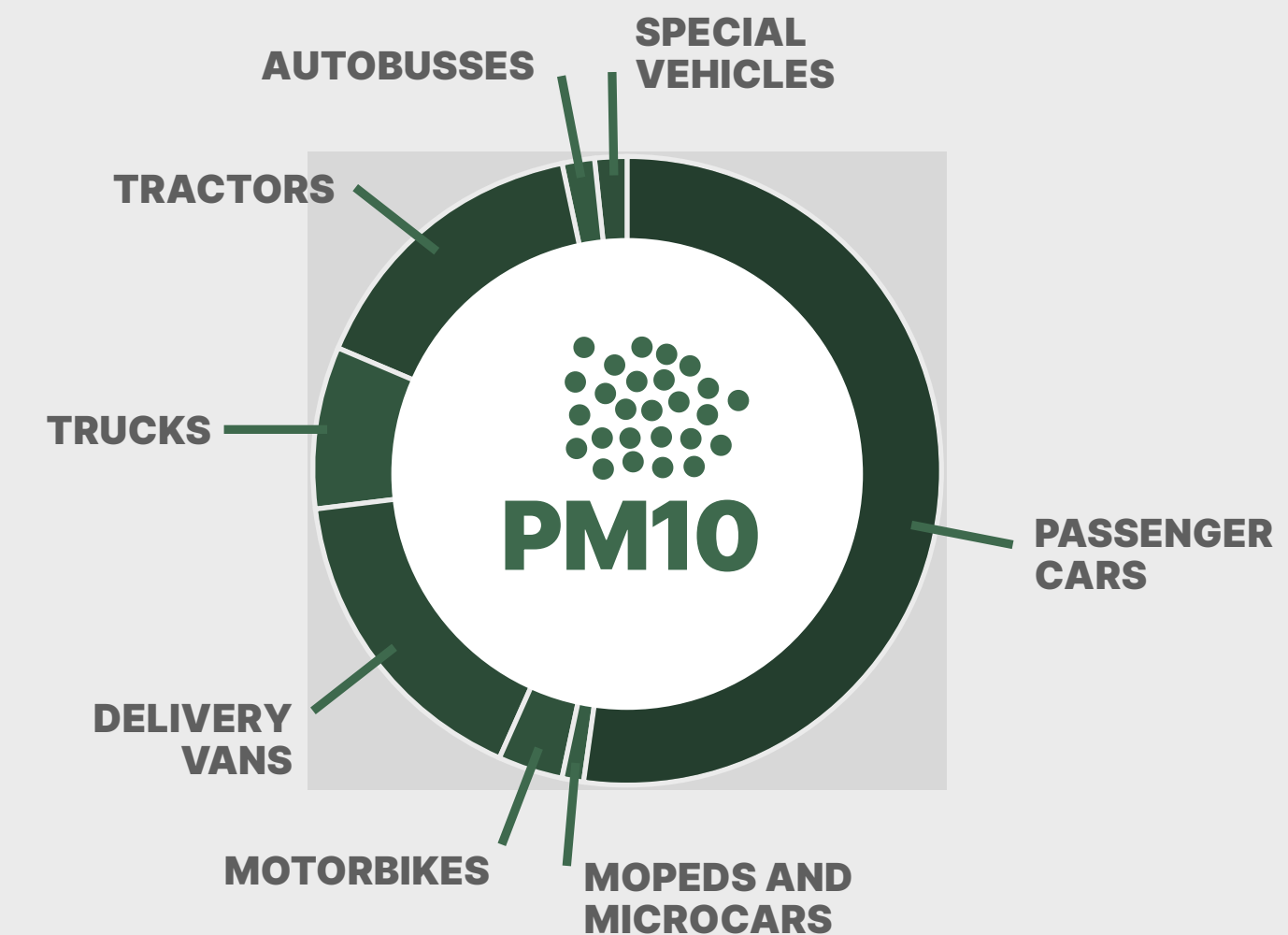
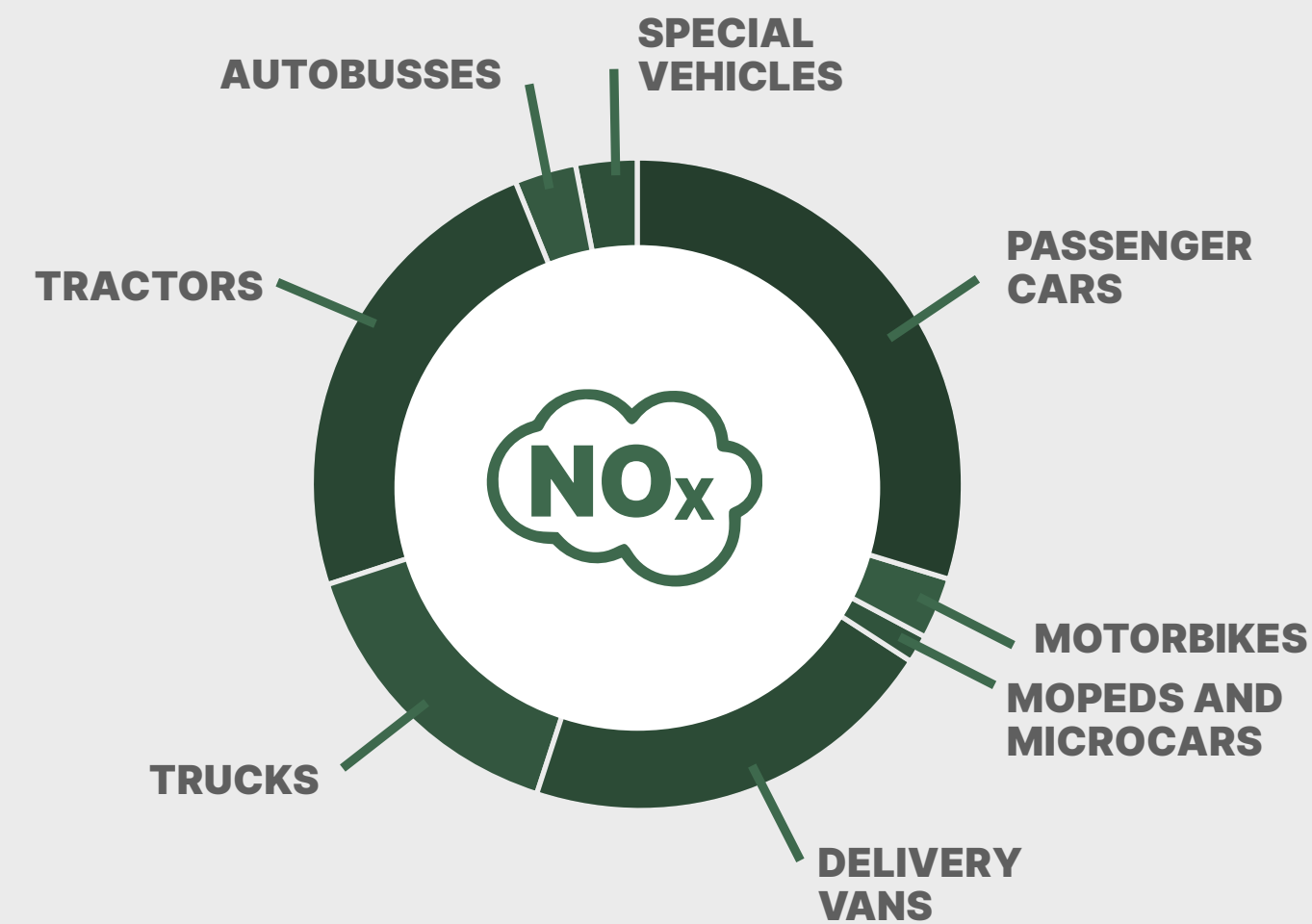
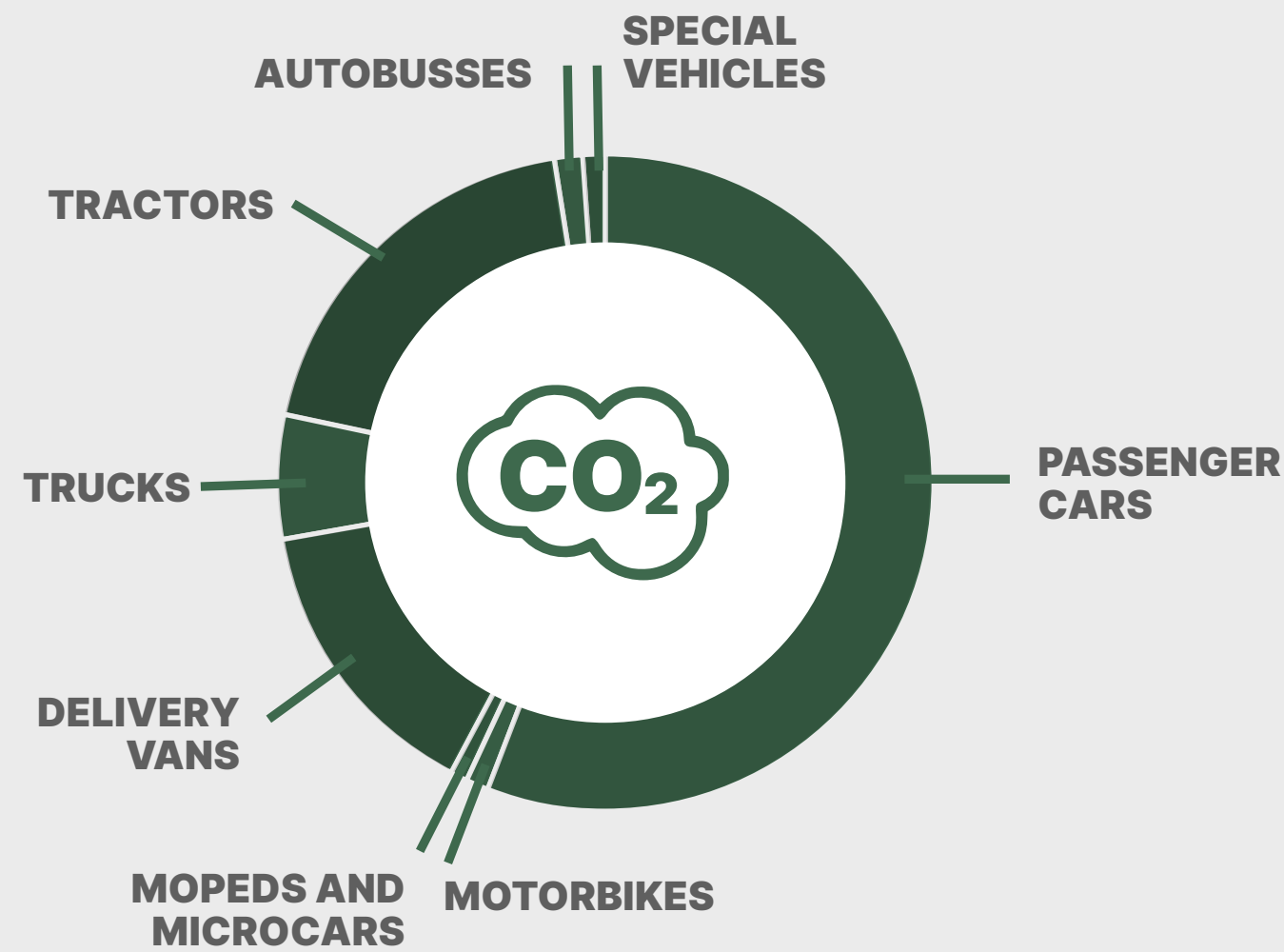
## NITROGEN OXIDES (NO<sub>x</sub>) ROAD TRAFFIC TOTAL (MILLION KG)

Passenger cars	20,35
Motorbikes	1,57
Mopeds and microcars	1,04
Delivery vans	13,47
Trucks	9,16
Tractors	16,72
Autobuses	1,79
Special vehicles	2,05

## PARTICULATE MATTER (PM<sub>10</sub>) 4 ROAD TRAFFIC TOTAL (MILLION KG)

Passenger cars	1,83
Motorbikes	0,04
Mopeds and microcars	0,12
Delivery vans	0,57
Trucks	0,29
Tractors	0,54
Autobuses	0,06
Special vehicles	0,05

Source: CLO 2022



# PARTICULATE MATTER EMISSIONS PER VEHICLE KILOMETRE (INDEX: 1990 =100%)

YEAR	TOTAL PARTICULATE MATTER	PASSENGER TRANSPORT PARTICULATE MATTER	FREIGHT TRANSPORT PARTICULATE MATTER
1990	100	100	100
1991	96	91	96
1992	89	84	87
1993	83	78	77
1994	77	74	71
1995	72	71	64
1996	66	67	57
1997	61	63	51
1998	57	60	45
1999	54	58	41
2000	51	53	38
2001	48	50	35
2002	44	47	32
2003	42	45	30
2004	39	43	28
2005	38	41	27

YEAR	TOTAL PARTICULATE MATTER	PASSENGER TRANSPORT PARTICULATE MATTER	FREIGHT TRANSPORT PARTICULATE MATTER
2006	36	39	25
2007	34	38	23
2008	32	36	21
2009	29	34	20
2010	27	32	18
2011	25	30	17
2012	23	28	15
2013	21	27	14
2014	20	25	13
2015	19	24	12
2016	18	23	11
2017	18	23	11
2018	17	22	10
2019	16	21	9
2020	16	21	9





Source: CLO 2020 (Compendium voor de leefomgeving)




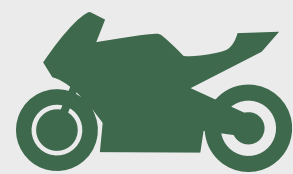
# TOTAL KILOMETRES ALL VEHICLES 1990-2020

**+146%**  
**AVERAGE  
VEHICLE  
MILLAGE**

**+137%**  
MORE MILES  
(1990-2019)  
  
**CARS**

**+236%**  
MORE MILES  
(1990-2019)  
  
**VANS**

**+138%**  
MORE MILES  
(1990-2019)  
  
**TRUCKS**

**+173%**  
MORE MILES  
(1990-2019)  
  
**OTHER**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Passenger cars</b>	81871	81164	84626	83538	85226	84152	85453	87256	89210	92573	93198	94262,8	96254,2	97414,3	99939,9	99504,5
<b>Delivery vans</b>	8065	8571	9518	10475	10551	10562	10938	11728	12771	14018	15351	16398,8	16613,7	17010,2	17721,3	17908,7
<b>Trucks + tractors</b>	5477	5792	6132	6097	6096	6345	6272	6348	6419	6877	6765	6592	6600	6610	6685	6797
<b>other vehicles</b>	3422	3150	3327	3469	3594	3657	3820	3600	3721	3806	3816	3797,2	3916,4	3963,4	3907,2	4164,1
<b>Total</b>	98835	98677	103603	103579	105467	104716	106483	108932	112121	117274	119130	121050,8	123384,3	124997,9	128253,4	128374,3

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Passenger cars</b>	100468,3	102218,4	101250,2	101514	102307,6	102956,4	103122,1	103211,2	103699,1	105088,9	107708,1	108936,1	110185	112305,3	98340
<b>Delivery vans</b>	17253,1	17567,7	17859,3	17407	17287,3	17056,1	16649	16309,2	16295,5	16544,3	17144,3	17668,4	18411,9	18995,1	17870
<b>Trucks + tractors</b>	6947	7138	7313,7	7227,6	7192,9	7113,1	7007,9	6617,3	6620,1	6923,4	7330,9	7436,1	7393,8	7590,5	9350
<b>other vehicles</b>	4114,6	5001,7	5254,9	5486	5626	5700,3	5670,9	5627,5	5581,7	5572,6	5654,3	5801,3	5850,1	5926,1	610
<b>Total</b>	128783	131925,8	131678,1	131634,6	132413,8	132825,9	132449,9	131765,2	132196,4	134129,2	137837,6	139842	141840,8	144817	126170



Source: CBS 2020



# EMISSIONS ANALYTICS: 1,000 TIMES MORE PARTICULATES FROM CAR TYRES THAN FROM EXHAUST FUMES [Source](#)

TNO: 3.2% of all particulate emissions is preventable by driving with correct tyre pressure. Exacerbated by increasing popularity of large, heavy vehicles such as SUVs and growing demand for electric vehicles, which are heavier than standard cars because of the batteries. [Source](#) On average, electric car tyres wear 30% faster due to car weight [Source](#)

	PARTICULATE MATTER EMISSIONS (MG/KM)	RATIO TO THE ALLOWED LIMIT
Tyre wear from aggressive driving	5760	1280
Tyre wear from normal driving	73	16,22222222222222
Tyre wear of used tyre from normal driving	36,5	78,9041095890411
Average particulate matter from exhaust	0,02	0,004444444444444444
Legally permitted amount of particulate matter from exhaust	4,5	1

[Source: Emission Analytics 2020](#)

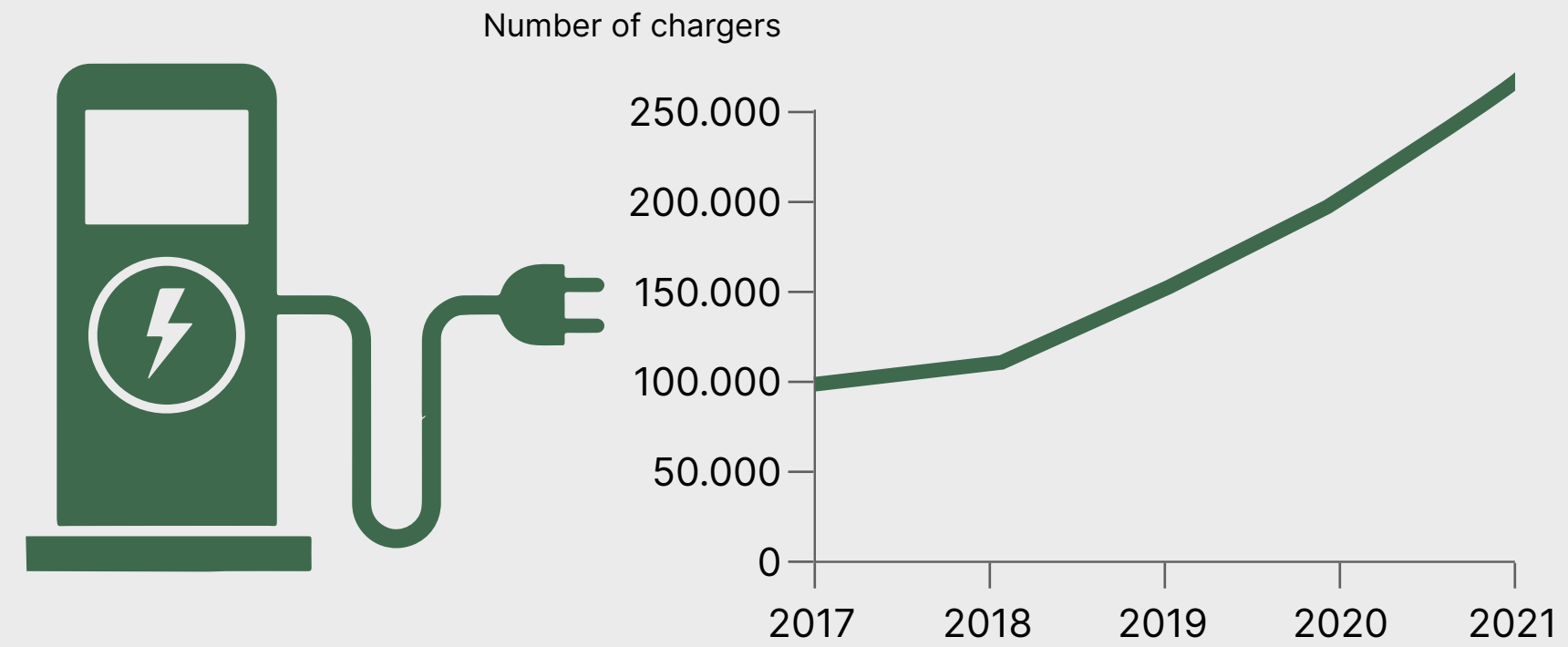
**16.2x  
more** 

**Particulates  
from tyre wear**

**than the legally permitted amount  
of particulates from emissions.**

# NUMBER OF CHARGING POINTS NETHERLANDS

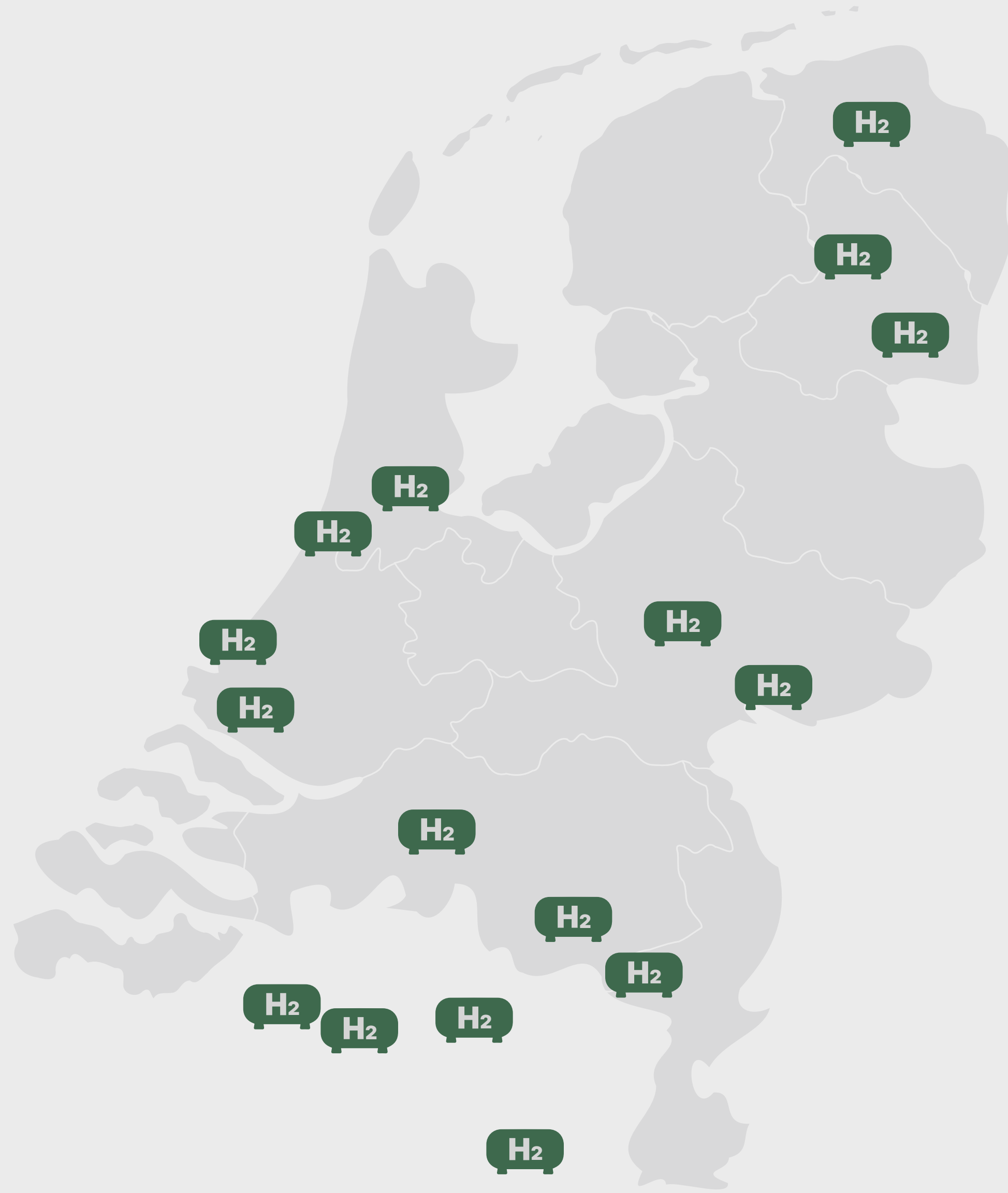
NUMBER OF CHARGING POINTS	2017	2018	2019	2020	2021
<b>Regular public + semi-public</b>	32875	35861	49520	63586	82876
<b>24/7 Public access</b>	15288	20228	27773	39968	51423
<b>Limited public access</b>	17587	15633	21747	23618	31453
<b>Fast charging points</b>	755	1116	1262	2027	2577
<b>Regular + fast charging points</b>	33630	36977	50782	65613	85453
<b>Total</b>	<b>100135</b>	<b>109815</b>	<b>151084</b>	<b>194812</b>	<b>253782</b>



[Source: RVO 2022](#)

# NUMBER OF PUBLIC HYDROGEN TANKS

LOCATION	FILLING PRESSURE (BAR)	OPERATOR	VEHICLE
Rhoon	350/700	Air Liquide	
Arnhem	350/700	TotalEnergies	
Den Haag	350/700	Kekhof &Zn	
Hoofddorp	700	Shell	
Amsterdam	350/700	OrangeGas	
Nieuwegein	350/700	Hysolar	
Amsterdam	700	Shell	
Pesse	350/700	Green Planet	
Groningen	350/700	Holthausen	
Assen	700 (slow-fill)	OrangeGas	
Doetinchem	350/700	Kuster Energy	
Breda	350/700	TotalEnergies	
Horst	350/700 (slow-fill)	Vissers Energy	
Veldhoven	350/700	TotalEnergies	
Zaventem (BE)	350/700	Air Liquide	
Halle (BE)	700	DATS 24	
Antwerpen (BE)	350/700	CMB.Tech	
Antwerpen (BE)	350/700	DATS 24	
Leuven (BE)	700	DATS 24	



Source: [waterstofnet 2022](https://waterstofnet.nl/)



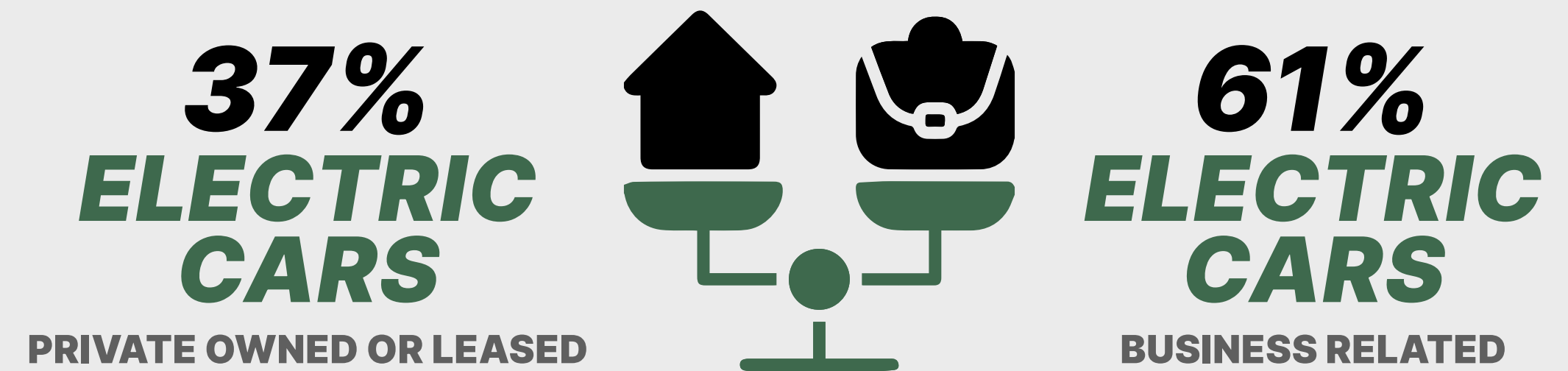


# ELECTRIC CARS SHARE IN TOTAL SALES RELATIVE TO EUROPEAN COUNTRIES

All-electric sales share on track to 1 in 4, but Netherlands no longer a trailblazer. Three-quarters of electric car registrations are business drivers EV purchase financial construction

[Source RVO 2021](#)

FINANCIAL CONSTRUCTION	2020 (AS PERCENTAGE)	2021 (AS PERCENTAGE)
Private purchase	30%	35%
Business lease as employee	30%	27%
Business purchase	21%	17%
Business lease as self-employed person	10%	8%
Private lease	7%	11%
Other	2%	2%

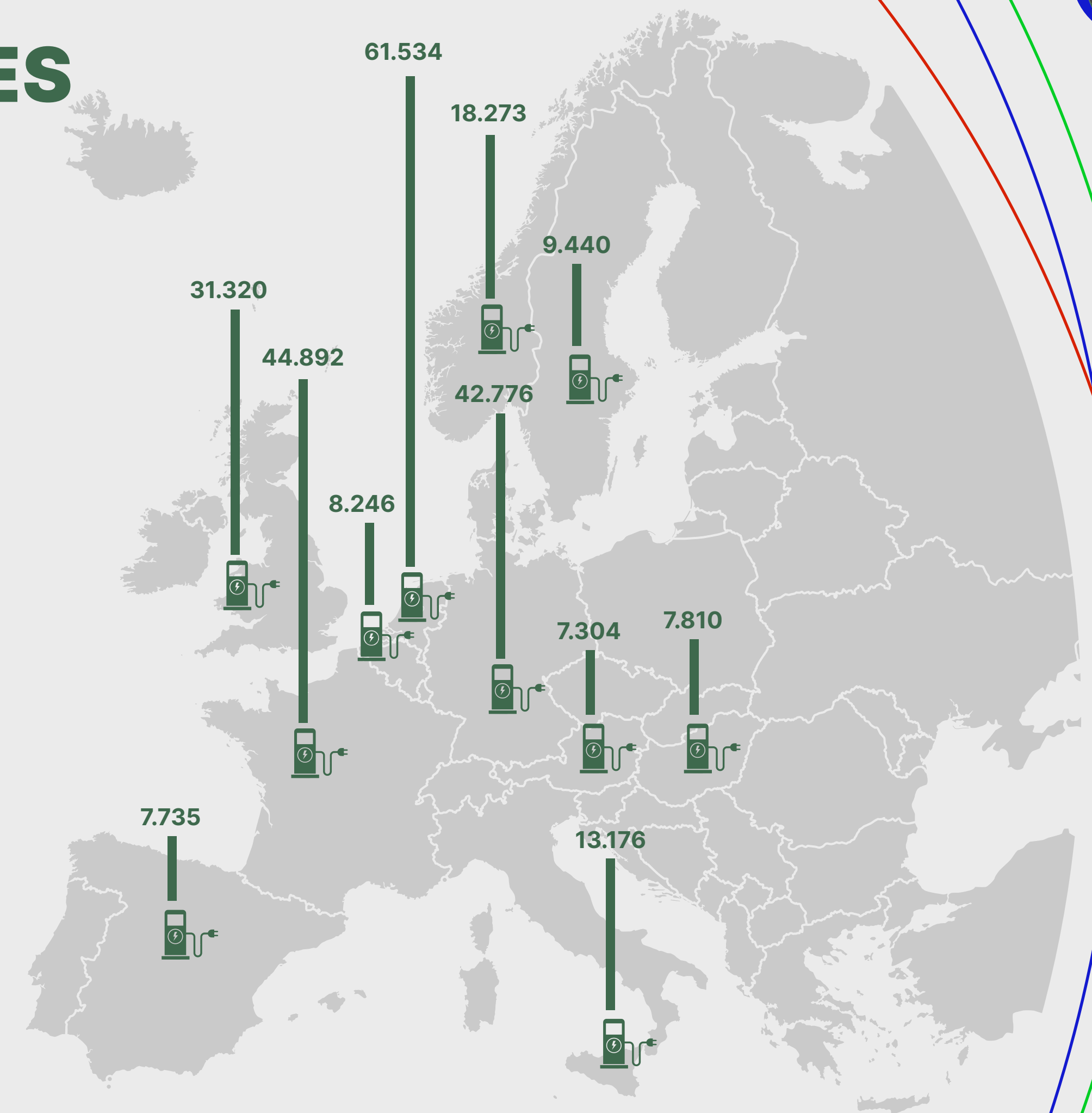


# CHARGING INFRASTRUCTURE RELATIVE TO EUROPEAN COUNTRIES

Four countries (the Netherlands, Germany, France and the UK) together account for 62% of the total number of charging points (167,000)

[Source: FIER 2021](#)

COUNTRY	TOTAL NUMBER OF PUBLIC CHARGING POINTS 2020
Netherlands	61.534
Norway	18.273
Sweden	9.440
Belgium	8.246
France	44.892
United Kingdom	31.320
Spain	7.735
Italy	13.176
Germany	42.776
Austria	7.304
Hungary	7.810





# ECONOMY

## PARTS AND RAW MATERIALS PRICES UNDER MAJOR PRESURE DUE TO MATERIAL SHORTAGES

With DAF, VDL NedCar and VDL Bus & Coach the Netherlands has its own automotive industry, but you have to look beyond the final product to map the overall industry in the Netherlands. In the Netherlands, the automotive manufacturing and service industry accounts for €65 billion in annual turnover. Automotive production and development accounts for €20 billion.

Furthermore, the Netherlands is a major supplier of auto parts, metals, electrical engineering and chemicals. 90% of sales in the automotive industry are intended to be shipped abroad.

In the Netherlands, new car sales have been declining since 2020. Over 120,000 fewer new cars were sold in 2021 compared to 2019. In contrast, used cars sales are growing steadily. About two million used cars were sold annually between 2017 and 2021. Over 100,000 more used cars were sold in 2020 and 2021 compared to 2019. So the decrease in new sales and the increase in used cars sold appear to be interrelated.

There might be a connection between the decline in new sales and the fact that car manufacturers are having great difficulty in achieving desired production numbers due to raw material shortages. This table shows that a number of major car manufacturers and manufacturing companies are realising lower production numbers in 2021 than planned. Toyota, Renault and Volkswagen, among others, are producing over 200,000 fewer cars than planned. The main reason is the ongoing scarcity of microchips needed for production. It is estimated that by 2021, the global automotive sector will have suffered a \$200 billion in losses due to this microchip shortage. An additional consequence is that the average delivery time of new cars in Q3 2022 is 32 weeks. This could be a cause of the fall in new cars sales in 2021.



€45 BILLION REVENUE



MAINTENANCE



SALES



RENTAL



LEASE

€20 BILLION REVENUE



CAR PARTS



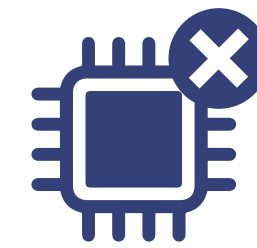
RAW MATERIALS



ELECTRICAL ENGINEERING

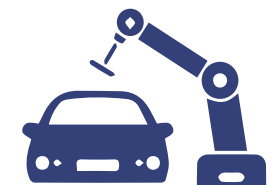


CHEMICAL ENGINEERING



SHORTAGE

+/- -20%



PRODUCTION

32 WEEKS



DELIVERY TIME



\$200 BILLION LOSS FOR THE INDUSTRY

## 2030 ROAD PRICING IS COMING

### CURRENT

FROM €0,007 PER KILOMETRE BASED ON 10.000 KM

FROM €0,008 PER KILOMETRE BASED ON 25.000 KM

### ROAD PRICING

FROM €0,005 PER KILOMETRE BASED ON 10.000 KM

FROM €0,06 PER KILOMETRE BASED ON 25.000 KM



14.000 TURNING POINT



FROM €0,08 PER KILOMETRE



GREEN DRIVING = CHEAP DRIVING!





# ECONOMY

## PARTS AND RAW MATERIALS PRICES UNDER MAJOR PRESURE DUE TO MATERIAL SHORTAGES

From the year 2030, the government will implement road pricing, where people do not pay road tax for owning a car, but per kilometre driven. This change affects a vehicle's Total Cost of Ownership (TCO): the combined fixed and variable costs per month that a car owner pays. The next table shows the monthly average TCO of a vehicle spread across the five car segments.

Diesel cars in segments B to E have on average the highest TCO compared to electric and petrol vehicles. This chart further specifies the costs proportionally by segment. Depreciation is the major cost factor in each segment, with electric cars having a higher depreciation rate compared to fossil fuel-powered cars.

Further differences between fuel cars and electric cars are in energy costs. This table shows the cost of electric charging compared to a petrol-powered car. Prices are based on electricity and fuel price levels in October 2022. For drivers of electric cars, charging at home is the most economical.

It saves €0.01 per kilometre compared to public charging and €0.04 compared to fast charging. In all situations, the energy cost of an electric car is lower than that of the average petrol car.

The next table shows the impact of road pricing on variable monthly costs. These costs include road tax, vehicle tax, fuel duty and an expected kilometre charge of €0.07. 14,000 kilometres per year is the threshold below which road pricing is cheaper compared to the current situation. If you drive 25,000 kilometres per year, the variable costs will be €38 higher on average.

The chapter sustainability describes that electric cars are gaining ground in Dutch vehicle fleets. This also means that the number of lithium-ion batteries in the Netherlands is increasing. The average lifetime of these batteries is 200,000 kilometres. After this period, the battery is still suitable for other applications.

 **€65 BILLION REVENUE**

**€45 BILLION REVENUE**



MAINTENANCE



SALES



RENTAL



LEASE

**€20 BILLION REVENUE**



CAR PARTS



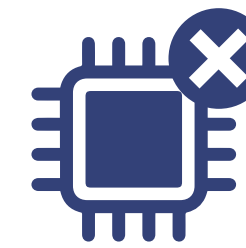
RAW MATERIALS



ELECTRICAL ENGINEERING

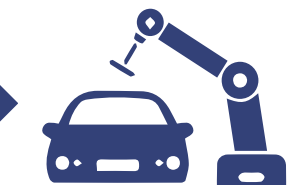


CHEMICAL ENGINEERING



SHORTAGE

+/- -20%



PRODUCTION

32 WEEKS



DELIVERY TIME



**\$200 BILLION LOSS FOR THE INDUSTRY**

## 2030 ROAD PRICING IS COMING

### CURRENT

FROM €0,007 PER KILOMETRE  
BASED ON 10.000 KM



FROM €0,0008 PER KILOMETRE  
BASED ON 25.000 KM

### ROAD PRICING

FROM €0,005 PER KILOMETRE  
BASED ON 10.000 KM



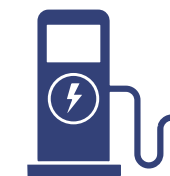
FROM €0,06 PER KILOMETRE  
BASED ON 25.000 KM



14.000 TURNING POINT

**PAY PER KILOMETER**

FROM €0,08 PER KILOMETRE



**GREEN DRIVING = CHEAP DRIVING!**

# AUTOMOTIVE INDUSTRY TURNOVER

 **€45 BILLION REVENUE**



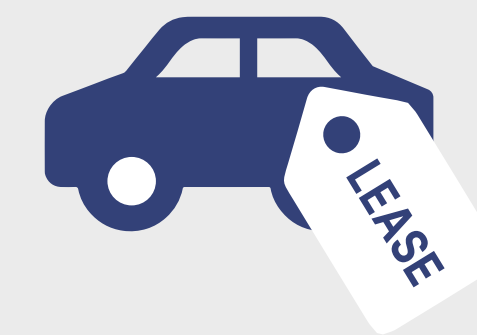
MAINTENANCE



SALES



RENTAL



LEASE

 **€65 BILLION REVENUE**



CAR PARTS



RAW MATERIALS



ELECTRICAL ENGINEERING



CHEMICAL ENGINEERING

 **€20 BILLION REVENUE**



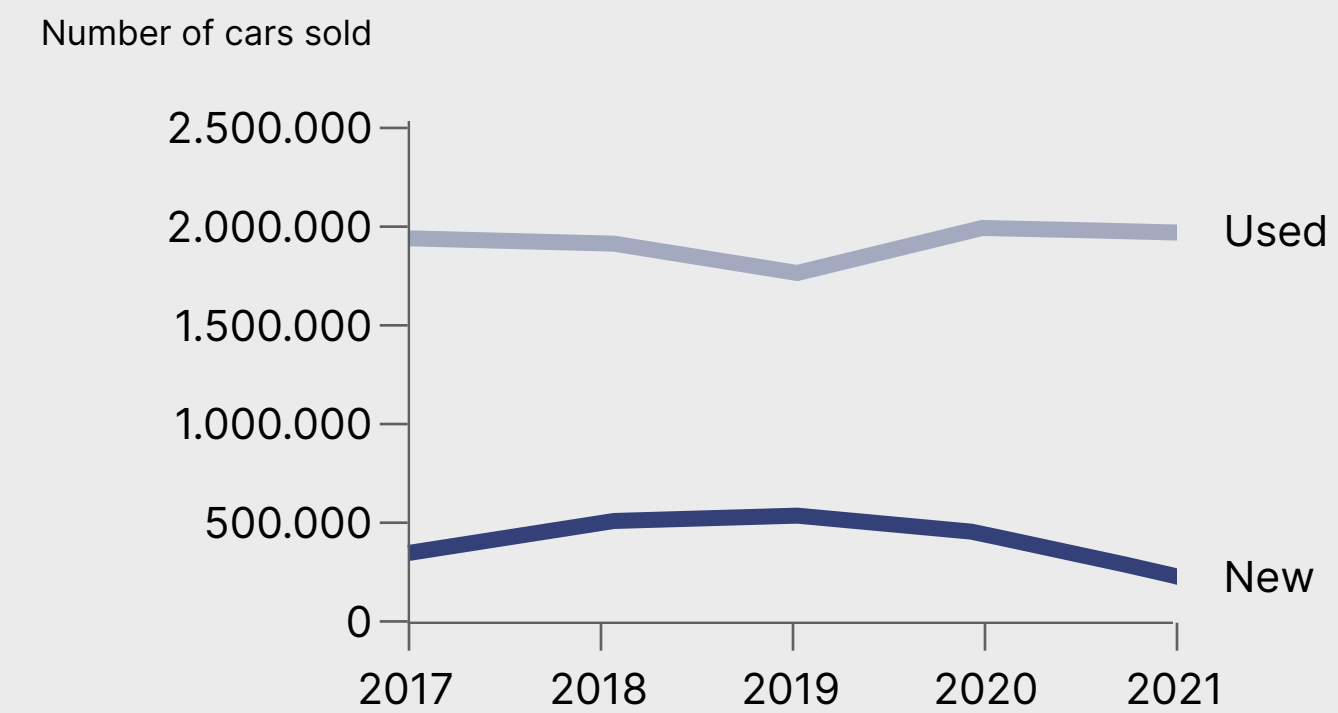
# NEW CARS AND USED CARS SALES

Number of new car sales 2017-2021 and number of used car sales (private and business) in relation to the raw materials shortage.

Conclusion: number of new car sales decreasing, used car market increasing. There appears to be a strong connection with the fact that car manufacturers are having great difficulty in achieving desired production numbers due to raw material shortages.

[Source Bovag 2021](#)

YEAR	NUMBER OF NEW CAR SALES	NUMBER OF USED CARS SOLD
2017	418.461	1.980.000
2018	443.812	1.860.090
2019	446.114	1.886.339
2020	351.000	2.025.564
2021	324.710	2.008.222

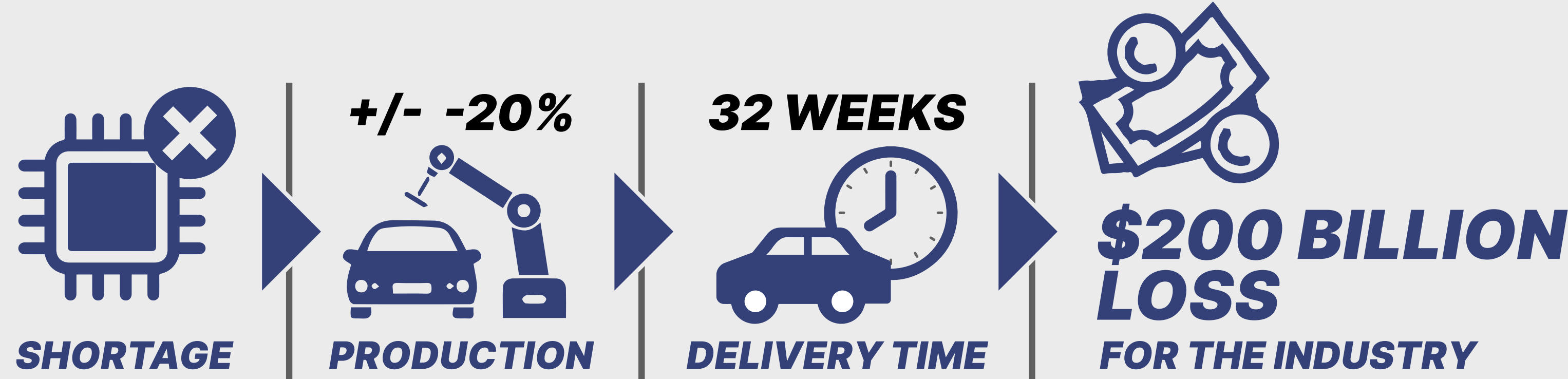




# CAR PRODUCTION SLACKS

Car manufacturers that have produced fewer vehicles due to production holdups in 2021. Total losses automotive industry: \$200 billion by 2021 due to microchip shortage. [Source](#) New car delivery waiting times: average 32 weeks in Q3 2022. [Source](#)

MANUFACTURER	PLANNED NUMBER OF CARS PRODUCED IN 2021	NUMBER OF CARS PRODUCED BELOW NUMBERS PLANNED IN 2021	SOURCE
Skoda	1,250,000	100.000	<a href="#">Source</a>
VDL Nedcar (manufacturing company of BMW X series and Mini x)	125,214	20.000	<a href="#">Source</a>
Toyota	8,783,985	200.000	<a href="#">Source</a>
Volkswagen	8513000	213000	<a href="#">Source</a>
Renault	800,000	300.000	<a href="#">Source</a>
Audi	1,830,378	190.000	<a href="#">Source</a>





# TOTAL COST OF OWNERSHIP

Total cost of ownership private car per month (fixed + variable).

[Source: RVO 2022](#)

	BEV	PETROL	DIESEL
<b>A segment</b>	€ 366,00	€ 362,00	€ -
<b>B segment</b>	€ 556,00	€ 477,00	€ 569,00
<b>C segment</b>	€ 660,00	€ 619,00	€ 765,00
<b>D segment</b>	€ 774,00	€ 792,00	€ 938,00
<b>E segment</b>	€ 1.175,00	€ 1.737,00	€ 1.731,00



# MONTHLY FIXED AND VARIABLE COSTS

Concerns the monthly fixed and variable costs calculated over the first 4 years at 15,000 kilometres per year Energy prices are based on the average price over the past 12 months (May to April 2022)

	INSURANCE	REPAIR, MAINTENANCE AND TYRES	MOTOR VEHICLE TAX	ENERGY	DEPRECIATION	TOTAL
<b>A segment BEV</b>	11%	6%	3%	15%	65%	100%
<b>A segment Petrol</b>	10%	10%	7%	32%	41%	100%
<b>B segment BEV</b>	10%	5%	3%	11%	71%	100%
<b>B segment Petrol</b>	10%	9%	9%	28%	44%	100%
<b>B segment Diesel</b>	8%	7%	16%	15%	53%	100%
<b>C segment BEV</b>	10%	4%	4%	9%	72%	100%
<b>C segment Petrol</b>	10%	8%	10%	23%	50%	100%
<b>C segment Diesel</b>	8%	6%	16%	13%	57%	100%
<b>D segment BEV</b>	10%	4%	4%	8%	74%	100%
<b>D segment Petrol</b>	9%	7%	9%	21%	54%	100%
<b>D segment Diesel</b>	8%	6%	16%	11%	60%	100%
<b>E segment BEV</b>	8%	3%	5%	14%	72%	100%
<b>E segment Petrol</b>	5%	3%	5%	14%	72%	100%
<b>E segment Diesel</b>	5%	3%	11%	8%	72%	100%

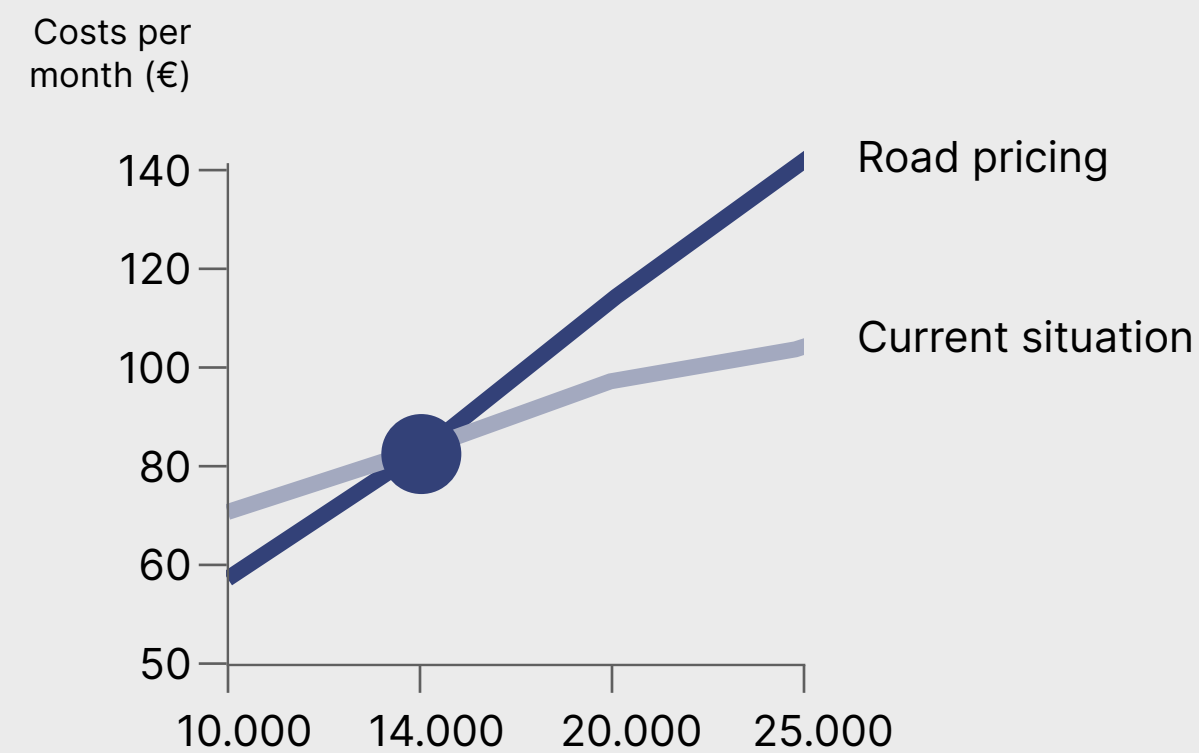
[Source: RVO 2022](#)



# ROAD PRICING VARIABLE COSTS

Costs (variable only) relate to road tax, vehicle tax, fuel duty, no bpm. Fuel duty: €0.53. Kilometre charge: €0.07

ANNUAL MILEAGE (KM)	CURRENT VARIABLE COSTS PER MONTH	MONTHLY VARIABLE COST ROAD PRICING	DIFFERENCE PER MONTH
10.000	€ 72,00	€ 58,00	€ -14,00
14.000	€ 82,00	€ 82,00	€ -
20.000	€ 96,00	€ 117,00	€ 21,00
25.000	€ 108,00	€ 146,00	€ 38,00




Source: RVO 2022

## CURRENT

**FROM €0,007  
PER KILOMETRE**  
BASED ON 10.000 KM


**FROM €0,0008  
PER KILOMETRE**  
BASED ON 25.000 KM



## ROAD PRICING

**FROM €0,005  
PER KILOMETRE**  
BASED ON 10.000 KM

**FROM €0,06  
PER KILOMETRE**  
BASED ON 25.000 KM



**14.000  
TURNING POINT**

# ELECTRIC CHARGING COSTS

Price level October 2022

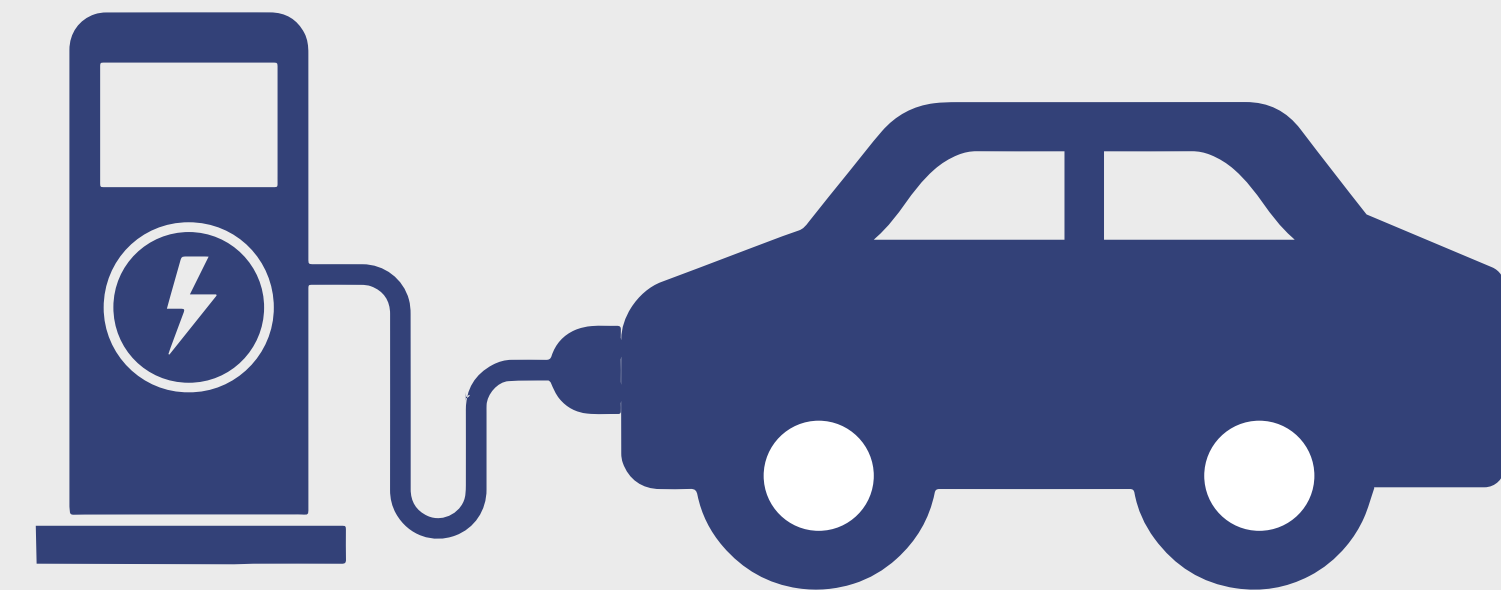
[Source ANWB 2022](#)

CHARGING METHOD	PRICE KWH	PRICE PER CHARGE**	PRICE PER KILOMETRE	PRICE PER YEAR***
Home charging	0,37	7,66	0,08	1149
Public charging point	0,41	8,49	0,09	1275
Fast charging	0,60	12,42	0,12	1860
Mix 60-30-10	0,41	8,49	0,09	1275
Mix 90-10 (no home charging point)	0,43	8,90	0,09	1335
Petrol car 1:15			0,13	2010

\*\* 20.7 kWh

\*\*\* 15,000 km per year

**FROM €0,08  
PER KILOMETRE**







automotive  
center of  
expertise

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