Dutch BEV policy in an international perspective

June 2023

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Summary of key findings

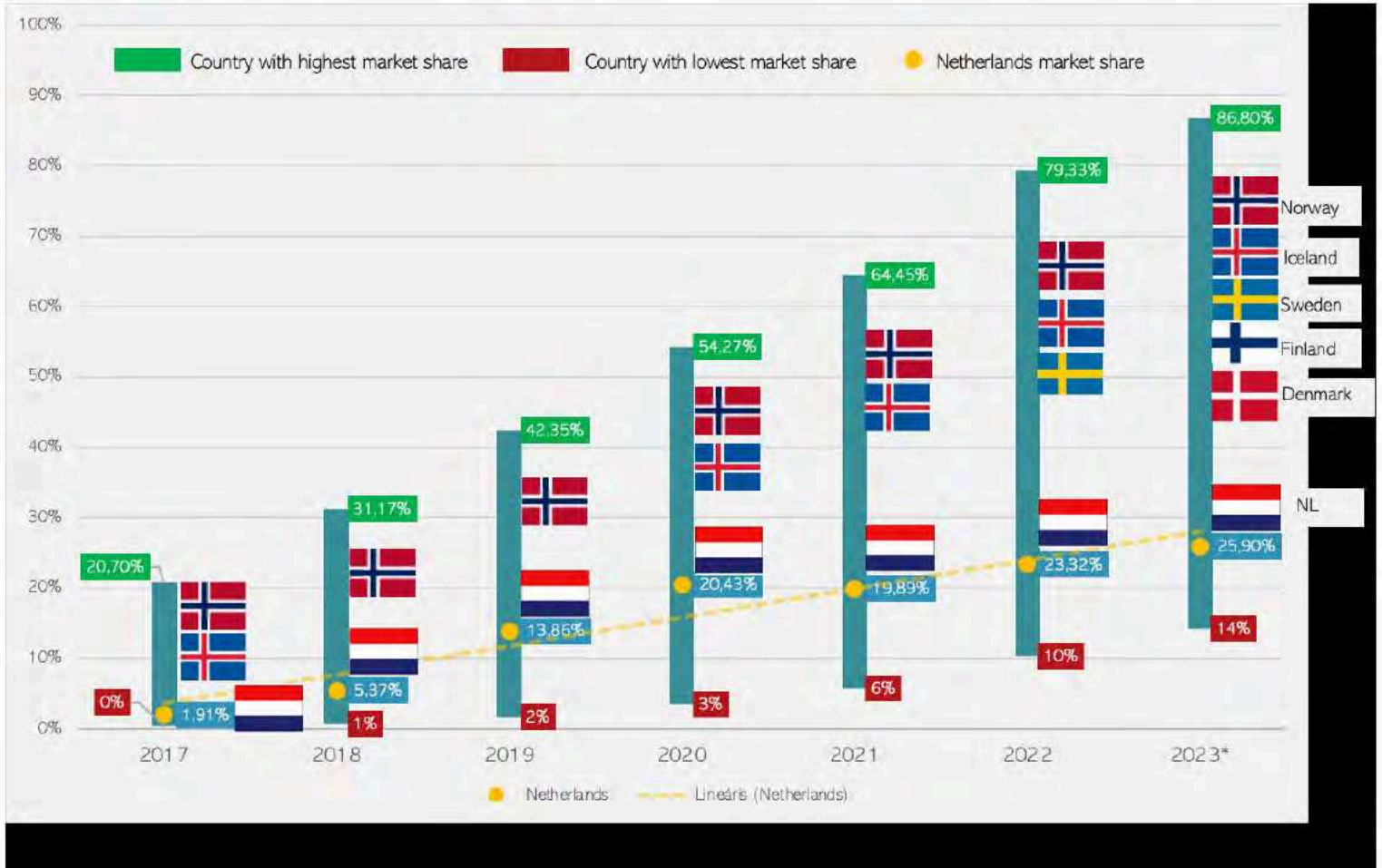
Key outcomes of the study

1) Relative leading position of the Netherlands is diminishing in the BEV market among peer countries
2) Incentives will not yet be phased out in peer countries
3) In most countries no phase out of registration tax or road tax advantages for BEVs planned before 2030
4) When TCO is positive there is an uptake of BEVs on the market
5) As government, it is possible to steer towards specific segments (e.g., France in small segments)
6) BIK. Only in The Netherlands no advantage for BEV anymore from 2025 onwards

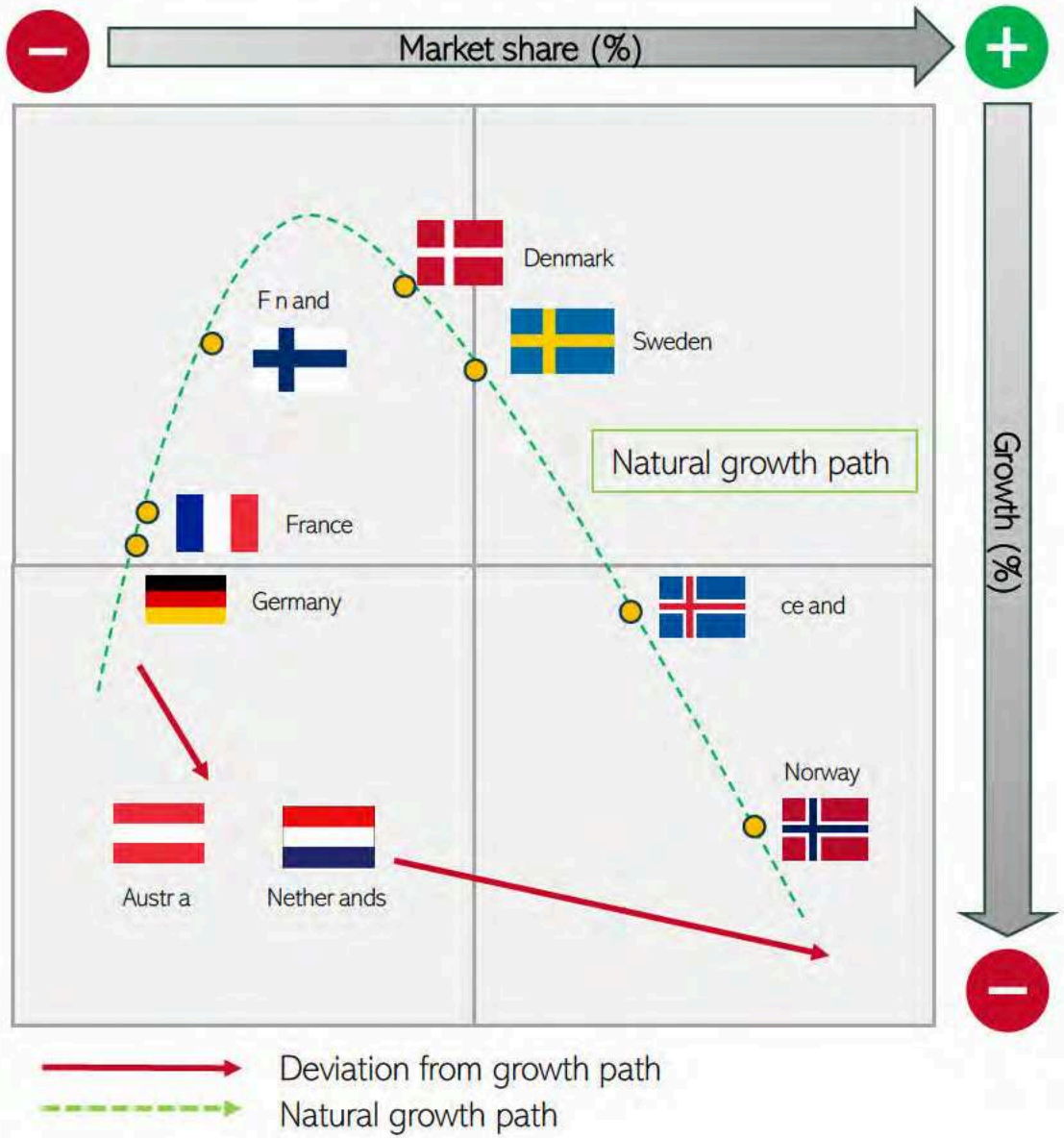
BEV Market Share and Growth: the leading position of the Netherlands diminished for both market share and growth in the last four years.

The Netherlands is experiencing stagnation with sales plateauing at around 20-25%. This is in sharp contrast to countries like Norway, celand, Sweden, Denmark, and inland, where BEV sales have surpassed that of the Netherlands in 2023 Q1. Based on international experience, a more consistent incentive policy might have propelled the country to achieve a BEV sales share of over 50%.

More countries are ahead in terms of market share

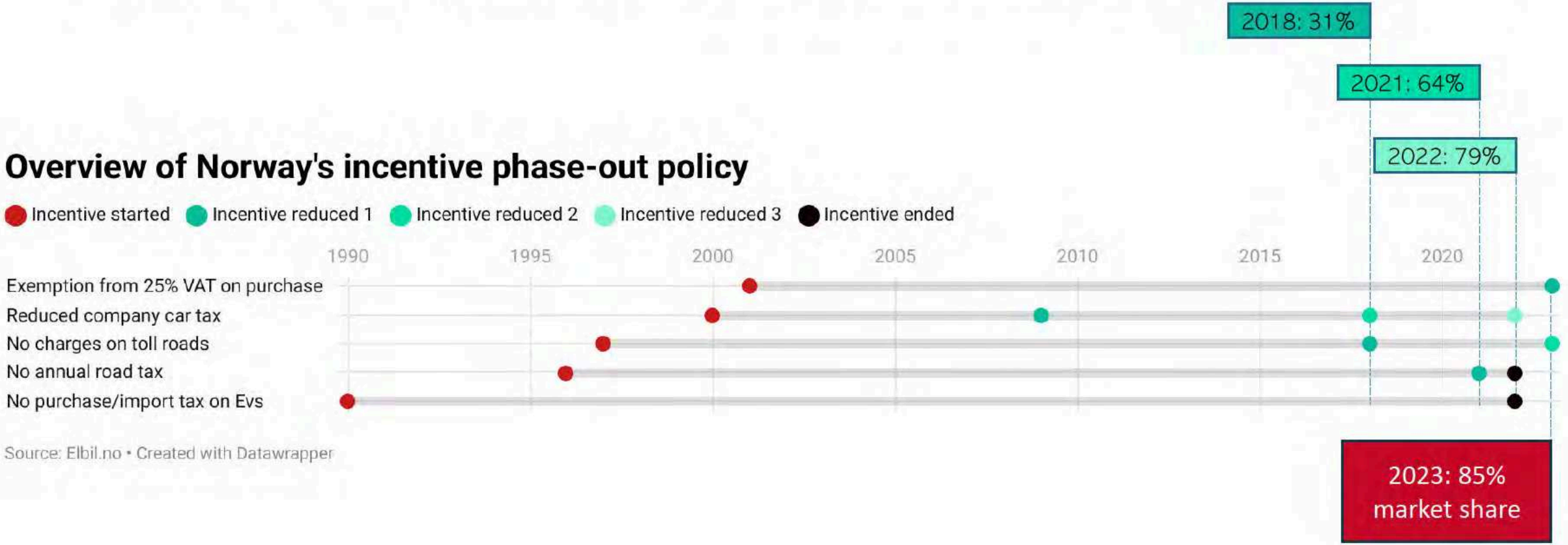


Netherlands is not in the natural growth curve within the market growth-share matrix

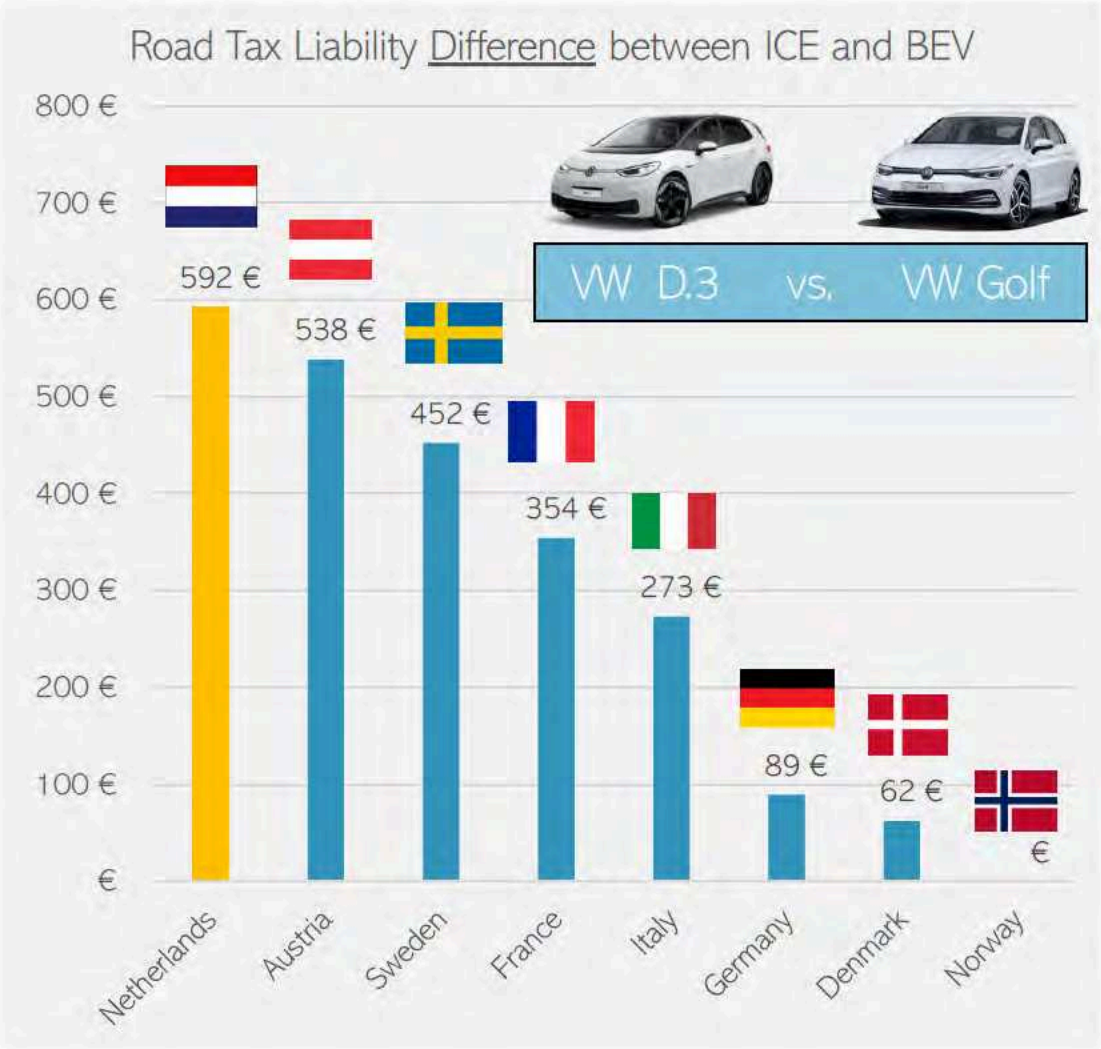


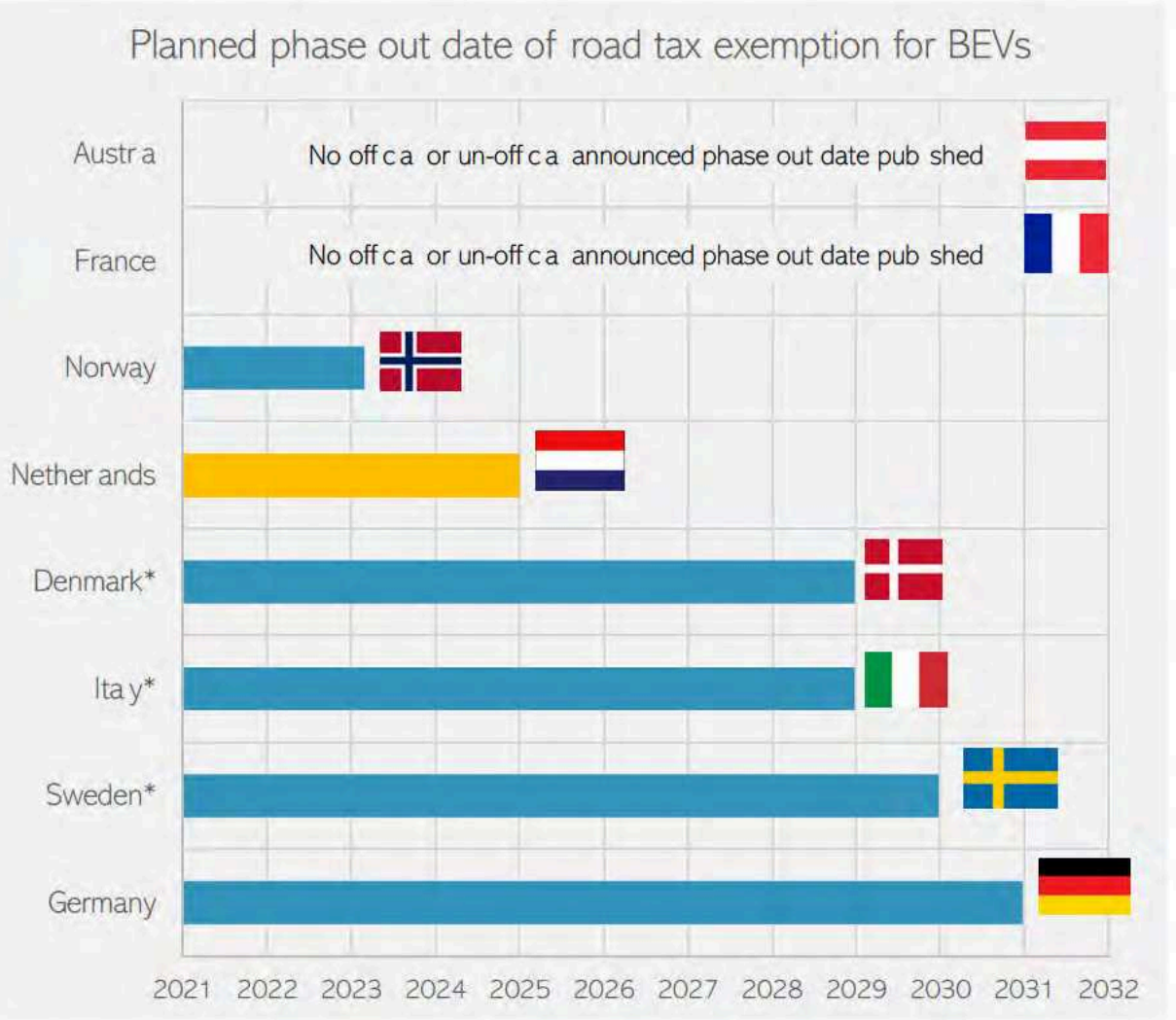
Premature Curtailment of Incentives: As leading country of BEV sales, Norway started to phase out incentives at 79% market share.

The Dutch government has been reducing stimulation measures from 2020 onwards, impacting growth. Examples include changes to the "bijtelling" (benefit-in-kind) taxation scheme and capping of purchase subsidies for new and second-hand BEVs. These decisions have led to a market share stagnation for BEV's just above 20% and a come back of nternal Combustion Engine Vehicles (CEVs) and Plug-in Hybrid Electric Vehicles (PHEVs) in certain segments. n comparison front running country Norway started their phase out strategy with a first step when market share of BEV's was already above 30% and larger steps now their market is already in mass market phase (79%).



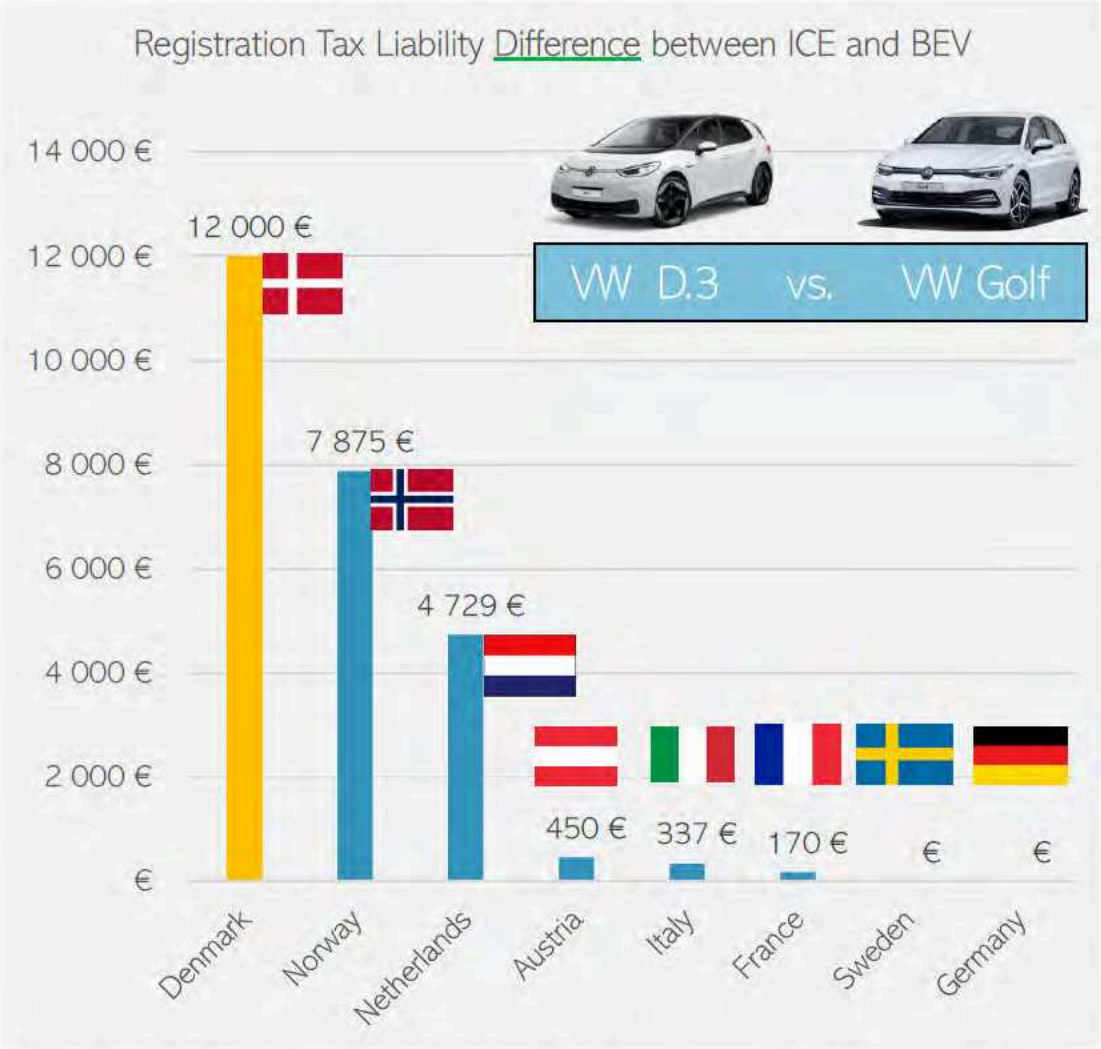
Road tax: The Netherlands provides the most significant amount of benefit on the road tax, but the phase out target is the earliest of all countries



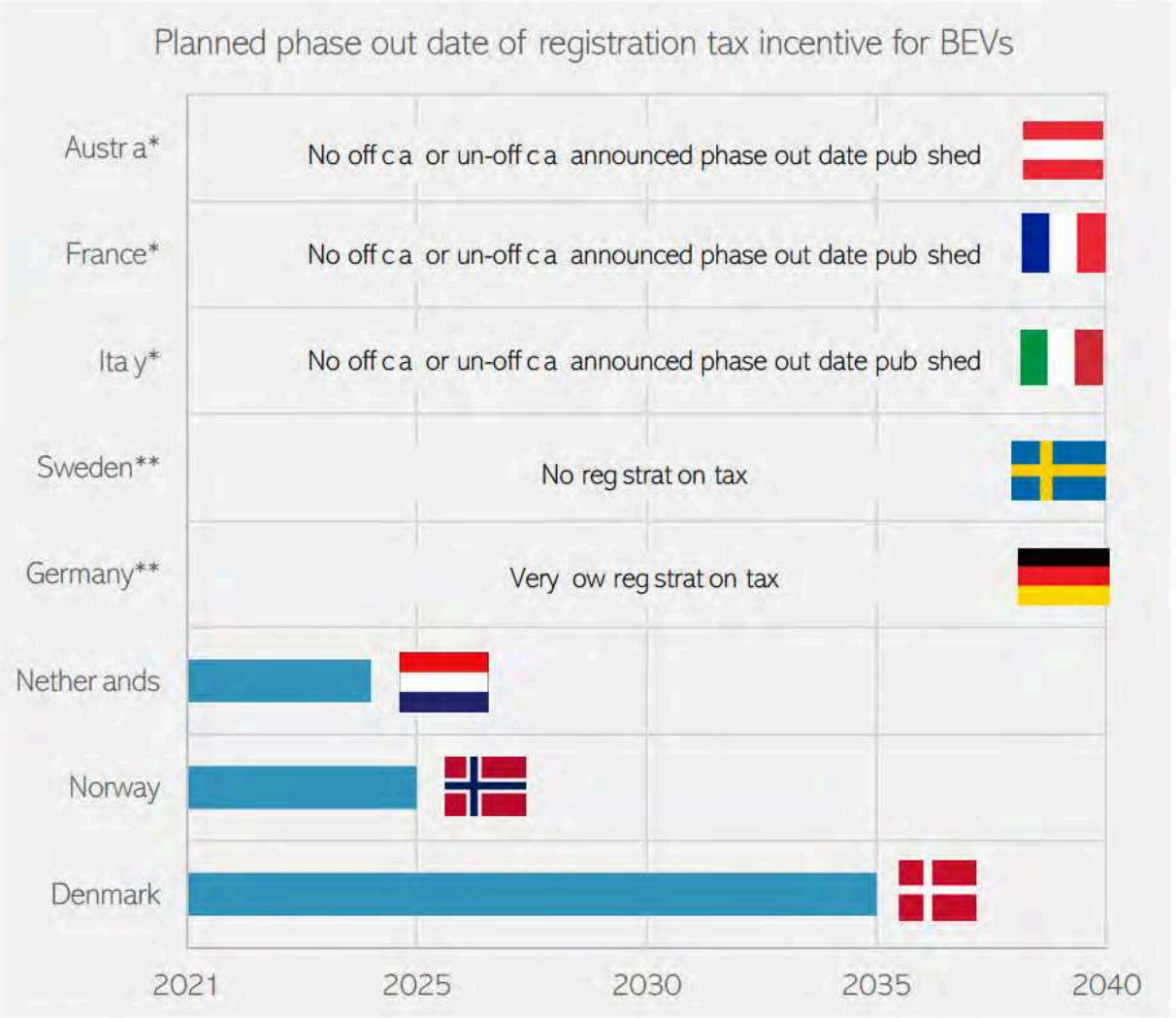


*Denmark plans to maintain benefits until 2028. Italy can earliest introduce phase out in 2029, Sweden IVL Institute predicts earliest possible introduction date from 2030.

Registration tax: Denmark provides the most significant amount of benefit on the registration tax; the Netherlands amount is also significant after Norway.

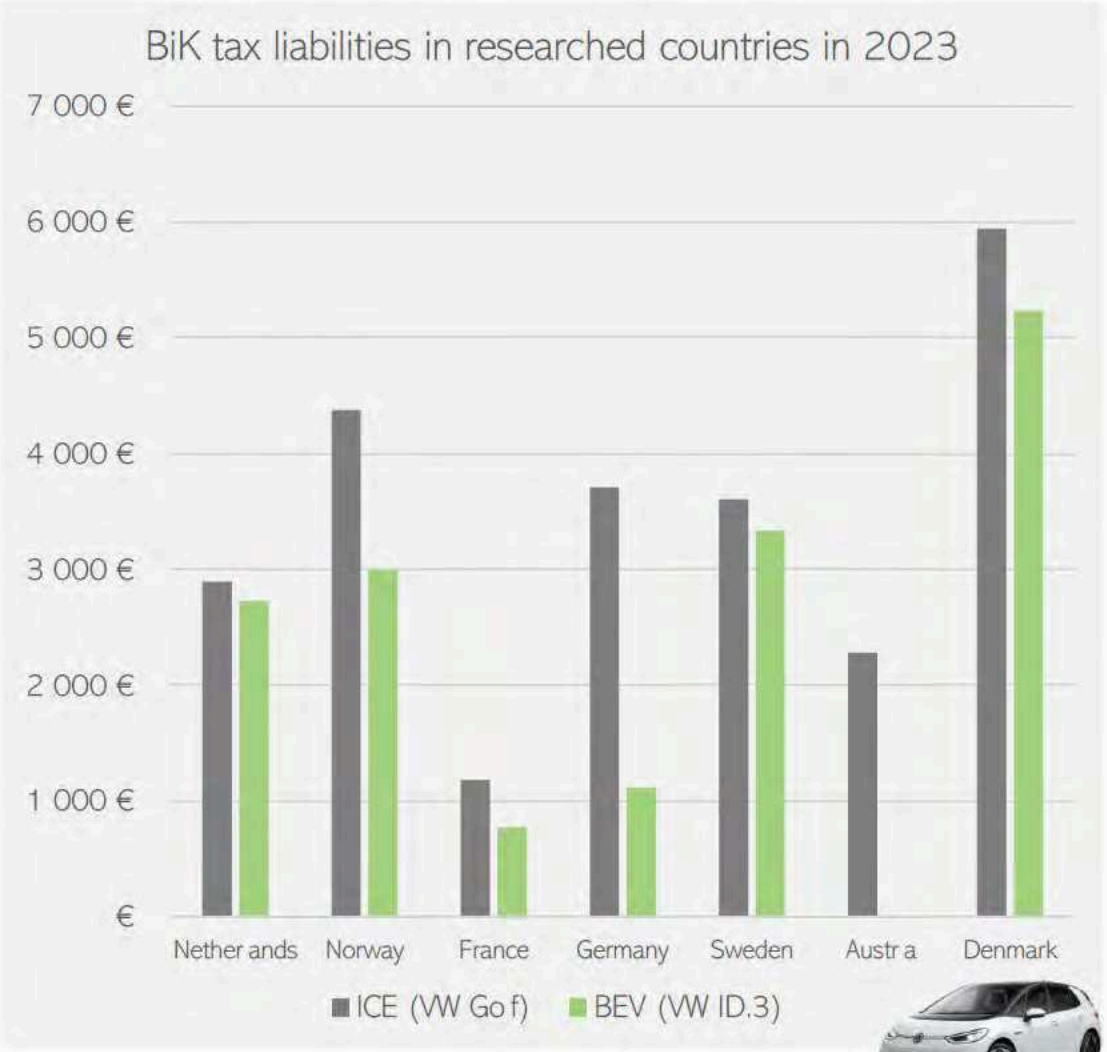


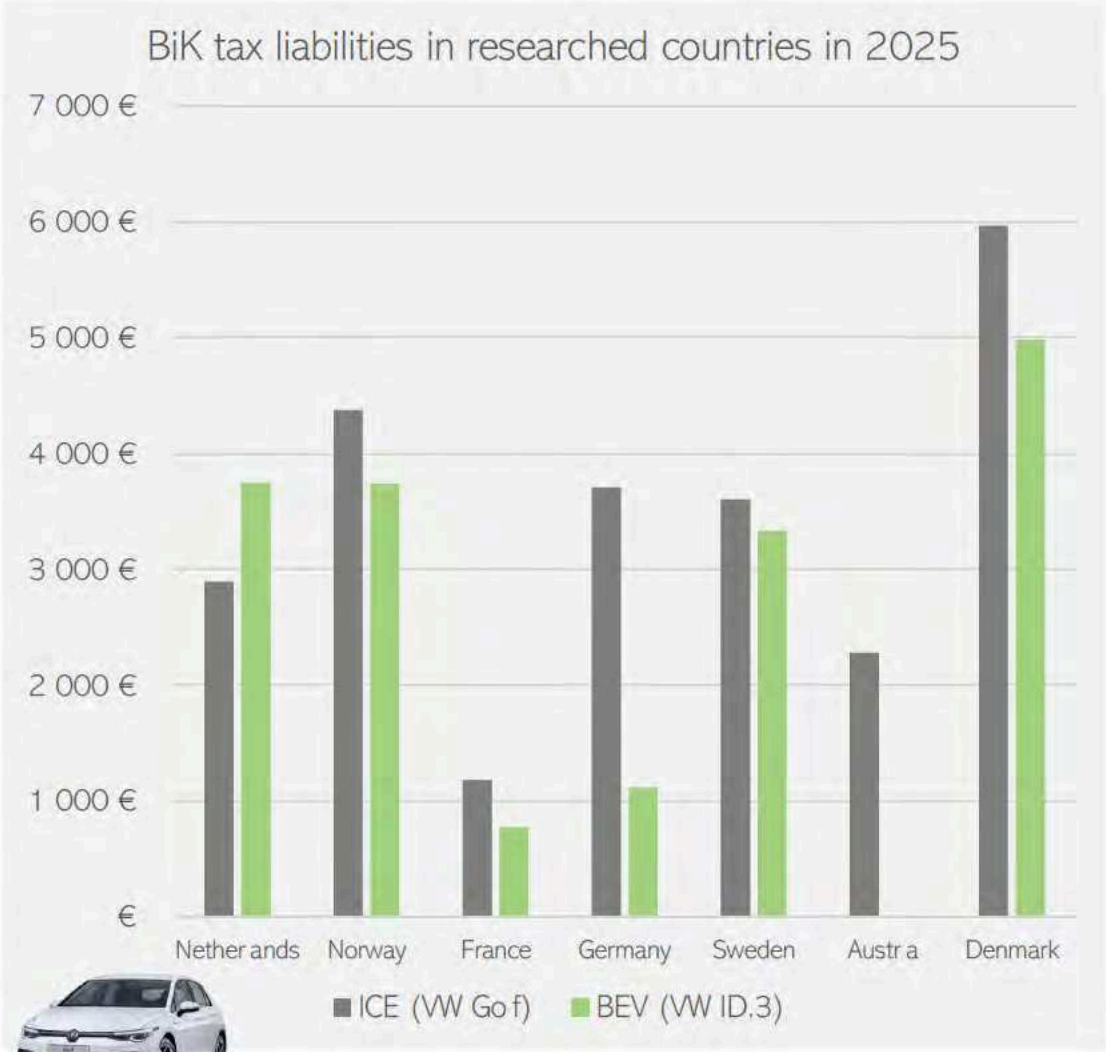
Tax ab ty d fference amounts are based on the reference cars of a Vo kswagen Go f and a Vo kswagen D.3.



*Denmark p ans to ma nta n benef ts unt 2028. Ita y can ear est ntroduce phase out n 2029, Sweden IVL nst tute pred cts ear est poss b e ntroduct on date from 2030.

Benefit-in-Kind: relative benefit of BEVs expected to shrink only in the Netherlands and Norway, until 2025.

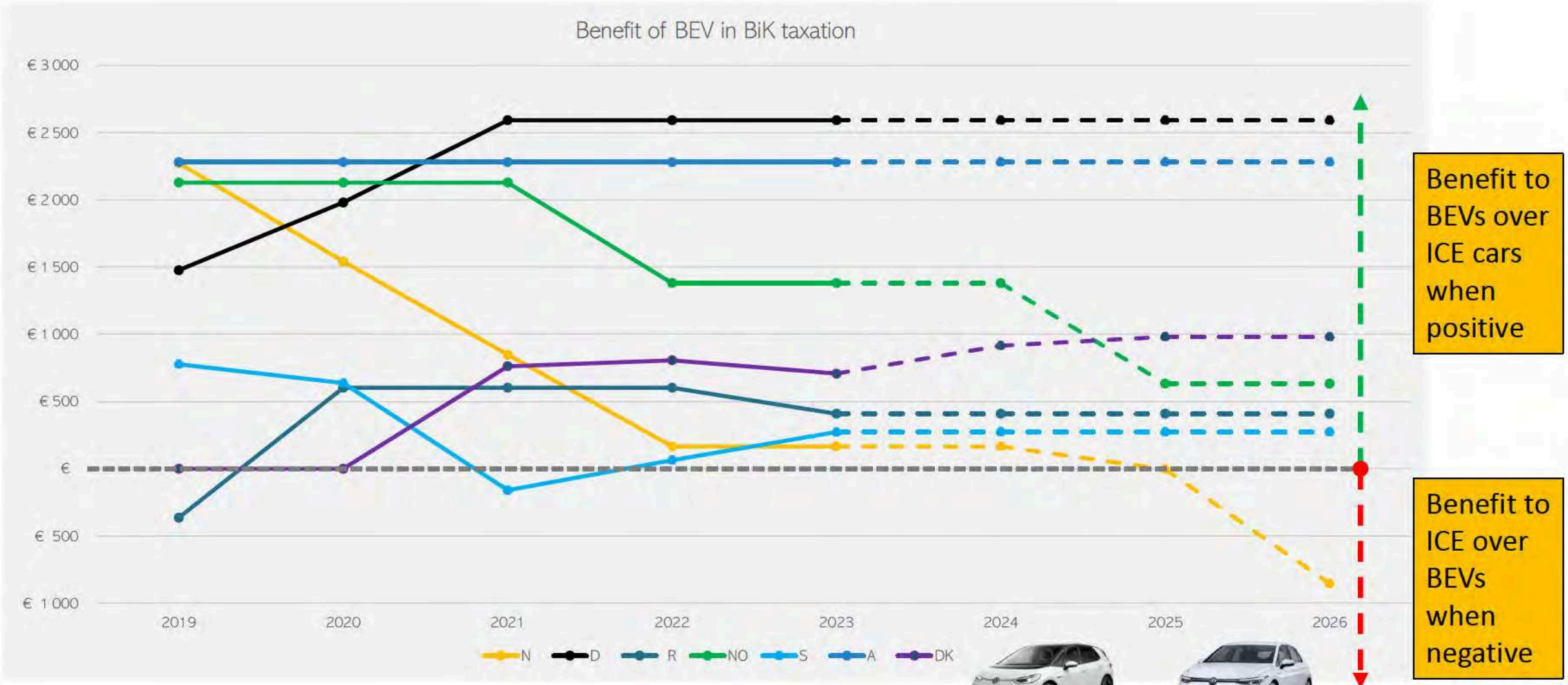




VW D.3 vs. VW Golf

Based on vehicle prices of 2023

Benefit-in-Kind: BEV tax benefit was among highest in the Netherlands, but from 2025 onwards it is the only country with a disadvantage for BEV.



Current purchase price for BEV's higher than ICE in almost all countries, but a lower TCO due to lower energy costs and tax exemptions

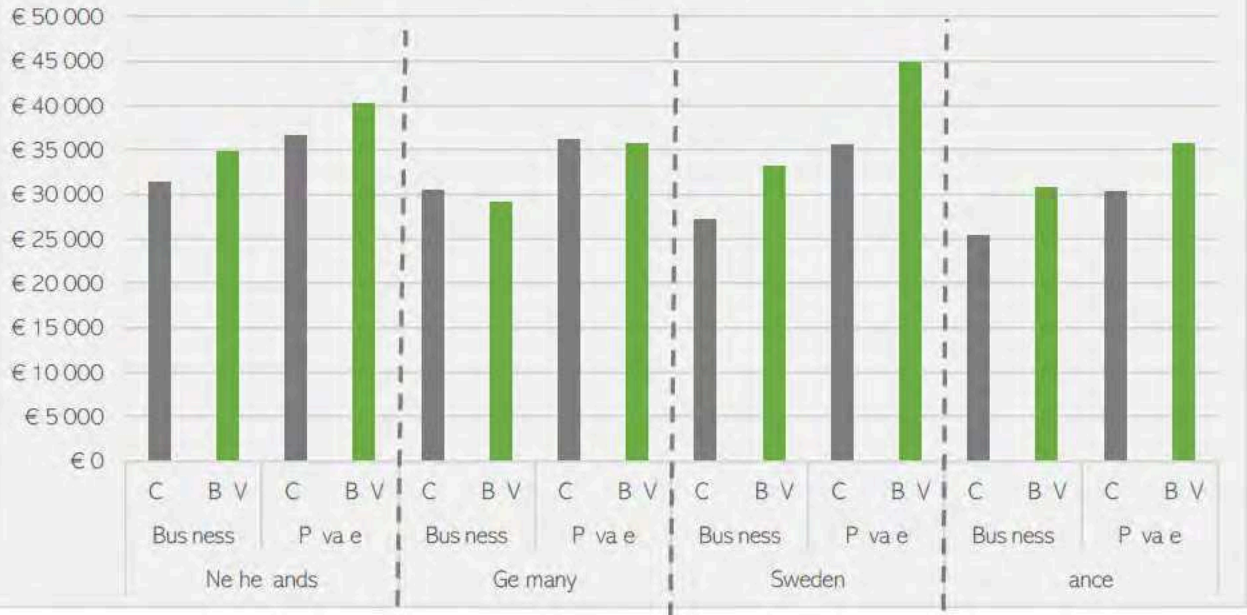
Purchase

	Business			Private		
	B segment	C segment	D segment	B segment	C segment	D segment
Nether ands	-€ 6 771	-€ 4 902	€ 955	-€ 6 174	-€ 4 138	-€ 562
Germany	-€ 3 106	€ 2 194	€ 4 788	-€ 4 917	€ 1 328	€ 4 899
Sweden	-€ 6 258	-€ 8 614	-€ 3 244	-€ 9 610	-€ 12 703	-€ 5 378
France	-€ 10 405	-€ 3 320	-€ 2 650	-€ 11 143	-€ 2 662	-€ 2 253

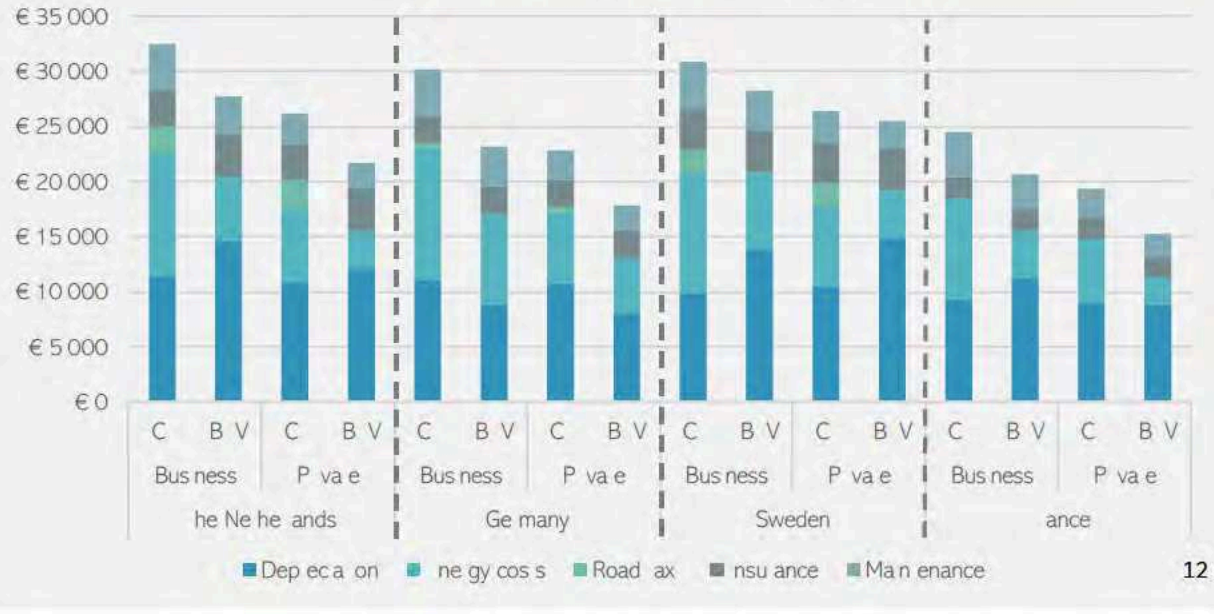
TCO

	Business			Private		
	B segment	C segment	D segment	B segment	C segment	D segment
Nether ands	€ 1 435	€ 4 849	€ 8 022	€ 2 990	€ 4 979	€ 5 479
Germany	€ 3 802	€ 8 356	€ 8 983	€ 3 409	€ 6 150	€ 5 469
Sweden	€ 1 729	€ 434	€ 5 762	€ 120	-€ 991	€ 3 657
France	€ 1 725	€ 5 666	€ 4 135	€ 2 178	€ 5 896	€ 4 243

Purchase price difference

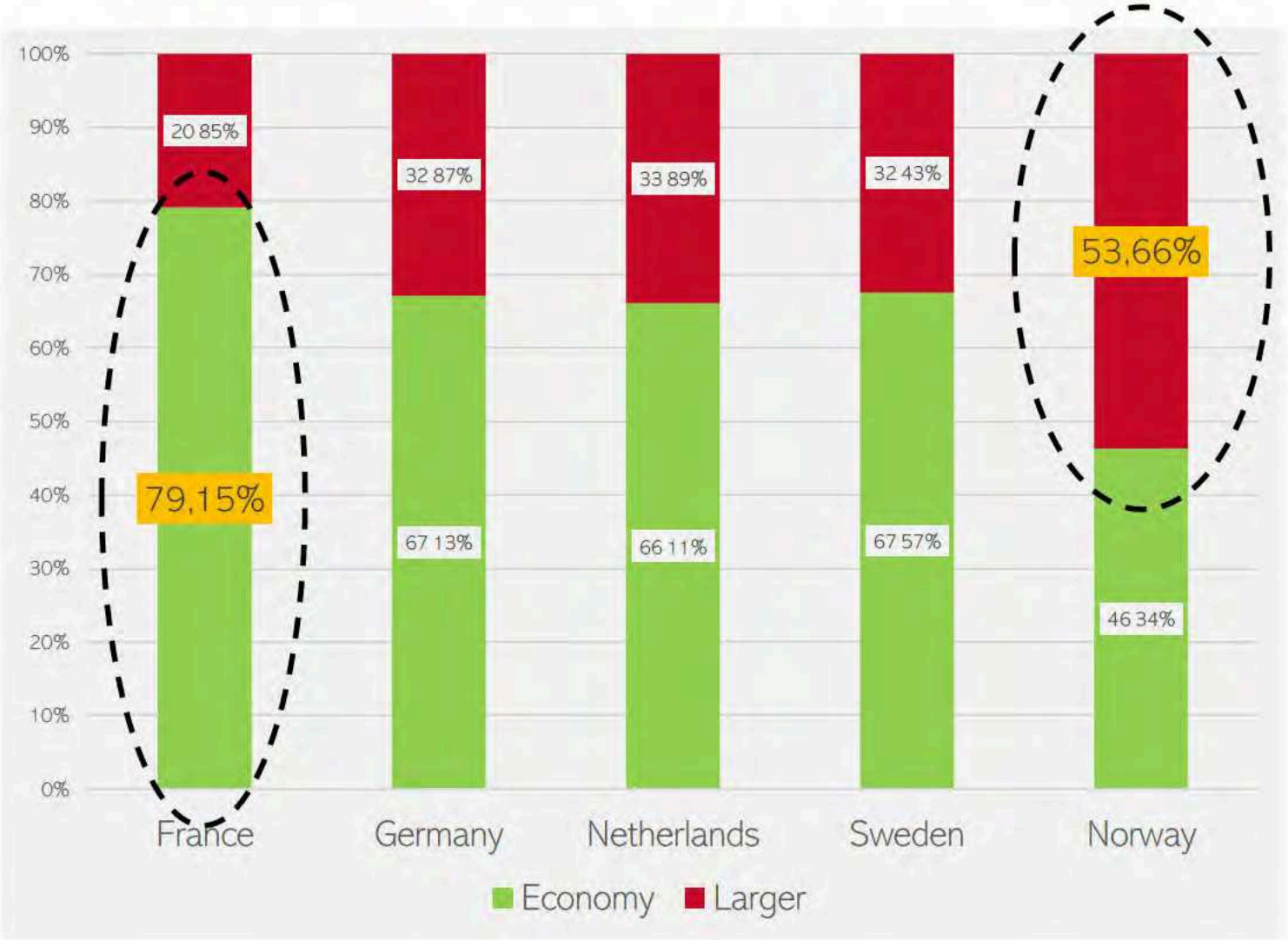


Average TCO BEV vs. gasoline cars



Steer towards specific segments is possible: France supports Economy segments and Norway Larger car segments (sales market share in 2022)

The French policy favors smaller car segments (A,B,C)



The Norwegian policy favors larger car segments (D, E, F, +)

Source: EAFO (2023)

France steers the market towards small subsidy segments

Increase to 15,4% market share and sales volumes in 2023 Q1

France

<u>French subsidy program</u>

<u>Funding rate private (2023):</u>

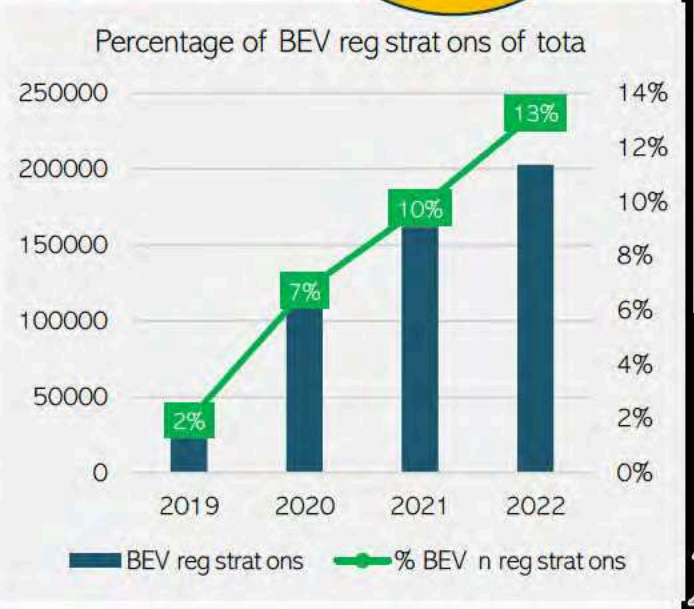
- € 5,000 for new BEV (€ 6,000 in '22)

<u>Funding rate business (2023):</u>

- € 3,000 for new BEV (€ 6,000 in '22)

<u>Additional conditions (2023):</u>

- <u>List price</u> max. € 47,000
- Max 27% of retail price
- <u>Weight</u> less than 2,4 ton
- Less than € 14,100 <u>income</u>: up to € 7,000 subsidy
- Extra € 3,000 in <u>Low Emission Zones</u>




The future electric Renault 5 at 100 euros per month? A possibility, with social leasing

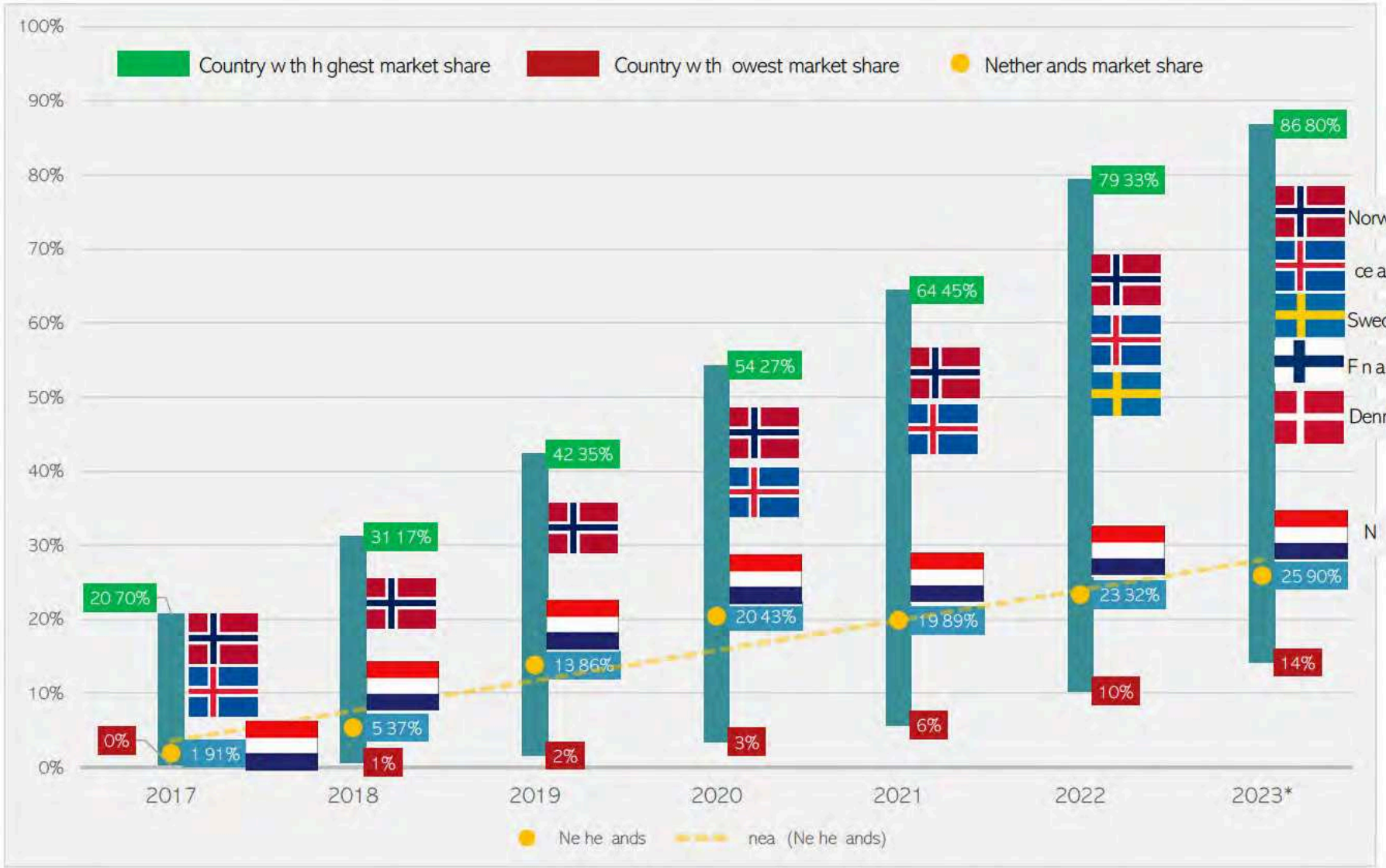
Targeting:

1. Small popular segments.
2. Low-income households in specific residential areas
3. Differentiation between private and business.

Source: EAFO (2023)

Netherlands position: BEV sales and growth

Market share of BEV's in The Netherlands stabilizes,m more countries within Europe ranked above the Netherlands



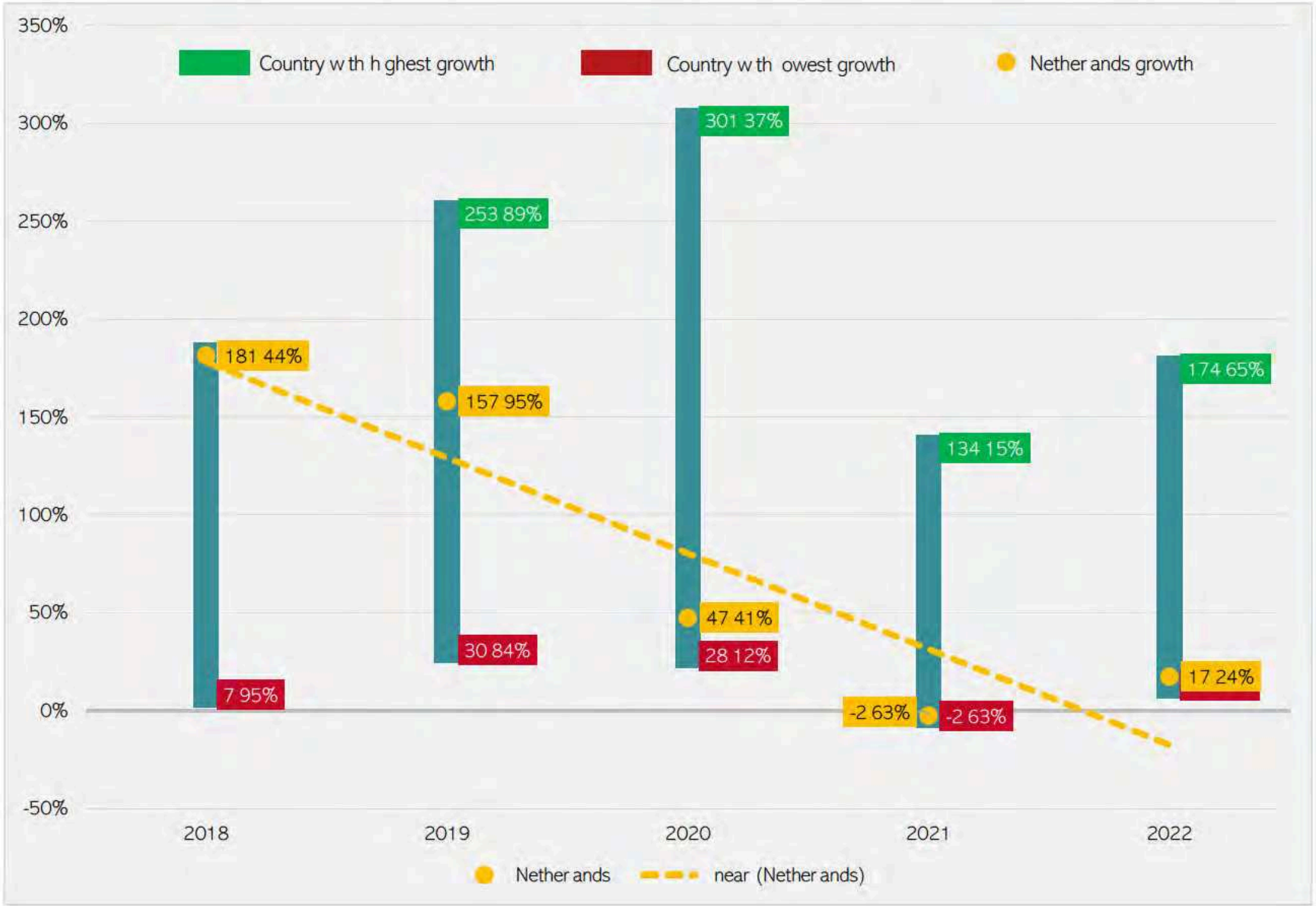
**2023 YTD (Q1). Source: RVO and. other national sources*

The Netherlands' BEV market share growth has slowed, while neighboring countries like Iceland (47%), Sweden (31%), Finland (28%) have surged ahead.

Since 2021, Denmark, Iceland, Finland, Germany, and the UK experienced significant BEV market share growth. The number of countries with higher share further increased to 3 in 2022 and up to 5 in 2023 Q1.

Peer countr es se ected: Countr es se ected: A , BE, DK, FI, FR, DE, IL, IE, LUX, NL, SW, CH, UK

Relative hare of the Netherland`s BEV registration share growth among peer countries



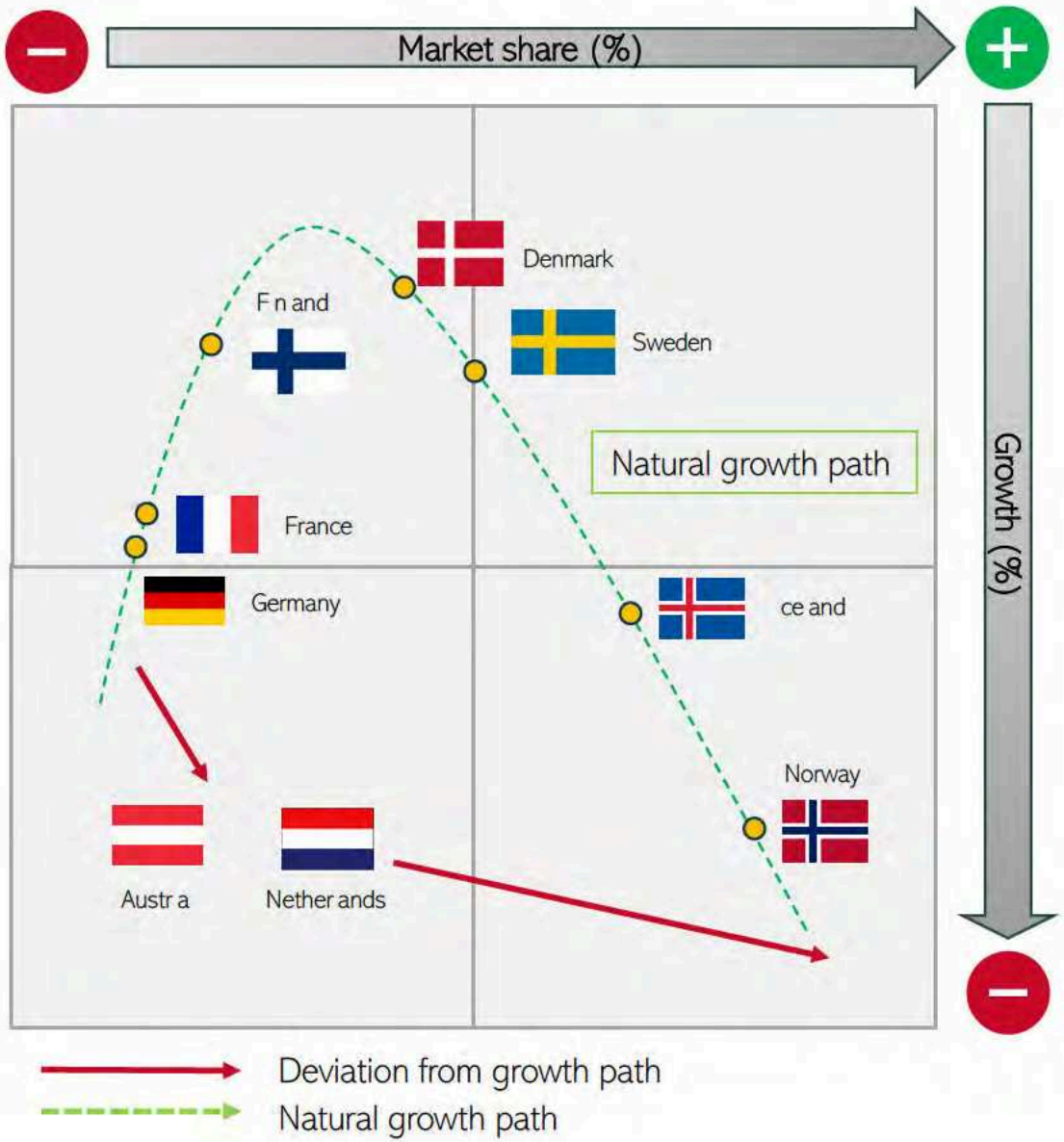
The Netherlands' transition from a BEV growth leader in 2018 (181.44%), went down to negative growth in 2021 (-2.63%) and low, 17,2% rate in 2022.

Countries like the UK, Denmark, inland, reland, Sweden have demonstrated remarkable BEV growth rates, surpassing the Netherlands.

Peer countries selected: Countr es se ected: A , BE, DK, FI, FR, DE, IL, IE, LUX, NL, SW, CH, UK

Method: Growth rates are ca cu ated as % changes from YoY of BEV (M1) reg strat on market shares.

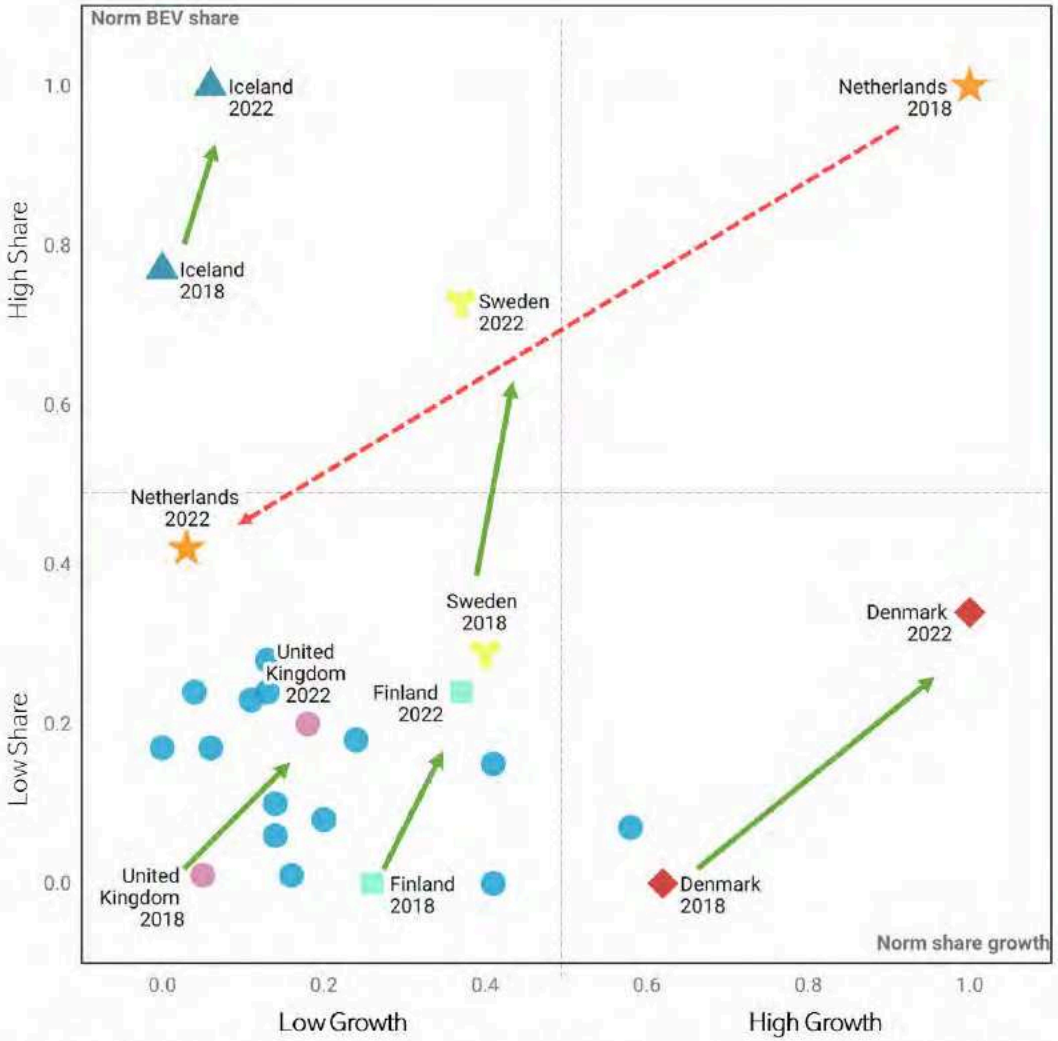
Position of the Netherlands in the growth - share matrix among European countries



Observations

- Examining the relative market share growth of BEVs between 2018 and 2022, the Netherlands had a growth of 34%, which is lower than the average growth of the European countries at 57%.
- In terms of growth, Denmark had the highest growth rate of 98%, followed by Finland at 93%, and Germany at 75%. Belgium, and Ireland also had high growth rates of 70%, and 72%, respectively. The Netherlands had a market share of 23% in 2022, ranking third behind Norway at 79% and Iceland at 41%.
- The Growth Share matrix indicates the relative position of the Netherlands among European countries, having position in the low share, low growth quadrant. Countries as Iceland and Norway show a relative low growth rate, but having a very high market share which justifies the low growth rate. Countries with high performance transit from high growth low share to low growth high share through the years (see natural growth parabolic curve). Exemptions from that curve are Austria and The Netherlands with a relative low growth rate while market share is still relative low. For those countries it will be difficult to reach high market shares for BEV in relative short time.

Relative change of selected countries in the growth - share matrix (2018 vs. 2022)

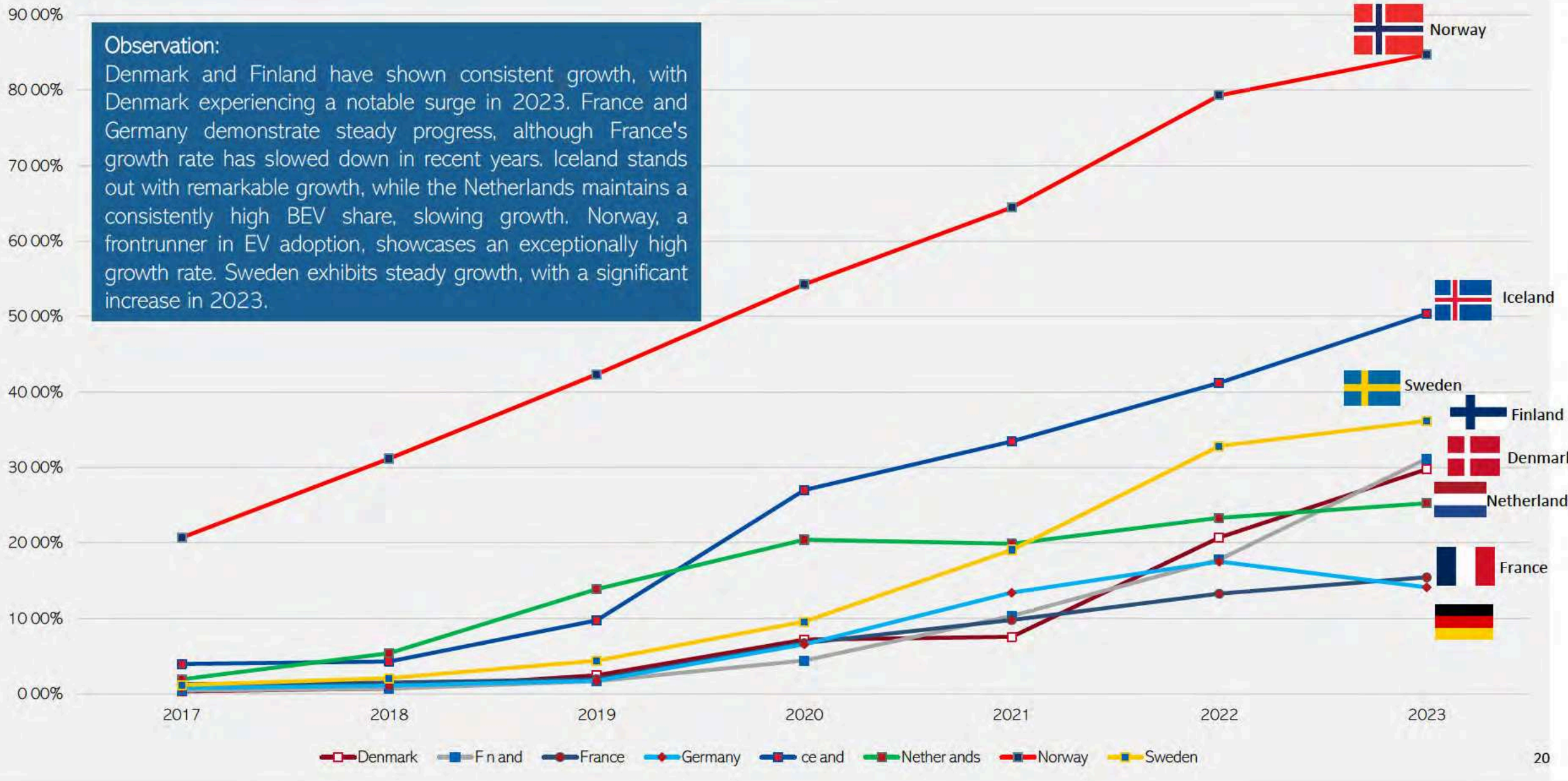


he se ec ed coun es a e cons de ed pee coun es o he Ne he ands (e g s m a GDP pe cap a eve) hey we e pos oned n he ma x based on he ma ke sha e and YoY ma ke sha e g ow h a e n 2018 and 2022 o ease compa son da a was no ma zed be ween 0 1 us ng M n Max me hod

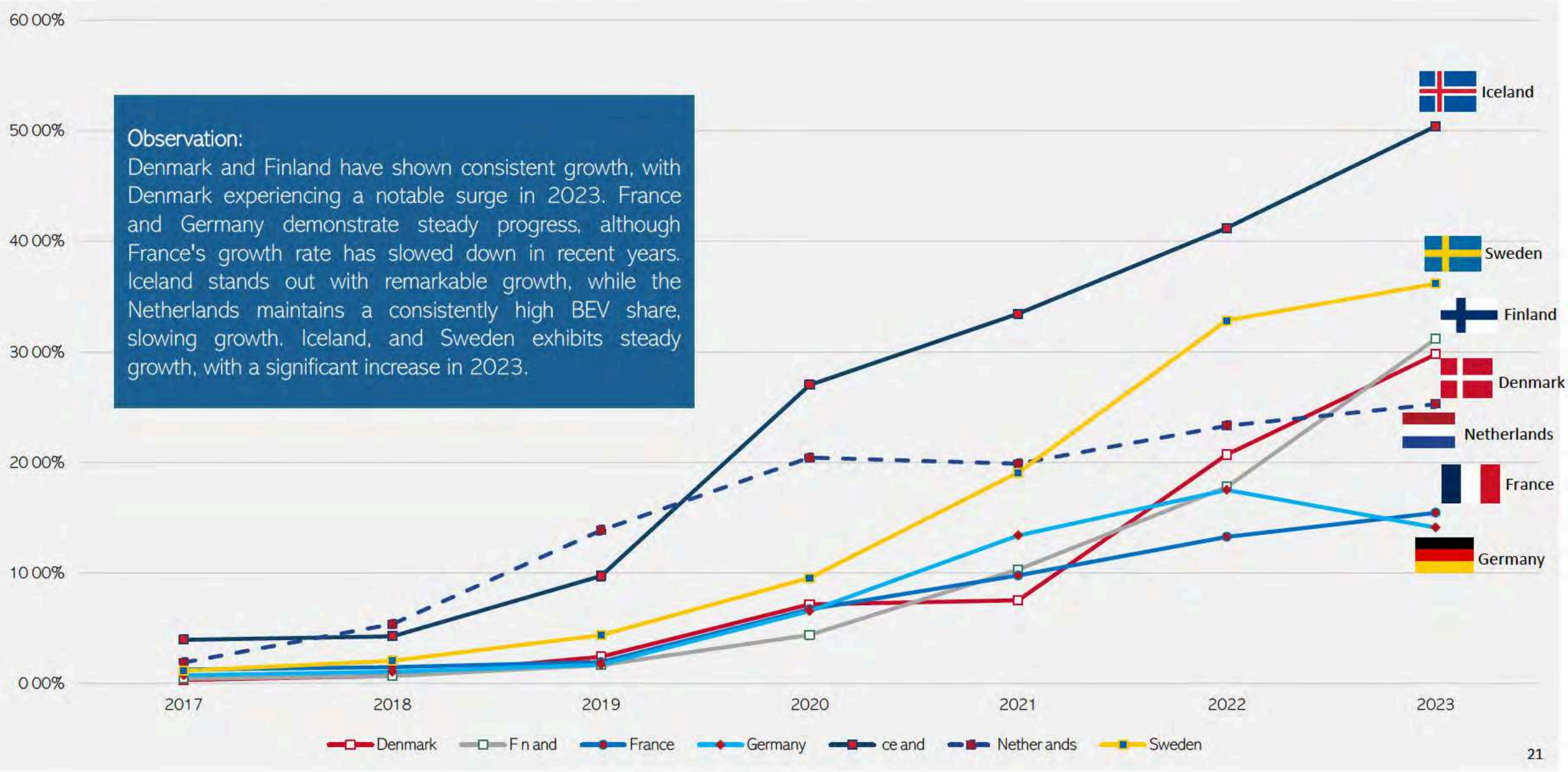
Observations

The competitive landscape of the BEV transition has evolved, with several countries excelling in both growth and market share. Sweden, Denmark, celand, inland, and the UK have experienced considerable repositioning, setting a new benchmark in the BEV transition. The Netherlands`s relative position shifted from a high share, high growth leader to a low share, low growth category member. Between 2018 and 2022, the Netherlands' relative ranking among its peers experienced the most significant decline in the BEV market.

Uptake of BEVs the selected countries (incl. Norway)

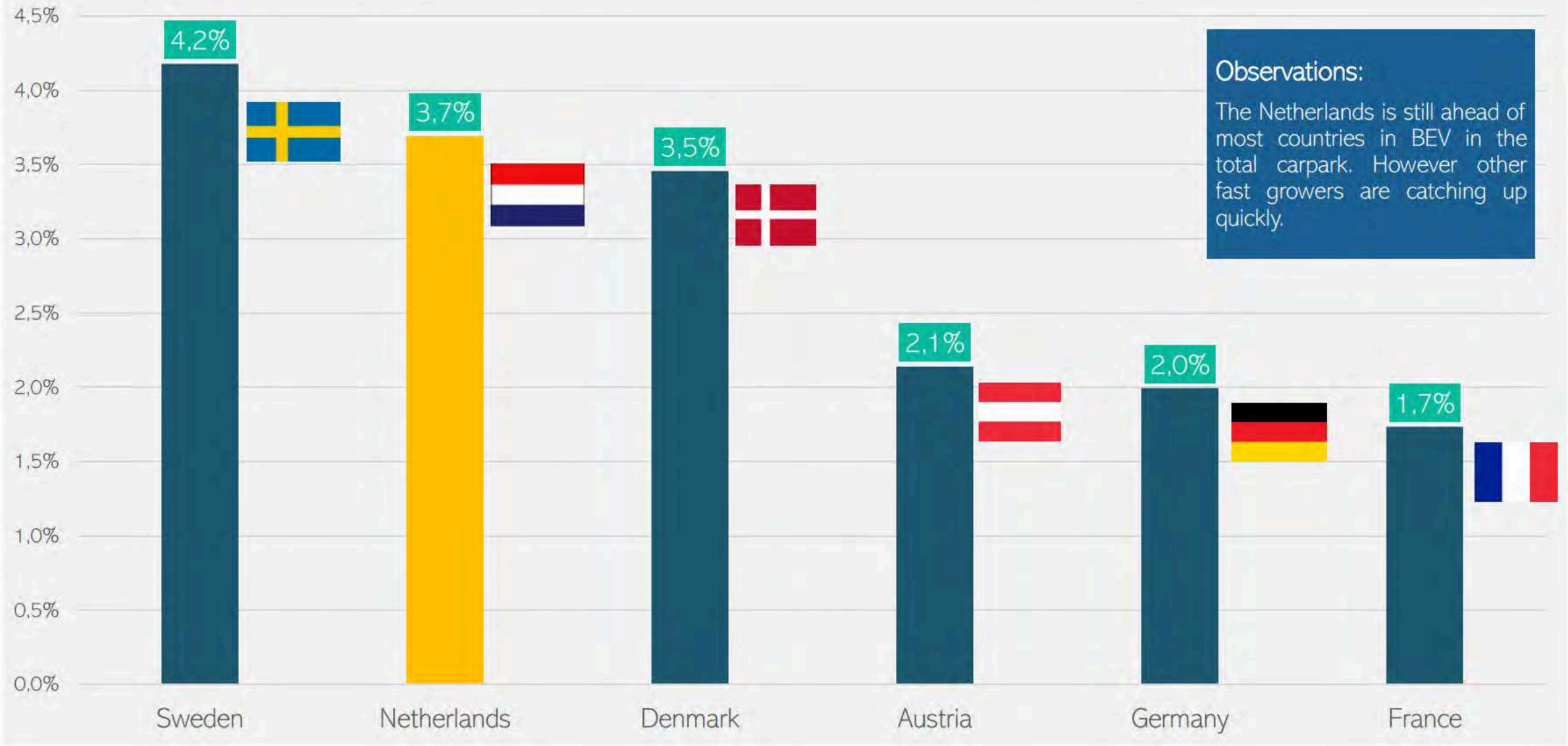


Uptake of BEVs the selected countries (excl. Norway)



Comparison of the yearly BEV fleet size in the Netherlands, Sweden, France, and Germany (% of BEV in total carpark 2022)

Norway: 16,76% BEV in total carpark (2022)



Observations:

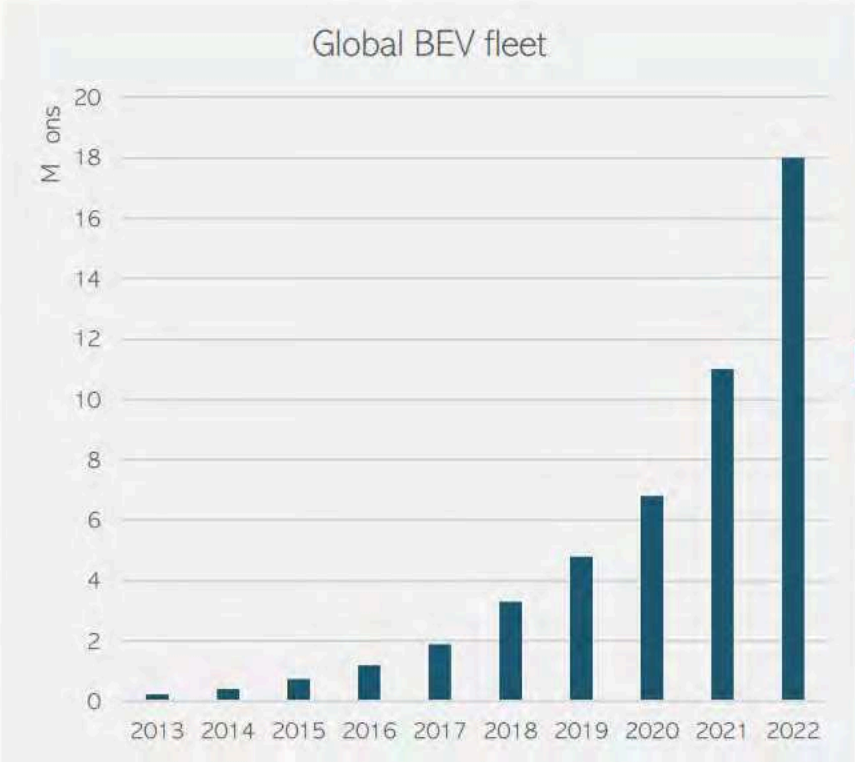
The Netherlands is still ahead of most countries in BEV in the total carpark. However other fast growers are catching up quickly.

Source: European Alternative Fuels Observatory

Effects of BEV policies in selected countries

Success of BEV sales which factors play a role?

The success of BEV sales is determined by various factors influencing buying behaviour. For governmental organisations it is possible to steer purchase behaviour, mainly by financial policy.



Source EA (2021)

General factors in purchasing behaviour

There are different (eco)systems in the countries discussed in this report, and therefore these factors play a different role when countries are compared.

Financial Policy

Effect of BEV policy abroad

The report starts with a general overview of the different countries (primary and secondary focus). This general overview includes the current (2023) applicable incentives, the EV uptake over several years, the growth of public available chargers as well as the top 5 BEVs sold. The report also provides an overview of available subsidies for used BEVs in European countries.

This is followed by an in-depth analysis of the Netherlands, Sweden, France, and Germany (primary focus). Here we discuss the chronology, purchase costs, and the "Total Cost of Ownership" (TCO) in depth. Within the chronology, the BEV sales per month are plotted against the change in financial incentives or other relevant events. The current financial incentives are put in to perspective by calculating the purchase costs and TCO of BEVs and petrol cars.

The Netherlands - Overview

Purchase subsidy (SEPP)

Fund ng rate (2023):
- € 2,950 for new BEV (€ 4,000 n 20/'21 and € 3,350 n 22)

Budget (2023):
- € 67 M for new BEV

Add t ona cond t ons (2023):
- st pr ce between € 12,000 and € 45,000
- Purchase or eas ng of the car
- At east 120 km range
- Requ red ho d ng per od 3 years for purchase and 4 years for eas ng

Road tax (MRB)

- 100% d scount unt 2024,
- 75% d scount rate n 2025,
- 0% d scount from 2026

Due to we ght, BEVs pay more than CE.

Recharging infrastructure

Subs dy: No nsta at on subs dy for nd v dua s. Compan es can make use of the M A/Vam scheme.

Reduced energy tax for charg ng stat ons: € 470 per charg ng stat on per year.

Environmental Investments, Profit Tax (MIA/Vamil) - 2023

BEV passenger cars are exc uded,

FCEV (2) cars:
- M A: max. 45% up to nvestment deduct on.
- Vam : wr te off 75% of nvestment cost.

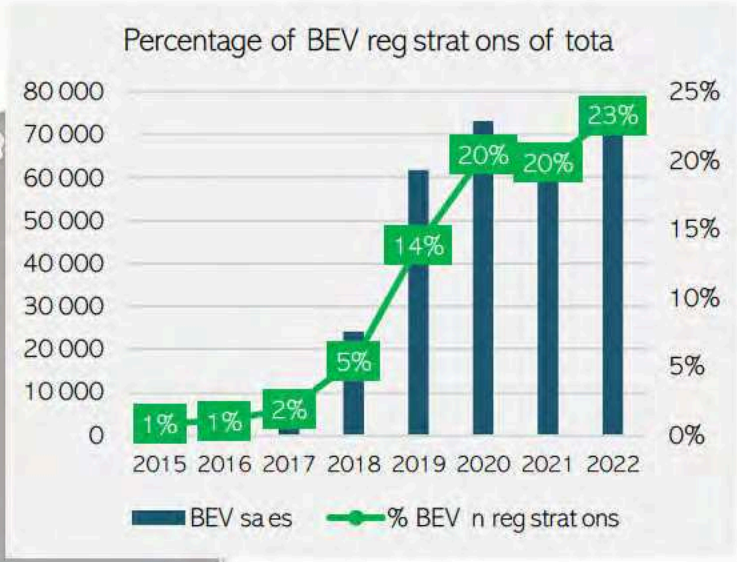
BEV vans: on y M A, 45% tax deduct b e

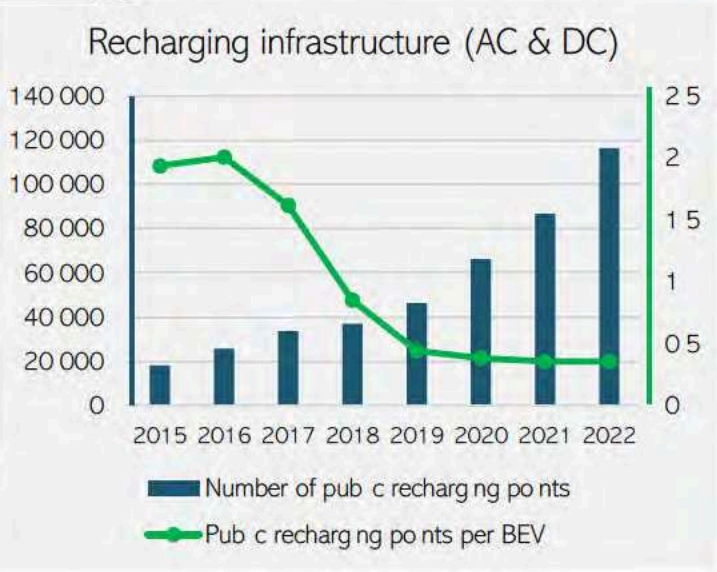
BiK taxation

Rate: For petro cars 22%. For BEVs t was 4%, ncreased to 8% n '20, 12% n '21, 16% n '22, th s s current y st the rate. P anned to ncrease to 17% n 2025 and the benef t removed after 2025.
D scount cap for car st pr ce: reduced from € 35,000 to € 30,000 n 2023. For the pr ce above the cap, the 22% rate app es.

Registration tax (BPM)

BEVs are exempt from pay ng reg strat on tax unt 2025. For petro cars, w th d fferent eve s of CO_2 em ss ons that are due d fferent amounts of reg strat on tax (cca. € 5,000 for a VW Go f)





Ambitions

2030: 100% of new M1 Zero Em ss on.

BIK/yr VW ID 3 2023: EUR 2.726, **2026: EUR 3.746**

BIK/yr VW Golf 2023: EUR 2.893, **2026: EUR 2.893**

Observations

- P ans are to cance new BEV subs dy and make on y used BEVs e g b e.
- 2025 phase out target for MRB, BPM, B K BEV benef ts. 2024 phase out for SEPP.
- he Nether ands' BEV market share growth has s owed, rank ng as aggard compared to peer countr es.
- Pub c nfrastructure network vo ume and dens ty s eader n Europe as of 2023.

Norway - Overview

VAT Exemption ("purchase subsidy")

Exempt on rate (2023)
- VAT (25%) exempt on for BEVs be ow € 42,000 pr ce. (no pr ce cap unt 2022)
- On y amount exceed ng pr ce cap taxed (25%).

Budget (2023)
No budget m tat on.

BiK taxation

Benef t va ue ca cu at on (2023)
- 30% of the car reta pr ce (unt € 28.689) + 20% on the excess amount

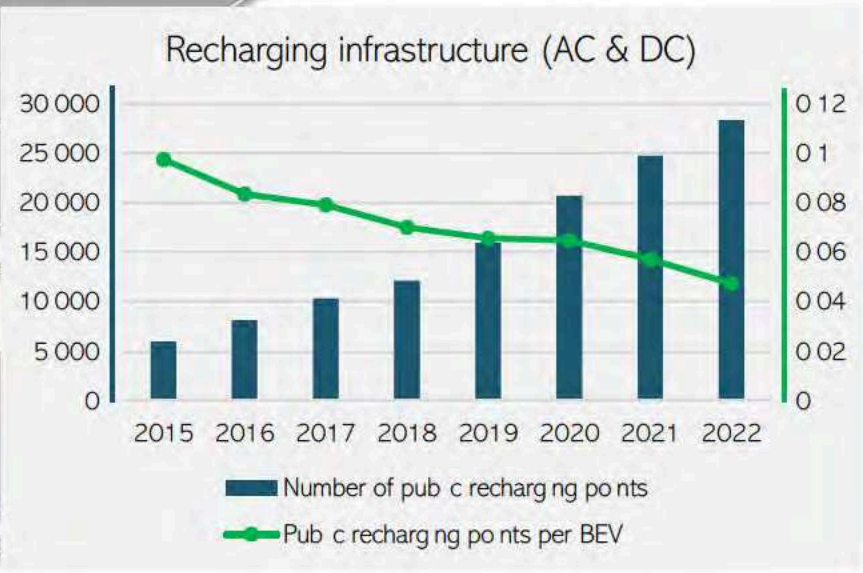
Benef t va ue ca cu at on (2022)
- 30% of the car reta pr ce (unt € 27.908) + 20% on the excess amount.
- For BEVs 80% of the new pr ce s cons dered.

Re-registration fee (2023)
- Fu fee of one-off € 575 for used BEVs.
- 75% d scount was removed n 2023.

Weight tax (from 2023)
- One-off tax rate: 1 EUR/kg for we ght above 500kg
- BEVs are not exempt, no we ght correct on

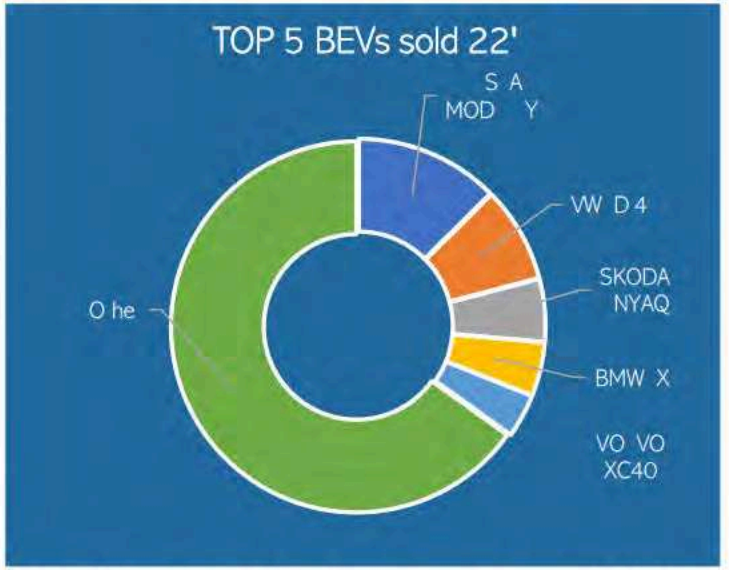
Road traffic insurance tax (from March 2023)
- BEVs pay ower rate, € 264 per year (15% d scount)
- € 50 benef t to CE per year
- 45% ncrease for BEVs s nce 2022

Road toll (2023)
- Max. cap of fee ncreased to 70% from 50% (compared to petro cars)
- The annua road tax s €48.



Ambitions

A new passenger cars (M1) and ght vans (N1) sa es shou d be zero em ss on by 2025



BIK/yr VW ID 3 2023: EUR 2.992, **2026: EUR 3.740**

BIK/yr VW Golf 2023: EUR 4.373, **2026: EUR 4.373**

Observations

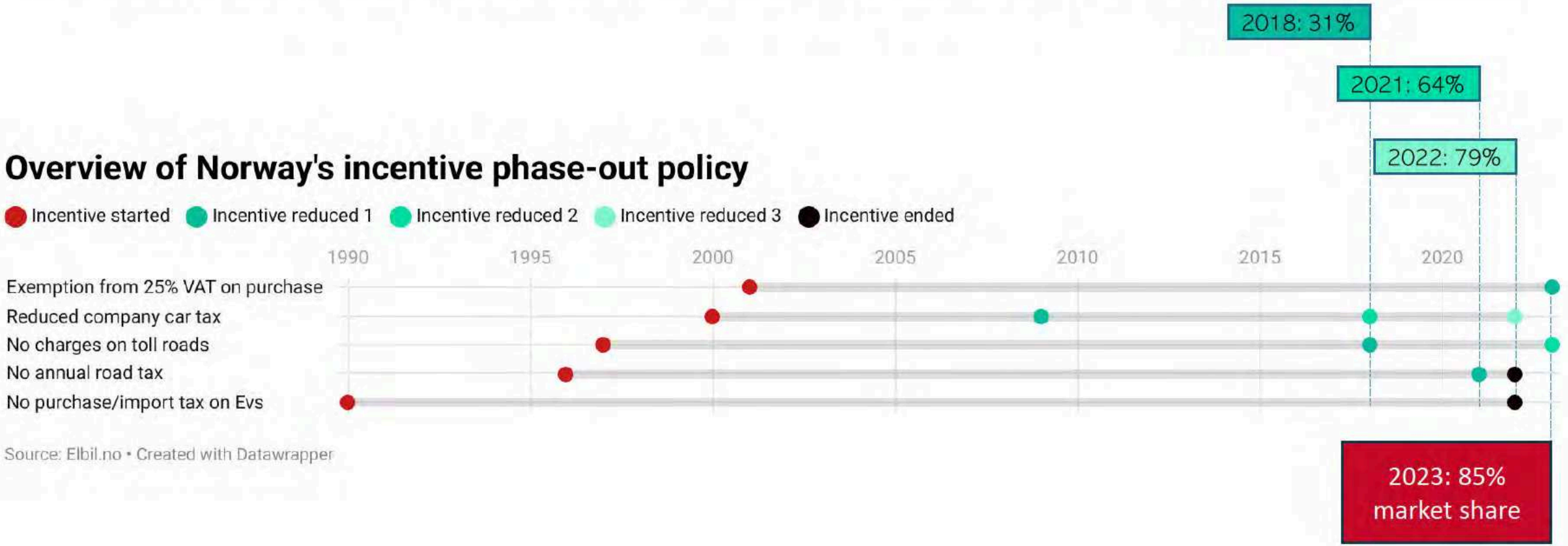
Desp te the benef ts of BEVs are cont nued to be gradua y reduced, organ c growth st went on unt 2022. Sa es dropped s gn f cant y n 2023 Q1.

Sa es and ava ab ty of new ICE cars are expected to be marg na from 2023.

A cars purchased by governmenta bod es, must be em ss on free from 2022 on.

Premature Curtailment of Incentives: As leading country of BEV sales, Norway started to phase out incentives at 79% market share.

The Dutch government has been reducing stimulation measures prematurely, impacting growth. Examples include changes to the "bijtelling" (benefit-in-kind) taxation scheme and capping of purchase subsidies for new and second-hand BEVs. These decisions have led to a market share stagnation for BEV's just above 20% and a come back of nternal Combustion Engine Vehicles (CEVs) and Plug-in Hybrid Electric Vehicles (PHEVs) in certain segments. n comparison front running country Norway started their phase out strategy with a first step when market share of BEV's was already above 30% and larger steps now their market is already in mass market phase (79%).



France - Overview

Purchase subsidy

Fund ng rate pr vate (2023):
- € 5,000 for new BEV (€ 6,000 n 22)
- € 1,000 for used BEV

Fund ng rate bus ness (2023):
- € 3,000 for new BEV (€ 6,000 n 22)

Add t ona cond t ons (2023):
- st pr ce max € 47,000
- Max 27% of reta pr ce
- We ght ess than 2,4 ton
- ess than € 14,100 ncome: up to € 7,000 subs dy
- Extra € 3,000 n ow Em ss on Zones

Conversion (scrappage) bonus

Bonus rate pr vate (2023): max. € 6,000 (€ 5,000 n 22)

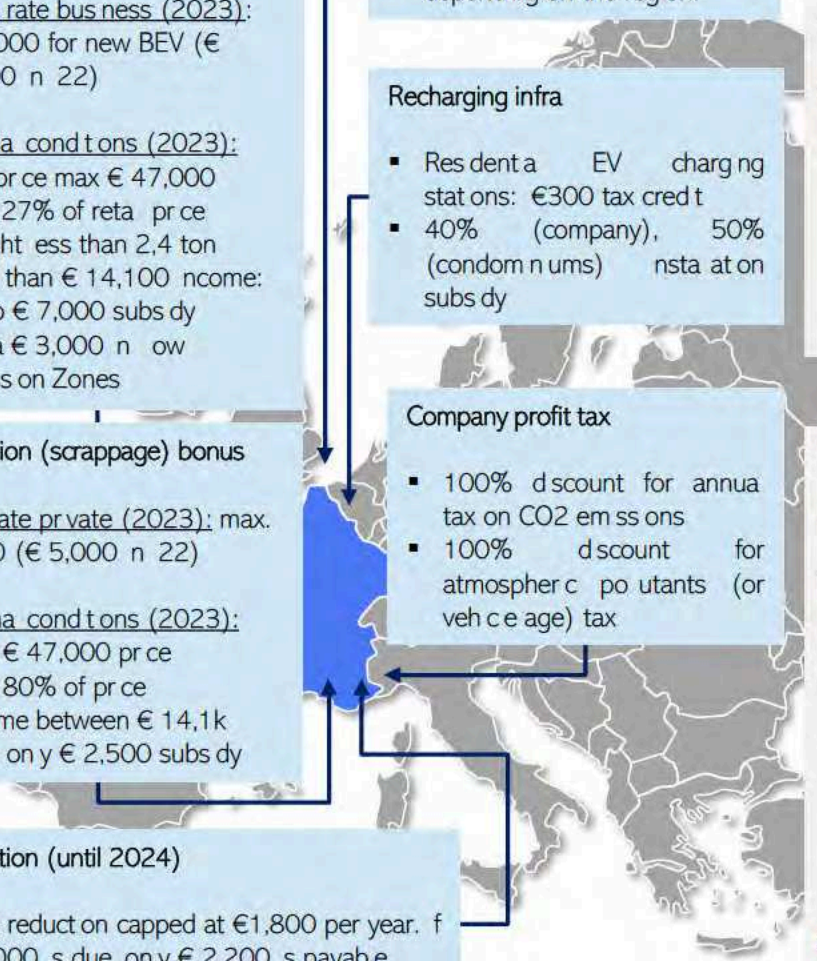
Add t ona cond t ons (2023):
- Max € 47,000 pr ce
- Max 80% of pr ce
- ncome between € 14,1k 23k: on y € 2,500 subs dy

BiK taxation (until 2024)
- 50% reduct on capped at €1,800 per year. f € 4,000 s due, on y € 2,200 s payab e.
- Charg ng at workp ace exempt from the tax.

Registration tax benefits
- 50% d scount for BEVs.
- 100% for cense p ate reg strat on (carte gr se) tax depend ng on the reg on.

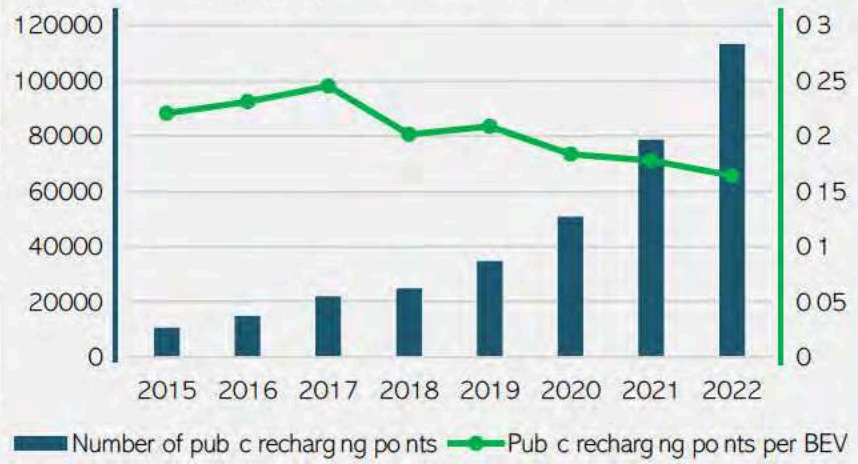
Recharging infra
- Res dent a EV charg ng stat ons: €300 tax cred t
- 40% (company), 50% (condom n ums) nsta at on subs dy

Company profit tax
- 100% d scount for annua tax on CO2 em ss ons
- 100% d scount for atmospher c po utants (or veh c e age) tax



Percentage of BEV registrations of total

Recharging infrastructure (AC & DC)

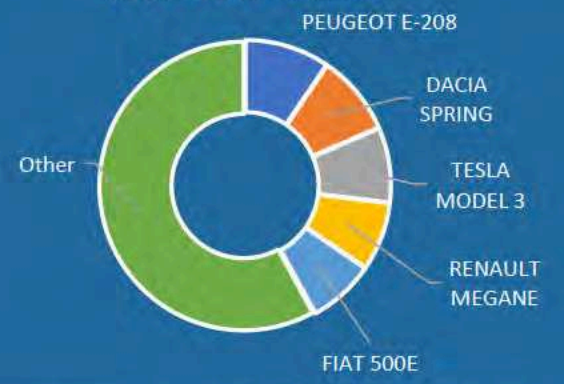


Ambitions

he French government's Mu t annua Energy Programme a ms to ncrease the ota BEV/FCEV f eet to 0.66M by 2023, and 1.8 m on by the end of 2028.

A ban on Sa es of ICE from 2040 onwards

TOP5 BEVs sold 22'



BIK/yr VW ID 3 2023: EUR 773, **2026: EUR 773**

BIK/yr VW Golf 2023: EUR 1.183, **2026: EUR 1.183**

Observations

France adopted changes cons der ng the grow ng oca product ons, budgetary restra nts and market evo ut on.

Funds a ocated to ower ncome househo ds and sma er car segments. Ma us ncreased for ICE cars: thresho d decreased to 123 g CO2/km from 128 start ng ower w th same rates.

Company car tax deduct ons made a s gn f cant mpact on sa es

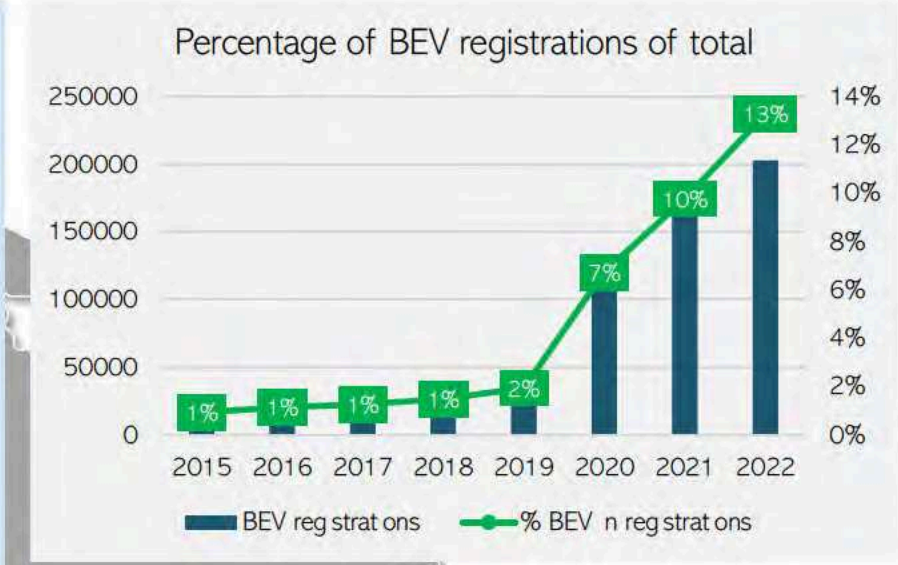
France Extended BiK taxation

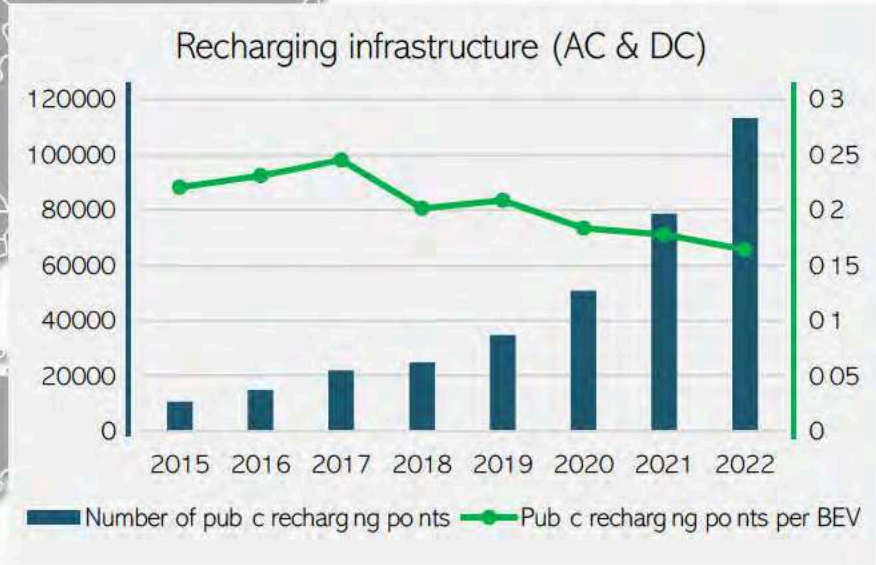
BiK taxation (until 2024)

Actua Expend ture Ca cu at on:
Suppose a company bought a car for €30,000. The annua fue costs, to s, and park ng come to €2,000. The car was dr ven 20,000km n a year, out of wh ch 5,000km were for pr vate use.
B K = (€30,000 + €2,000) * (5,000km / 20,000km) = €32,000 * 0.25 = €8,000

F at-Rate Ca cu at on (Purchased Car):
f the same car was ess than 5 years o d, the B K wou d be 9% of the purchase pr ce p us the fue costs. f we cons der fue costs as a f at rate of 3%, we have:
B K = 9% of €30,000 + 3% of €30,000 = €3,600

E ectr c Car (F at-Rate Ca cu at on):
f the same eased car was an e ectr c veh c e, we wou d app y the reduct on:
B K = €4,000 - 50% (max €1,800) = €4,000 - €1,800 = €2,200





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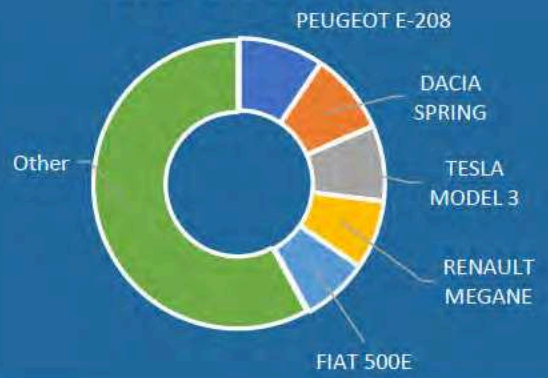

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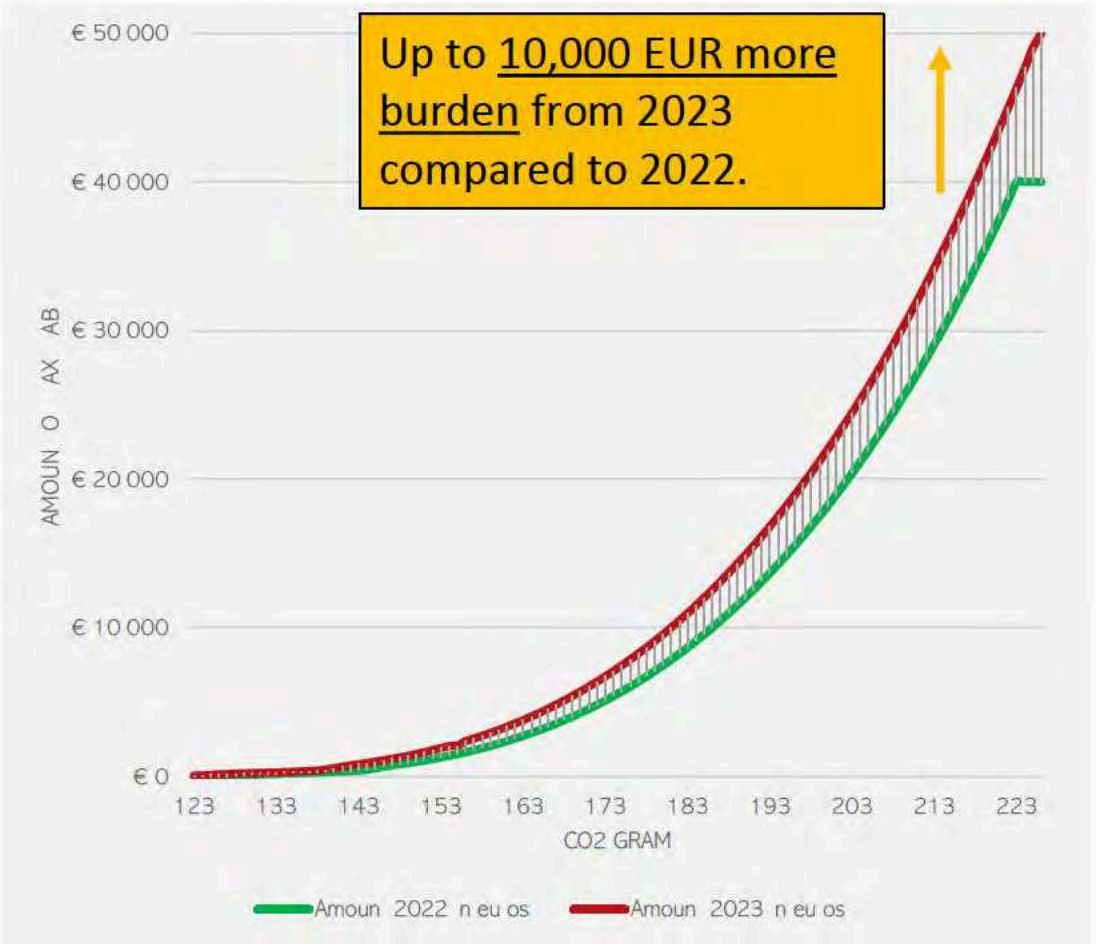
Funds a ocated to ower ncome househo ds and sma er car segments. Ma us ncreased for ICE cars: thresho d decreased to 123 g CO2/km from 128 start ng ower w th same rates.

Company car tax deduct ons made a s gn f cant mpact on sa es

French strategy: "The "carrot and the stick": disincentives must be in place to ensure a still positive gap for BEV - the polluter pays principle

Disincentives for ICE vehicles must stay in place, and the phase out of incentives for BEVs shall ensure a still positive gap for BEV. As we see examples in Sweden or France, even with reducing, or phasing out incentives for BEVs, the burdens of ICE vehicles grow, or remain, so that the relative attractiveness of BEVs stay, and not a situation arises, where ICE vehicles become more attractive.

Increasing financial burdens (malus) in France for petrol car registrations



Source: French D rectorate for ega and Adm n strat ve nformat on (2023)

Germany - Overview

Purchase subsidy

BEVs max € 40,000 pr ce (2023):
- € 6,750 for purchase or 2 year ease (€ 9,000 n 22)
- € 3,375 for ess than 2 year ease

BEVs max € 65,000 pr ce (2023):
- € 4,500 for purchase or 2 year ease (€ 7,500 n 22)
- € 2.250 for ess than 2 year ease

Used BEVs max € 65,000 pr ce (2023):
- € 4,500 for purchase or 2 year ease
- € 2,250 for ess than 2 year ease

Add t ona cond t ons (2023):
- For used BEVs, max 1 year o d reg strat on, 15k m eage

Motor Vehicle Tax

- BEVs reg stered between 2016, and 2020, rece ve 10 years exempt on.
- BEVs reg stered by 2025, are exempt unt 2030.

BiK taxation (until 2030)

BEVs under € 60.000: month y taxed at 0,25% of purchase pr ce. (75% d scount from CE) and 0,0075% of purchase pr ce as commut ng tax per km (75% d scount from CE)

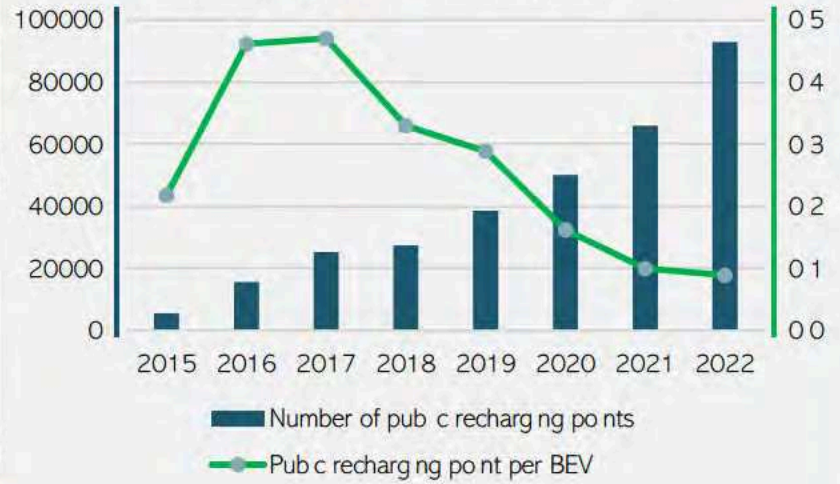
BEVs above € 60.000: month y taxed at 0,5% of purchase pr ce. (50% d scount) and 0,015% of purchase pr ce as commut ng tax per km (50% d scount from CE)

Recharging infra

- €130 b on for nfrastructure deve opment, tax cuts, and further subs d es.
- BEV owners are exempt from dec ar ng charg ng the r cars at the r emp oyer's prem ses as a cash benef t n the r ncome tax return.
- 900 EUR res dent a support program s no onger ava ab e.

Percentage of BEV registrations of total

Recharging infrastructure (AC & DC)



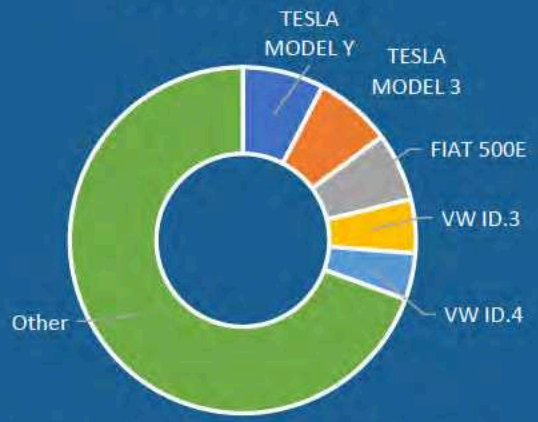
Ambitions

15 m on BEVs (M1) by 2030.

50k recharg ng po nts by 2025. 1M recharg ng po nts 2030 (DC focus).

3 b on nvestment to arge sca e battery product on va ue cha n.

TOP5 BEVs sold 22'



BIK/yr VW ID 3 2023: EUR 1.115, **2026: EUR 1.115**

BIK/yr VW Golf 2023: EUR 3.708, **2026: EUR 3.708**

Observations

Purchase subs d es w decrease to max. € 4,500 n 2024.

he h gh growth of BEV reg strat ons n 2022 most y ke y happened due to expected subs dy cuts. 2023 Y D (March) shows s ght s ow down.

2022 saw a b g ncrease n pub c DC chargers.

Germany provides generous purchase subsidies with no differentiation

Germany

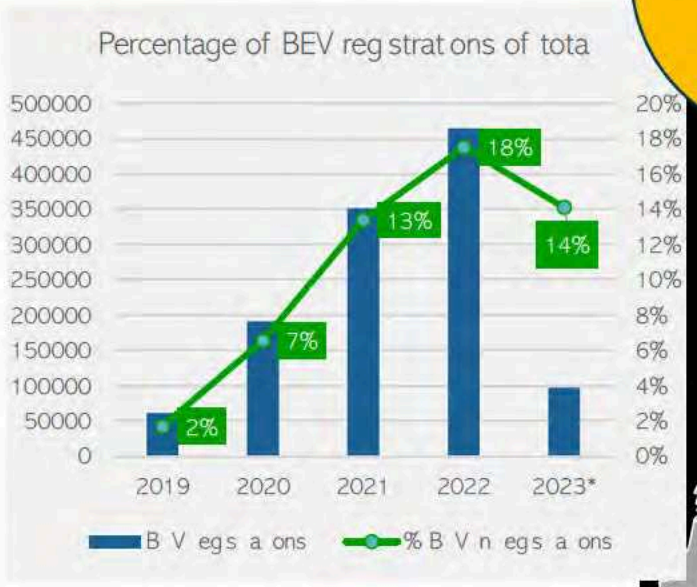
German subsidy program

BEVs max € 40,000 price (2023):

- € 6,750 for purchase (2023) was € 9,000 in '22

BEVs max € 65,000 price (2023):

- € 4,500 for purchase (2023) was € 7,500 in '22



Targeting:

- Smaller segments, due to high subsidy on amortisation, which matters more for Economy segment vehicles.
- No differentiation between private and business.
- No differentiation on household income.

Source: EAFO (2023)

Belgium - Overview

Purchase subsidy

- No nat ona or reg ona purchase subs dy ava ab e or p anned as of 2023.
- Some c t es offer purchase subs d es (€ 4,000)

Registration tax

F anders:
No reg strat on tax for BEVs

Wa on a and Brusse s:
M n mum amount (m n: € 62, max: € 4960) for BEVs.

BiK Tax

- F xed m n mum rate of 4% (max.. 18%, m n mum € 1,400 per year.
- Formu a: st pr ce veh c e x age % x CO2 % x 6/7. The base % CO2 s 5,5%, w th em ss ons of 91 g/km, for every gram h gher or ower 0,1% s added or deducted.

Road tax

F anders:
No road tax for BEVs

Wa on a and Brusse s:
M n mum amount for BEVs.

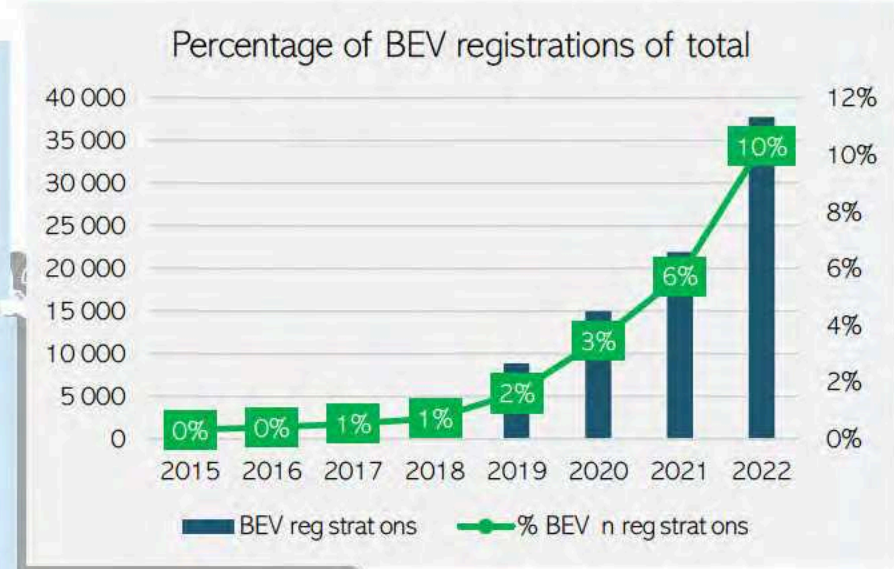
Company car tax

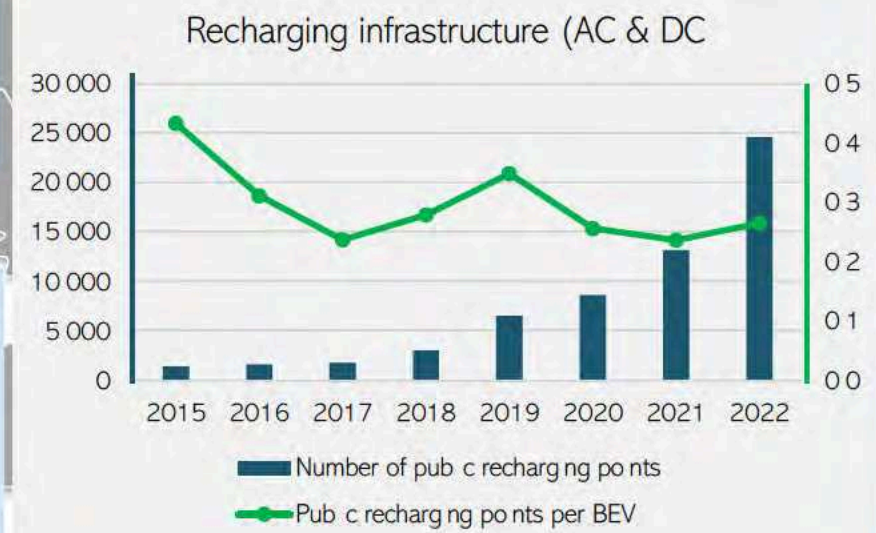
- BEV cars w be 100% tax deduct b e by 2026.
- For BEVs, deduct b ty w taper from 100% n 2026 to 67.5% n 2031.
- Tax deduct b ty for CE cars purchased between Ju y 2023 and Dec 2025 w decrease over t me. Max mum deduct b ty w be 75% n 2025, 50% n 2026, 25% n 2027, and 0% n 2028.

Home charging

ome:
2023: 30% tax deduct on (max. € 1,500)
2024: 15% tax deduct on

Company:
150% cost deduct on unt 2024



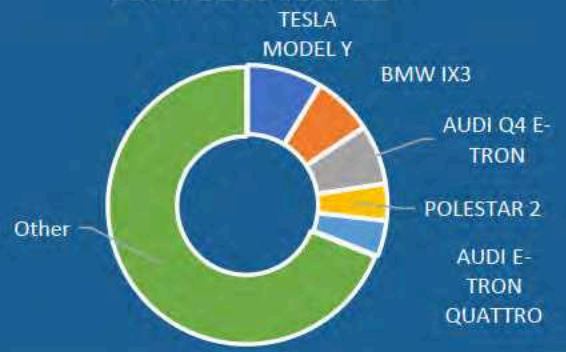


Ambitions

A new bought company cars must be zero em ss on veh c es from 2026 onwards.

On y a ow ng the sa e of zero em ss on veh c es for the ent re market. No date s spec f ed for th s amb t on.

TOP5 BEVs sold 22'



Observations

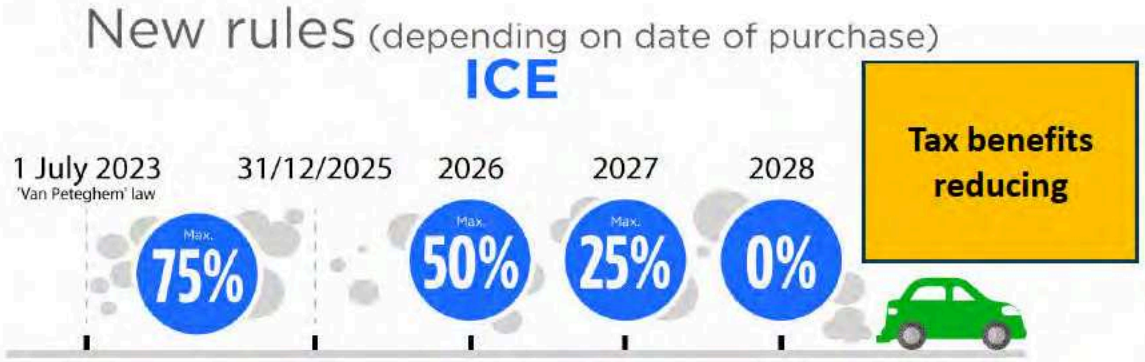
Company car tax deduct b ty have a c ear v s on for BEV and ICE cars unt 2031.

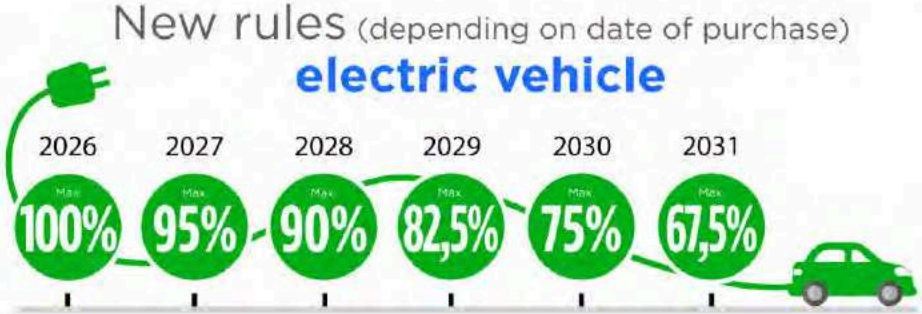
Be g um has more governmenta eve s than other European countr es, th s eads to d fferent ncent ve programs n d fferent parts of Be g um.

Charg ng po nt dens ty has been re at ve y stab e. Home charg ng tax cuts ava ab e unt 2024.

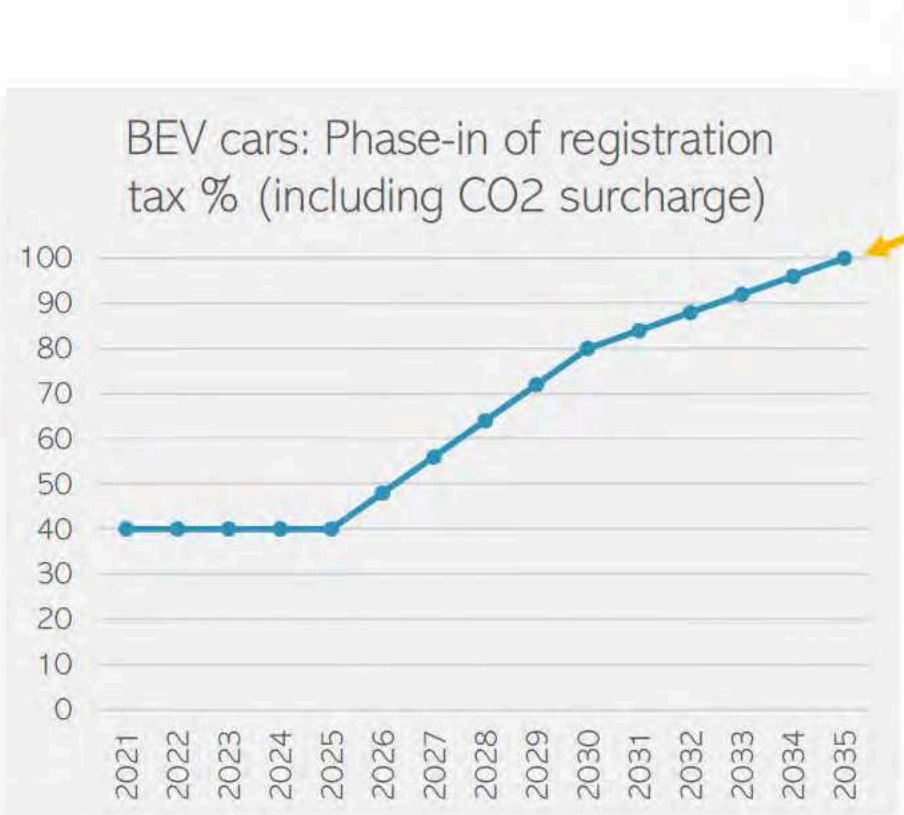
Premature Curtailment of Incentives: Long-term and predictable incentive polices are driving BEV sales growth.

Belgium gradually phasing out incentives for BEVs, and increasing financial burdens on ICE cars





Denmark gradually reduces incentives for BEVs until 2035



Source: Skat.dk (2023)

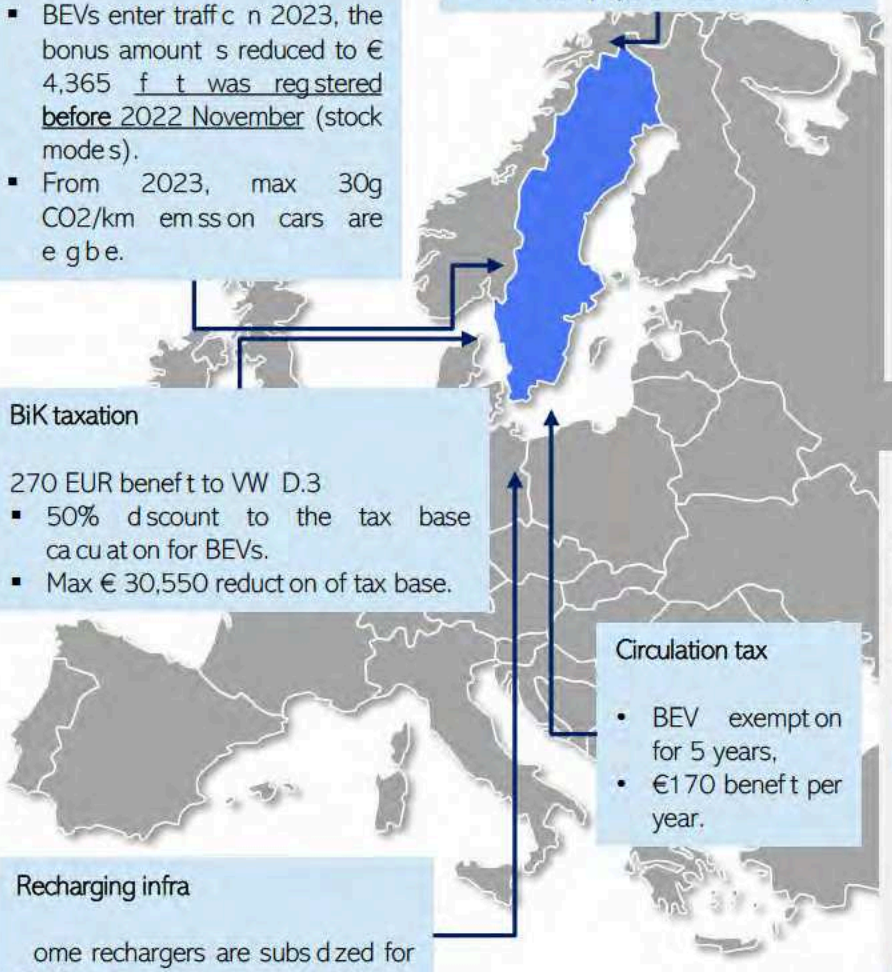
Sweden - Overview

Purchase subsidy

- No subsidies available for cars registered after 8th November 2022.
- BEVs entering traffic in 2023, the bonus amount is reduced to € 4,365 if it was registered before 2022 November (stock models).
- From 2023, max 30g CO2/km emission cars are eligible.

Road Tax (2023)

- BEVs pay lowest amount, appx. € 32.
- VW Golf pays € 355 annually.



BiK taxation

270 EUR benefit to VW ID.3

- 50% discount to the tax base calculation for BEVs.
- Max € 30,550 reduction of tax base.

Circulation tax

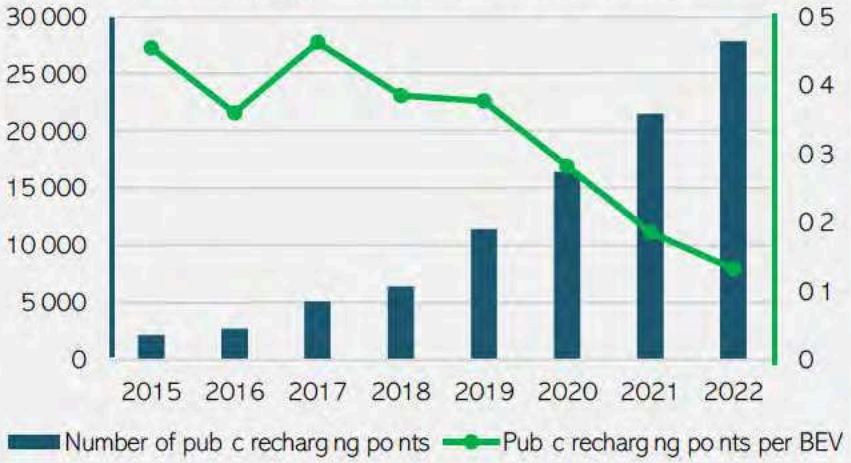
- BEV exemption for 5 years,
- €170 benefit per year.

Recharging infra

Some rechargers are subsidized for 50%, up to a maximum of €960.

Percentage of BEV registrations of total

Recharging infrastructure (AC & DC)



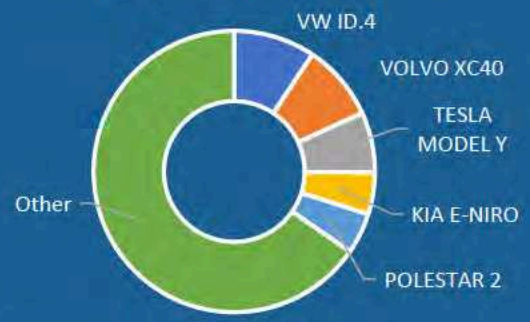
Ambitions

The Swedish government is banning the sale of combustion engines by 2030.

The Swedish government presented the goal of net zero emissions by 2045.

The government wants parity in costs between private and company cars.

TOP5 BEVs sold 22'



BIK/yr VW ID 3 2023: EUR 3.333, **2026: EUR 3.333**

BIK/yr VW Golf 2023: EUR 3.603, **2026: EUR 3.603**

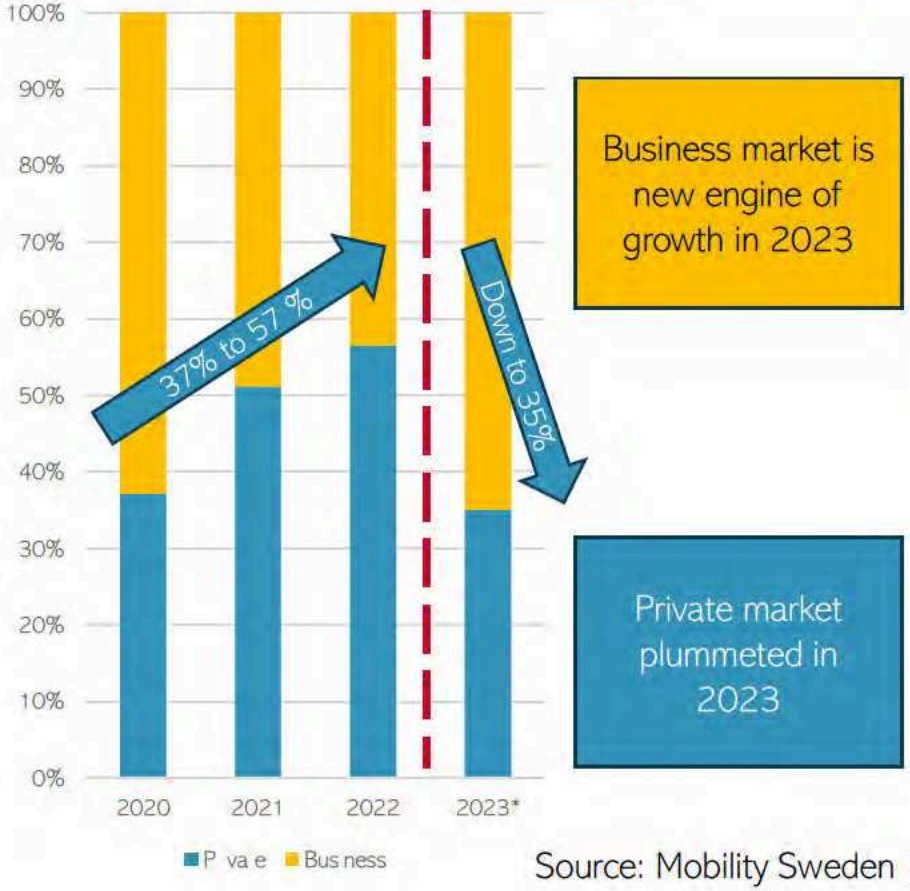
Observations

- Sweden is reducing benefit of BEVs over petrol and diesel cars sooner than other countries, due to budgetary restrains (to balance bonus malus) and balanced price differences.
- Larger and luxury car segments are now more taxed and excluded from benefits to promote smaller vehicles.
- Dealerships and industry associations reported sudden disinterest towards BEVs after the subsidy disappeared.

Sweden stopped 6000 EUR subsidy on a short notice
Result: collapsing private market in 2023, growing business market

Sweden

2022 Nov: 6000 EUR Subsidy phased out

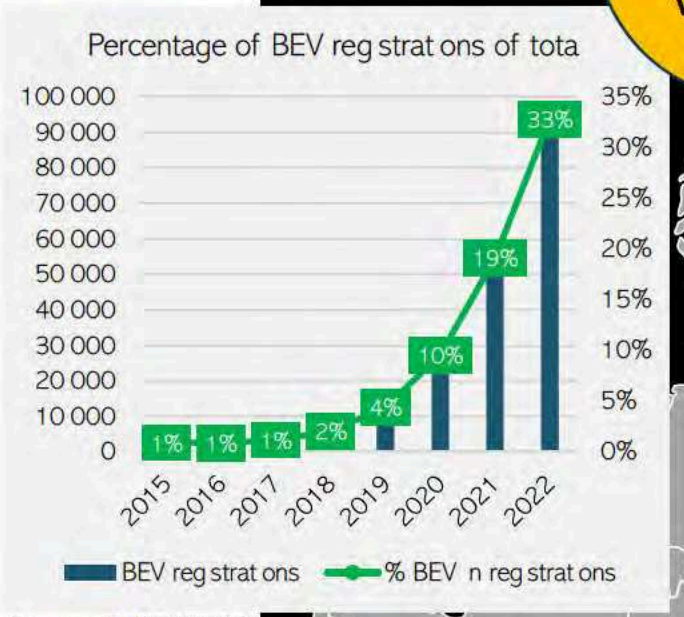


Business market is new engine of growth in 2023

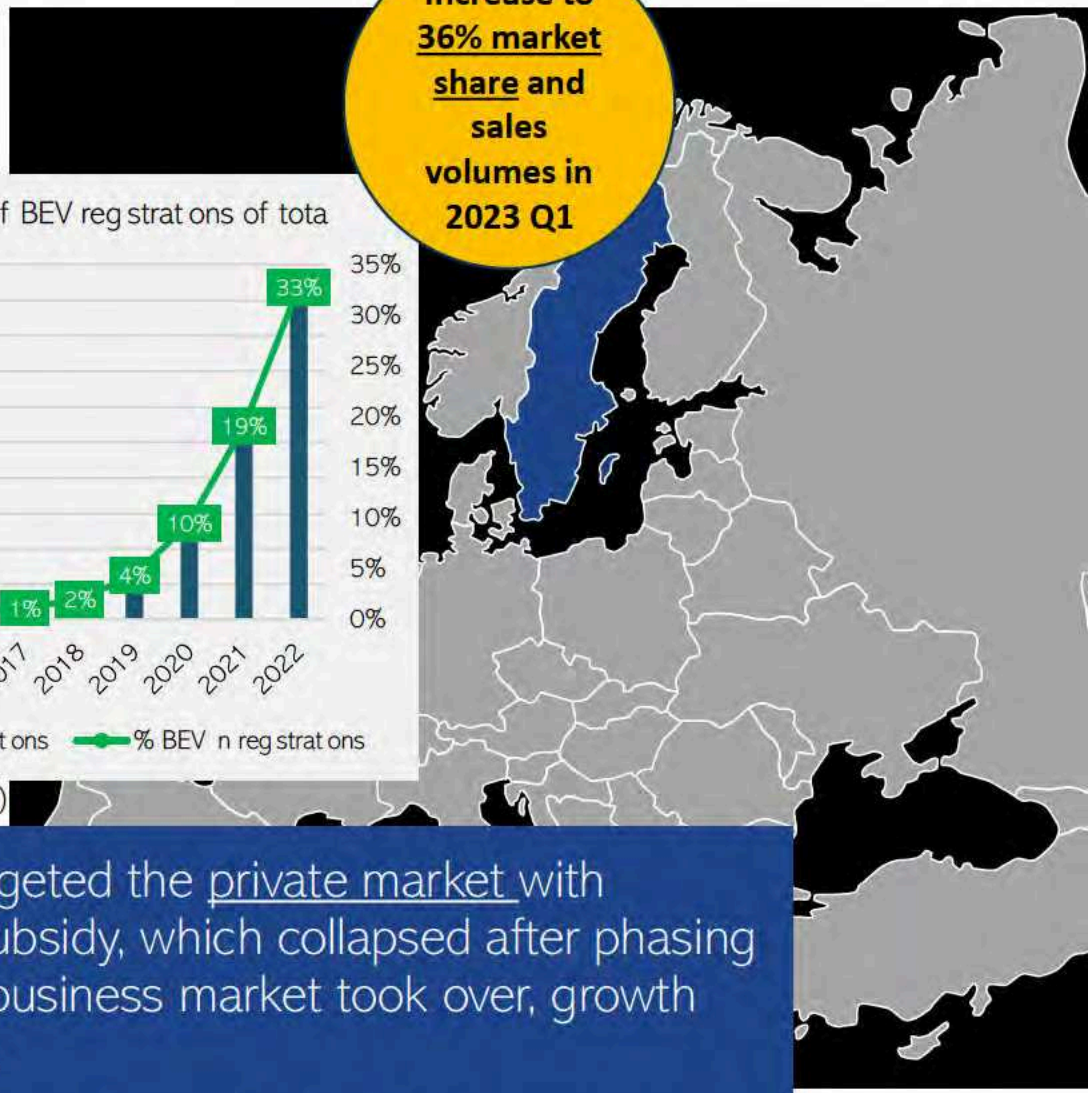
Private market plummeted in 2023

Source: Mobility Sweden (2023)

Increase to 36% market share and sales volumes in 2023 Q1



Source: EAFO (2023)



Sweden targeted the private market with purchase subsidy, which collapsed after phasing it out, and business market took over, growth engine role.

Market share still growing in 2023!

Austria - Overview

Purchase subsidies (until 03/24)

Fund ng rates
- BEV subs dy amount for pr vate: € 5.000 (€ 3,000 federa + € 2,000 mporter) - same n 22
- BEV subs dy amount for bus ness: € 2.000 € 4,000 n '22

Add t on cond t ons
- BEV st pr ce cap: € 60.000
- Max 50% of st pr ce
- M n 60 km W TP
- Max 12 months s nce 1st reg.
- Budget: € 32 m on

Registration tax
- Po ut on tax (NoVA): 100% exempt on. Max. 70% for CE (23), 80% n 24.
- Motor nsurance tax: 100% exempt on.

Recharging infrastructure

For pr vate
- € 600 for s ng e homes (max. 50% of the expenses)
- € 900 for nd v dua nsta at ons and €1800 for shared nsta at ons (max. 50% of the expenses)

For compan es:
- €900 for a 11/22kW charger (max 30% of the expenses).

Investment premium
- 14% nvestment bonus for compan es purchas ng BEVs
- Max. € 60,000 st pr ce

VAT benefits (2023):

Be ow €40.000 st pr ce:
- VAT s fu y deduct b e

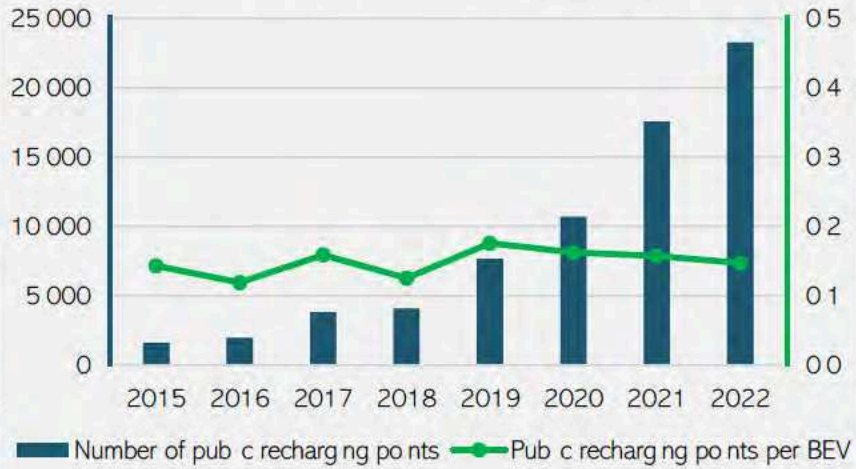
Between €40k and €80k of st pr ce:
- Amount exceed ng €40k s taxab e

st pr ce above €80k:
- No VAT deduct on ava ab e

BiK Tax
- 100% exempt on of B K taxat on for BEVs.
- CE cars w th CO2 em ss on <132 gr/km taxed at 1,5%, A other cars taxed at 2% (max. € 960 per month).
- Em ss on m t reduces to 126 g CO2/km unt 2026.

Percentage of BEV registrations of total

Recharging infrastructure (AC & DC)

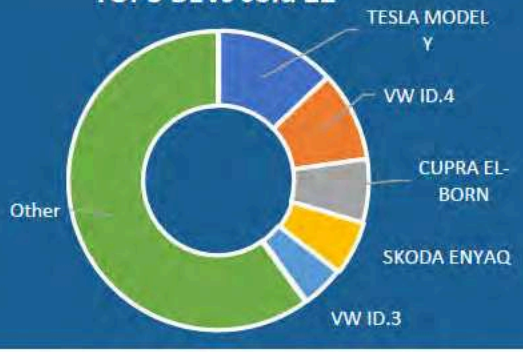


Ambitions

he Austr an government a ms to be carbon neutra by 2040. he amb t ous p an nc udes heavy decarbon zat on of the mob ty sector.

100% share of ZEV's n new car and ght commerc a veh c es by 2030.

TOP5 BEVs sold 22'



BIK/yr VW ID 3 2023: EUR 0, **2026: EUR 0**

BIK/yr VW Golf 2023: EUR 2.282, **2026: EUR 2.282**

Observations

he Austr an government, ma nta ned subs d es n 2023 w thout s gn f cant changes st pr ce caps app ed st .

Desp te s gn f cant subs dy programs for veh c es and nfrastructure, growth decreased n 2022.

Denmark - Overview

Registration tax

No reg. tax for BEV, for P EV cca. € 11,000, for CE (VW Go f) cca. 14,000 EUR

1. Taxab e va ue:
st pr ce of BEV battery reduct on

Battery deduct on
- 2023: - €120/kWh (175 n 22)
- 2024: - €67/kWh
- 2025: - €0/kWh

Max. 45 kWh reduct on.

3 phase for tax base ca cu at on:
- 1st € 9,100: 25%
- 2nd € 19,200: 85%
- 3rd above € 19,200: 150%

2. CO2 a owance
- 100% exempt on for BEVs
- 0-117 g CO2 / km: - € 35 per g CO2
- 117-150 g CO2 / km: - € 70 per g CO2
- 150 g + CO2 / km: - € 133 per g CO2

3. Phase- n deduct on for BEVs
- Unt 2025: 40%
- 2025-2035: gradua ncrease to 100%

4. Bas c deduct on
€ -22,150 for BEVs (on y € 3,000 for CE cars)

Ownership tax (weight, CO2)
- Based on we ght and em ss on
- BEVs pay m n. amount: €92/year (VW Go f €330 as reference)

BiK Tax

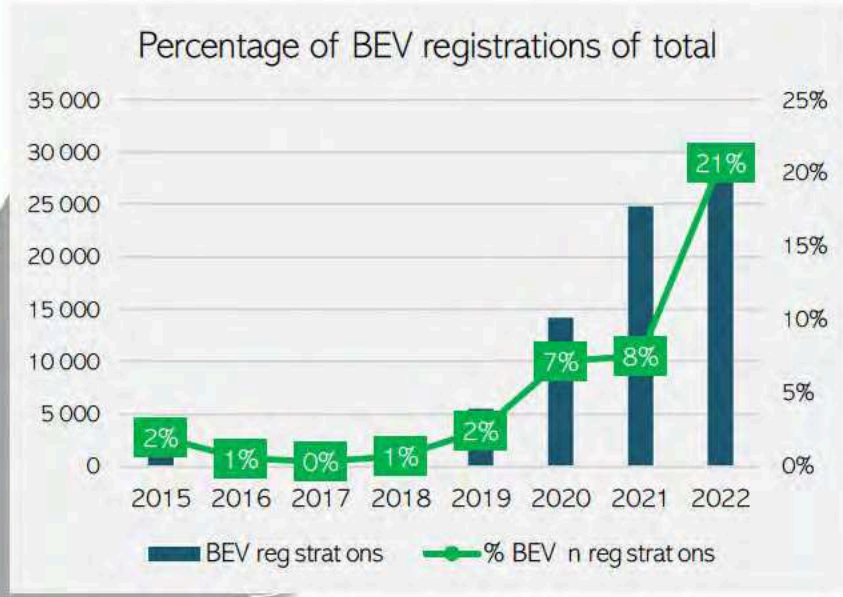
Value of the car (2023):
- 23,5% unt € 40,200
- 21,5% for exceed ng amount

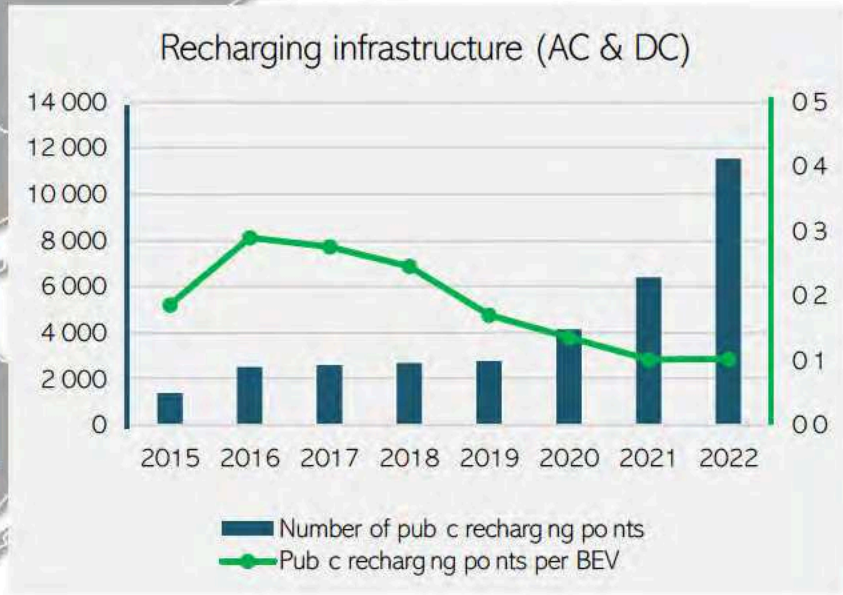
2024: 23% / 22%
2025: 22,5% / 22,5%

Env ronmenta a owance
- 450% of green ownersh p tax
- BEVs are exempt

Month y tax: (va ue of car + env ronmenta a owance)/12

Recharging infra
- Tax-free BEV charg ng at work (2023 - 2026)
- ous ng assoc at on charge po nt nsta at on subs dy (2023-2025)
- 25% of tota costs.

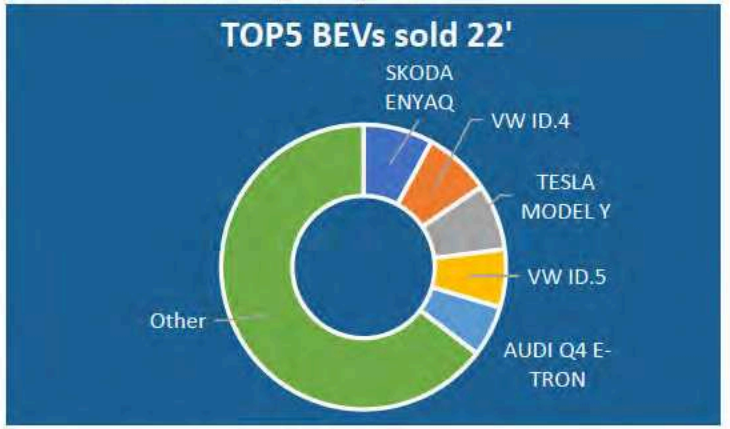




Ambitions

he Dan sh government s a m ng to put at east 1 m on BEVs on the road by 2030. In th s year they a so a m to ban ICE veh c es

A m to ban PHEV' sa es from 2035 onwards and a foss free car park by 2050



BIK/yr VW ID 3 2023: EUR 5.232, **2026: EUR 4.983**

BIK/yr VW Golf 2023: EUR 5.940, **2026: EUR 5.964**

Observations

Changn ng ncent ves made a huge mpact on both sa es share and growth n 2022 and n Q1 2023, mak ng Denmark eader n Europe.

Incent ve phase out targets have a ong v s on n Denmark (unt 2035).

Denmark owered the r tax rebates on PHEVs, ead ng to a s gn f cant ncreased share of BEVs n 2022.

Italy - Overview

Purchase subsidy (2023 - 2024)

Private individuals

For income <€ 30.000
- Subsidy amount: €4500
- Additional scrappage bonus: €3000

For income above €30.000
- Subsidy amount: € 3000
- Additional scrappage bonus: €2000

Additional conditions
- Only brand new
- Businesses can lease
- Max. € 35.000 net retail price
- 1 year holding period, 2 years for business lease

Budget of € 250 million for BEVs in 2022, 2023 and 2024.

Regional subsidy (Lombardy):
- Max. € 4.000 (€1,000 without scrapping)
- Max. € 45.000 net retail price

Charging infra

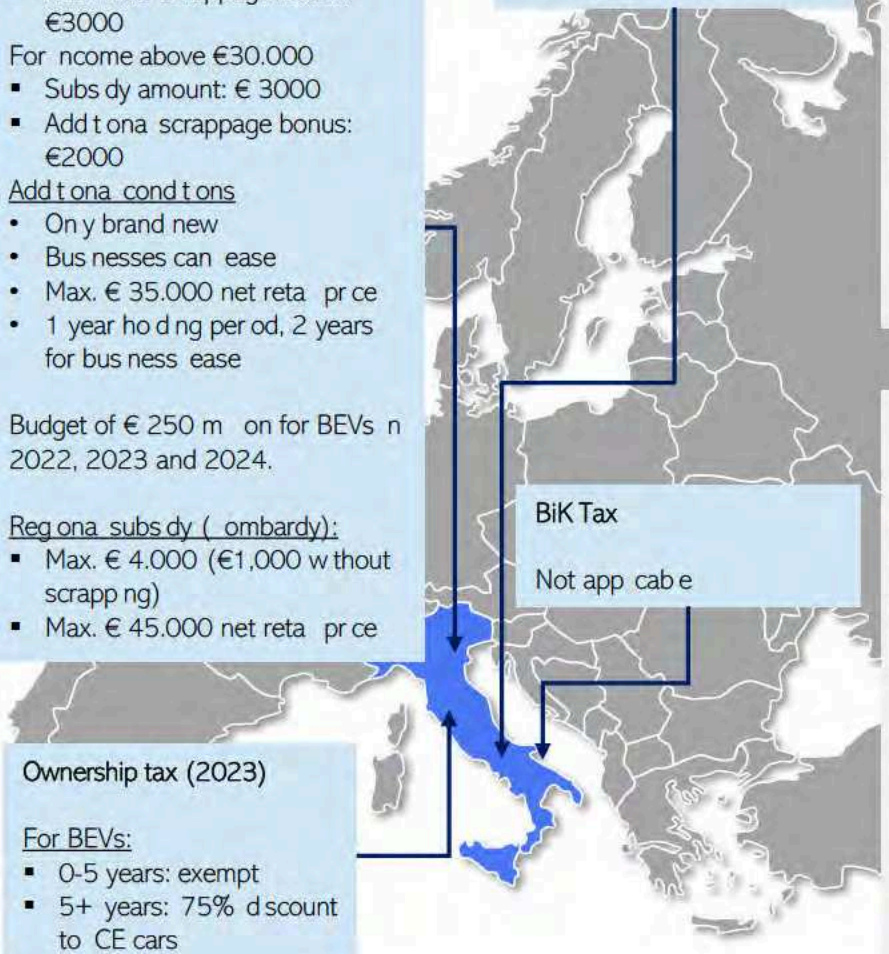
Natural and legal persons:
- 80% subsidy of total costs (max. € 1500).
- Budget: €40 million

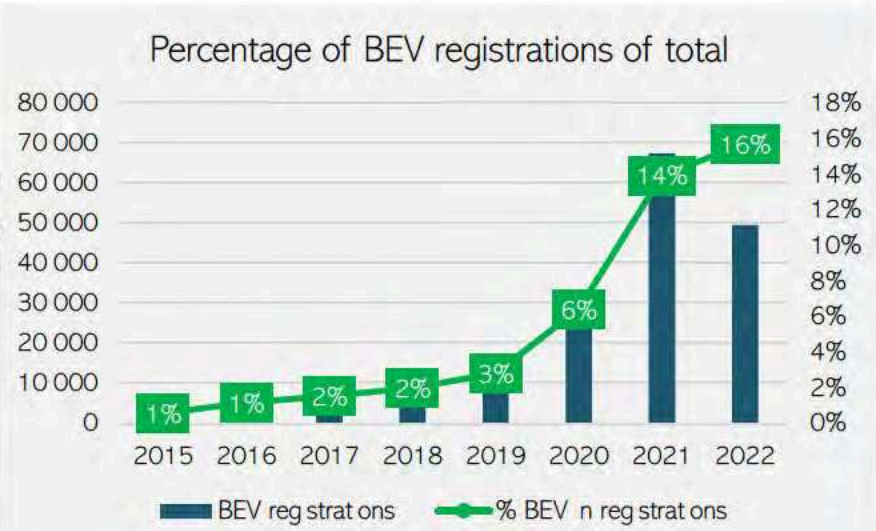
BiK Tax

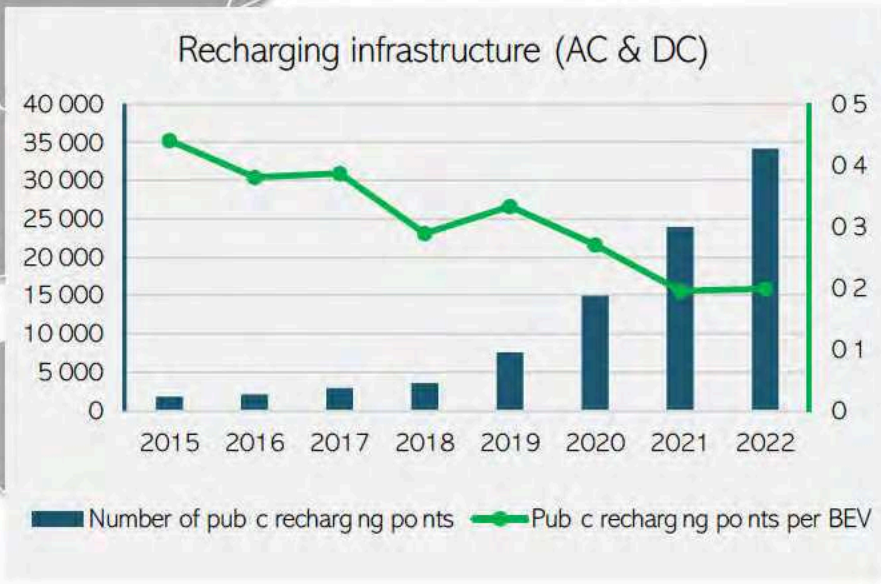
Not applicable

Ownership tax (2023)

For BEVs:
- 0-5 years: exempt
- 5+ years: 75% discount to CE cars



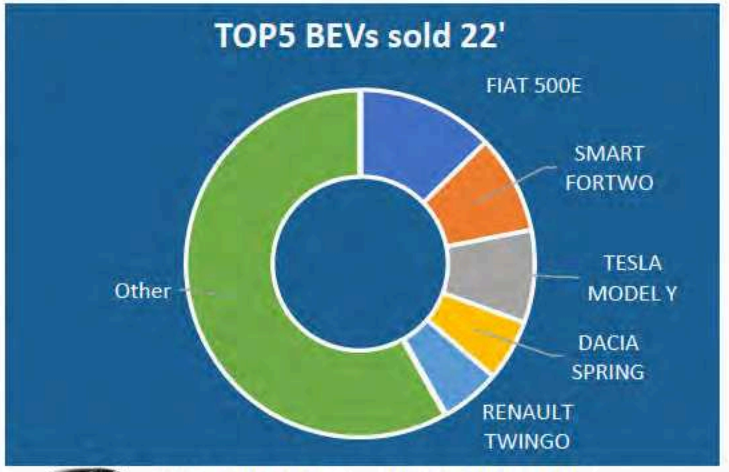




Ambitions

Italy aims to have at least 6 million electric vehicles (BEV PHEV) on its roads by 2030

4,500 DC fast charging points and 7,000 DC ultra fast charging points by 2030.



BIK/yr VW ID 3 2023: EUR 0, **2026: EUR 0**

BIK/yr VW Golf 2023: EUR 0, **2026: EUR 0**

Observations

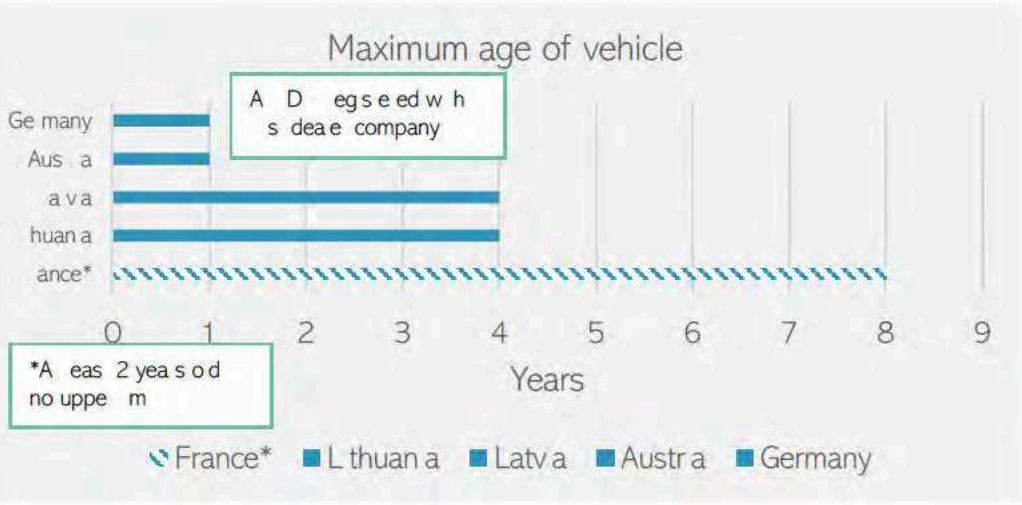
Abrupt end of incentives and political/economic uncertainty discouraged BEV adoption. Low public funding allocated. Consumers saw disruption of local economy.

Limited availability of affordable small BEVs and underdeveloped charging infrastructure hated sales

Increased competition from PHEVs reduced BEV demand.

Overview of used vehicle subsidies

For France: Eco og ca Bonus (max. € 1,000) Convers on Bonus (max € 6,000) Bonus for res dents n Low Em ss on Zones (max € 1,000 nat ona € 2,000 Mun c pa bonus) = max. € 10,000.



France

Ecological bonus
€1,000 bonus for pr vate buyers.

Veh c e cond t ons:
- 2 years ownersh p
- A ready n France for m n. 2 years
- BEV of FCEV
- On y one payment per 3 years

Opt ona extra amount on top of € 1,000
- **Conversion (scrappage) bonus**: €2,500 - €6,000 based on ncome and veh c e type.
- Bonus for res dents or workers n **Low Emission Zones (LEZ)**: €1,000 for those who ve or work n a EZs. Extra bonus from oca author ty: max: €2,000.

Germany*

Purchase subsidy
- Used BEVs max € 65,000 purchase pr ce (2023): € 4,500 for purchase or 2-year ease.
- Max 1 year o d reg strat on to the dea ersh p, max. 15k m eage.

Latvia

Purchase subsidy
- €2,250 for used BEVs

Scrappage bonus
- Extra €1,000 to the subs dy

Veh c e cond t ons:
- Purchase pr ce max. €50,000
- Max. 4 years o d veh c e

Budget: € 10 M (2023)

Lithuania

Purchase subsidy
- €2,250 for used BEVs

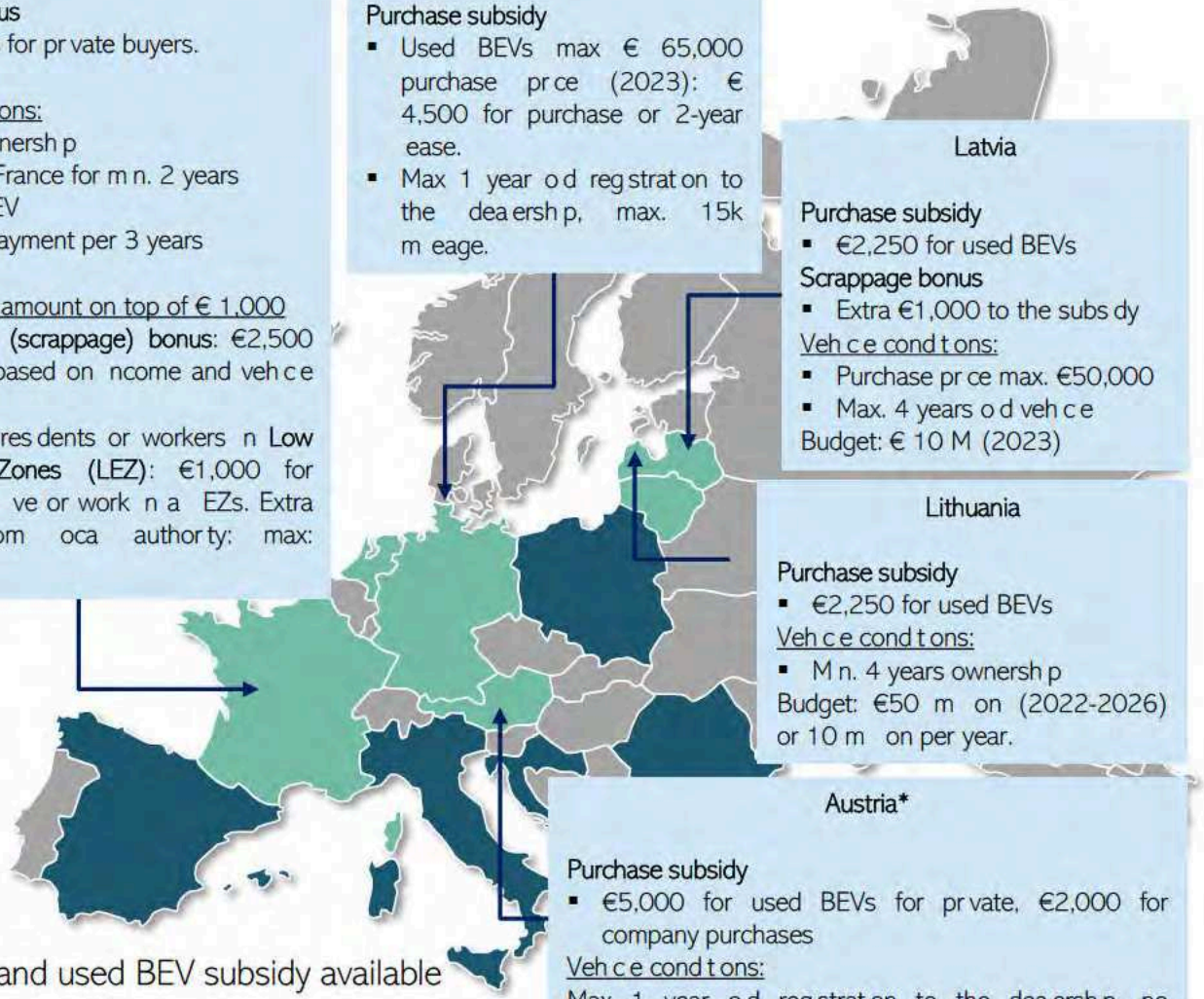
Veh c e cond t ons:
- M n. 4 years ownersh p

Budget: €50 m on (2022-2026) or 10 m on per year.

Austria*

Purchase subsidy
- €5,000 for used BEVs for pr vate, €2,000 for company purchases

Veh c e cond t ons:
Max 1 year o d reg strat on to the dea ersh p, no m n mum age requ red.



New and used BEV subsidy available

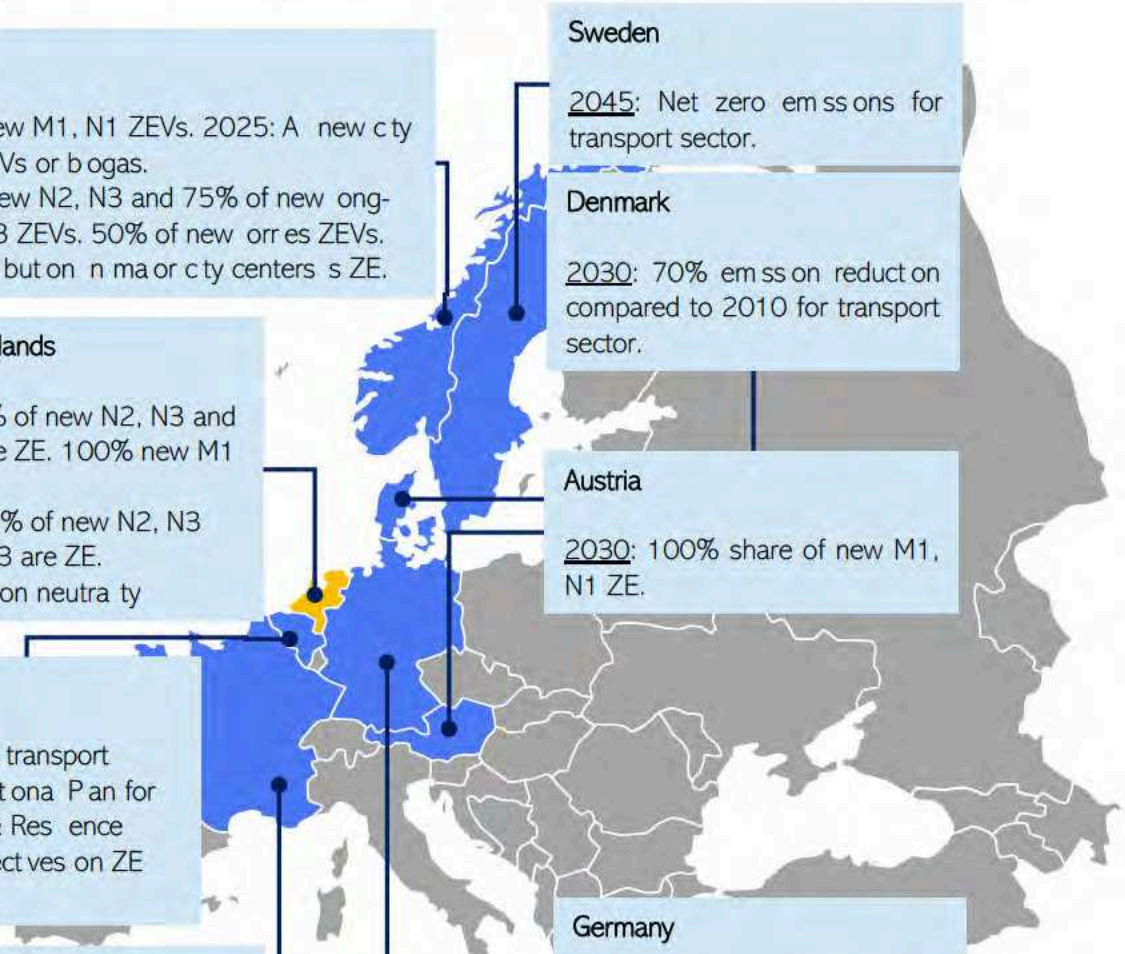
Only new BEV subsidy available

No subsidy available as of May 2023

*For Germany and Austr a techn ca y the purchase subs dy s a so ava ab e for BEVs no o der than 1 years

Emission reduction goals in transport sector and general emission reduction goals

Transport Sector Emission Reduction Goals, Sales Targets



Norway

2025 A new M1, N1 ZEVs. 2025: A new c ty M2, M3 ZEVs or b ogas.
2030: A new N2, N3 and 75% of new ong- d stance M3 ZEVs. 50% of new orr es ZEVs. Goods d str but on n ma or c ty centers s ZE.

Sweden

2045: Net zero em ss ons for transport sector.

Denmark

2030: 70% em ss on reduct on compared to 2010 for transport sector.

The Netherlands

2030: 30% of new N2, N3 and M2, M3 are ZE. 100% new M1 ZE.
2040: 100% of new N2, N3 and M2, M3 are ZE.
2050: carbon neutra ty

Austria

2030: 100% share of new M1, N1 ZE.

Belgium

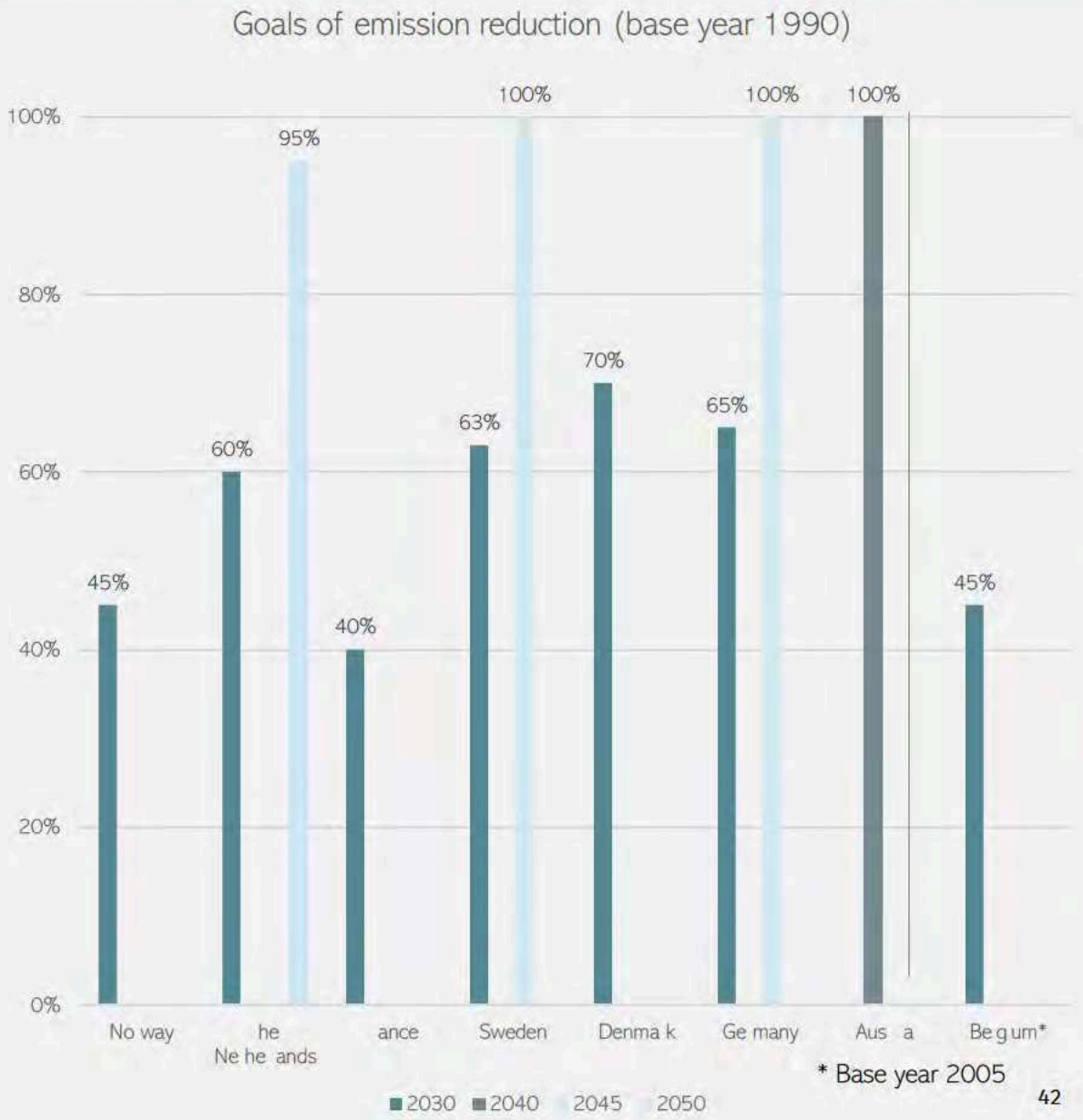
No spec f c transport targets. Nat ona P an for Recovery & Res ence enta s ob ect ves on ZE transport.

France

2030: 32% em ss on reduct on compared to 2005 for the transport sector.

Germany

2030: 15 m on BEVs. 1/3 of road fre ght m eage s ZE.
2050: Goa transport sector: 40% reduct on n em ss ons.



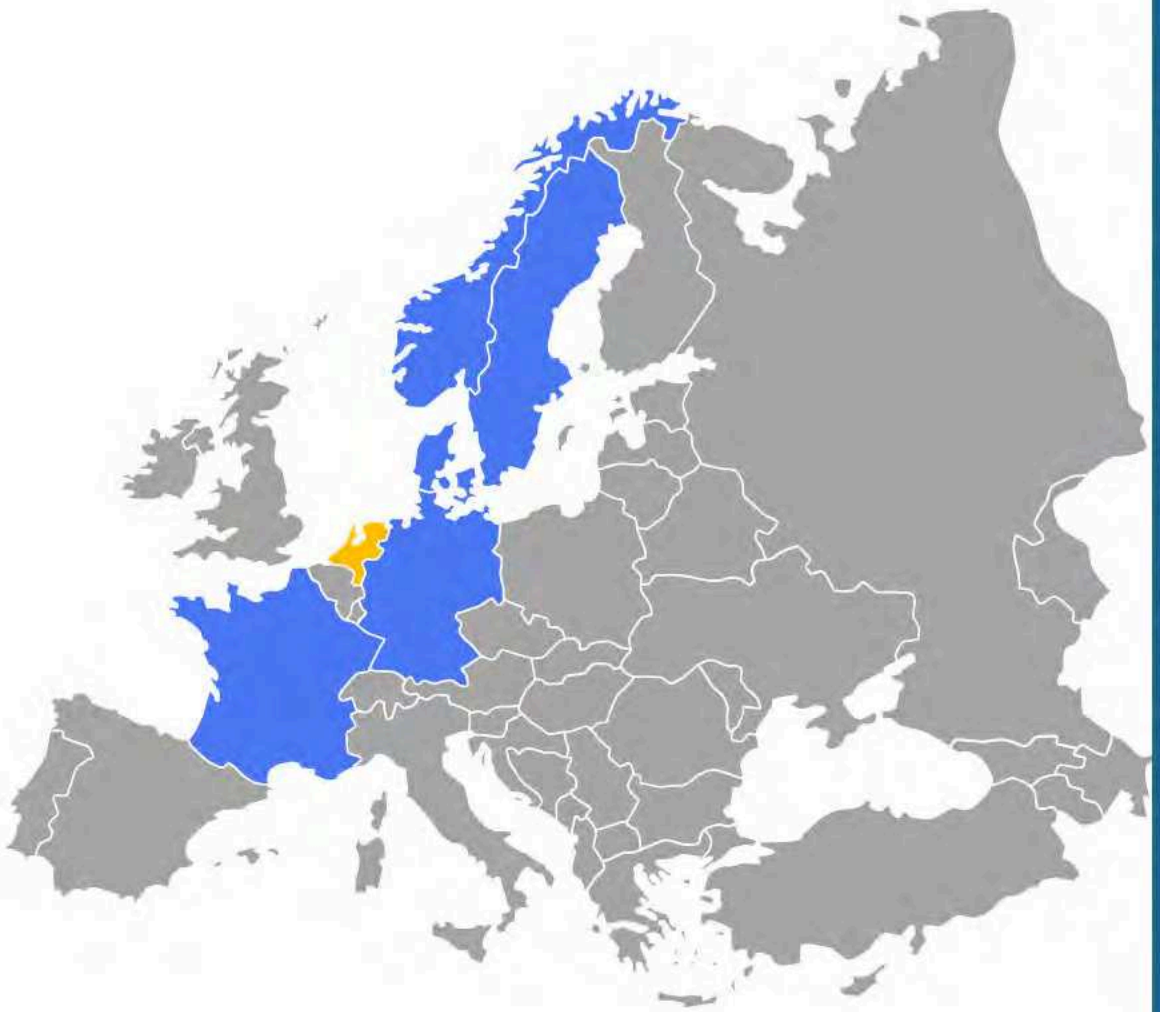
Overview of road tax system in the Netherlands and researched countries

Country	BEVs are exempted from road tax	Incentive phase-out Timeline	Tax calculation method	Petrol rate Reference car (VW Golf – 124 g CO2/km, 96 kW, 1302 kg) (year)	BEV rate (year)	Difference between ICE and BEV (year)
Nether ands	☑	2024.12.31	For ICEV cars the average amount s n between €20 €60 per month	€592	€0	€592
Ita y	☑	F rst 5 years after reg strat on. *2029 earliest*	BEV: (rated kW/4) *tar ff amount based on reg on Petro /D ese : rated kW*tar ff amount based on reg on	€273 n Rome	F rst 5 years: €0 From year 5: 75% d scount	€273
France	☑	No f na date announced	r gger ng m t: 123g CO2/km = €50 (from 128g n 2022) Above th s m t every em ss on amount has a pre determ ned tax va ue Above 1800 kg: €10/kg 100% d scount for BEVs	€354 (one off tax) New VW Go f em ss on s ow	€0 n Par s	€354
Sweden	☑	No f na date announced IVL: 2030	75g 125g CO2/km: € 9 /gram 125g < CO2/km: € 11 /gram	€483 (f rst 3 years) €56 (after 3 years)	€31 Bas c amount for every veh c e	€452
Norway	✗	2023.03.01	Annua road tax was rep aced by traff c nsurance tax s nce 2018. F xed rate for every car be ow 7,5 tons. (H gh reg. tax!)	€260	€260	€0
Austr a	☑	No f na date announced	Based on eng nge kW, pre determ ned EUR per kW based on certa n brackets of performance. (L nk)	€538	€0	€538
Germany	☑	2030.12.31	Petro : 2€/100 cm^3 CO_2 va ue tax amount D ese : 9.50€/100 cm^3 CO_2 va ue tax amount	€89	€0	€89
Denmark	☑	No f na date announced. Unt 2027 not	Based on CO2 g/km em ss on (the po utes pays), progress ve sca e. E ectr c cars pay the owest amount. (H gh reg. ax!)	€161	€99	€62

Overview of registration tax system in the Netherlands and researched countries

Country	BEVs are exempted from registration tax	Incentive phase-out Timeline	Tax calculation method	Petrol rate Reference car (VW Golf – 124 g CO2/km, 96 kW, 1302 kg) (year)	BEV rate (year)	Difference between ICE and BEV (year)
Nether ands	☑	2024.12.31	BPM	€4729	€0	€4729
Ita y	✗	No f na date announced Depends on Reg on	Imposta prov nc a e d trascr z one IP	€337	€337 n Rome No ncreased rate	€337
France	☑	No f na date announced	Ma us CO²	€170	€0 n Par s	€170
Sweden	Not re evant	Not re evant	No reg strat on tax at the purchase		-	
Norway	☑	2025.12.31 (p anned)	One off reg strat on tax: are we ght tax Bas c fee for own we ght CO2 tax NOx tax	€9510	€1635	€7875
Austr a	☑	No f na date announced	NoVA CO2, kW, pr ce based components.	€450	€0	€450
Germany	✗	Not re evant	Reg strat on fees app y to a veh c es	€26.30	€26.30	€0
Denmark	☑	2034.12.31 Gradua decrease of d scount	Based on CO2, we ght, pr ce, power tra n, veh c e category.	€14.000	0	€14.000

Incentives for BEVs



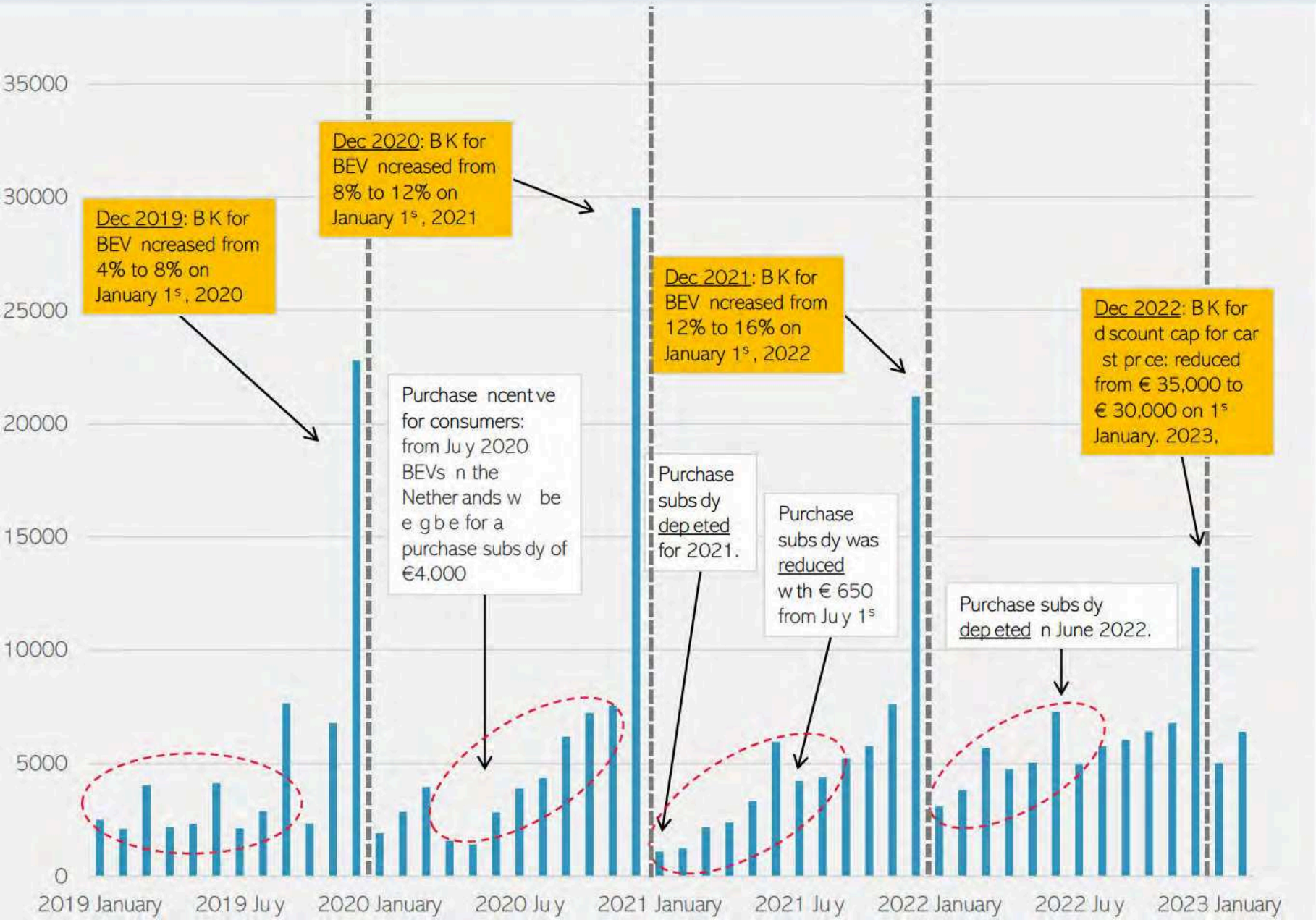
Conclusion on BEV incentives per country

There are clear differences in incentives, often led by the existing tax structure in a country. Countries as the Netherlands, Norway and Denmark have high taxation on CE cars, which makes it possible to incentivise BEVs through taxation benefits. rance and Germany have, for instance, much lower overall taxation on cars. This creates a higher need of subsidies when trying to incentivise BEVs. Taxation on private use of a company car is fairly similar across all countries, BiK is added to a person's income. This makes it possible in all countries to incentivize BEVs by reducing BiK taxation for BEVs. The amount of the benefit for BEVs are different per country, but they are present in all countries. All countries apply different kinds of incentives to stimulate the uptake of BEVs and there are significant differences.

Deep dive in effect of BEV policies

The Netherlands, Sweden, France, Germany, Norway, Denmark

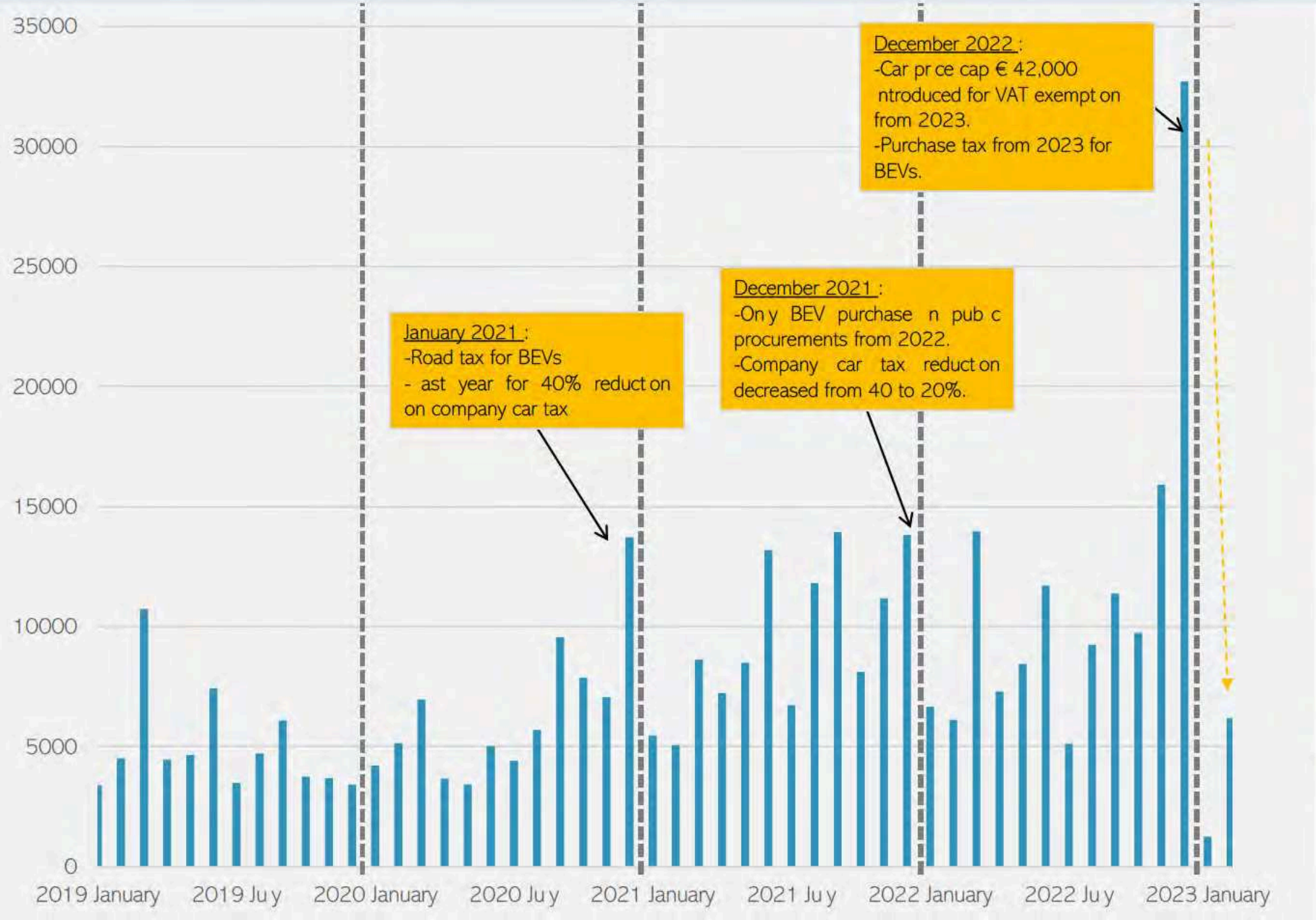
The Netherlands - Chronology



Observations

- There are large deviations between months in BEV sales with three noticeable peaks;
- These peaks are observed in the last month before an increase in the BiK taxation;
- The effect of the purchase subsidies is expressed in peak months when the budget was depleted (06/22), or amount reduced (06/21).
- Growing intra-year trend can be observed as deliveries are completed after purchase subsidy depletion.

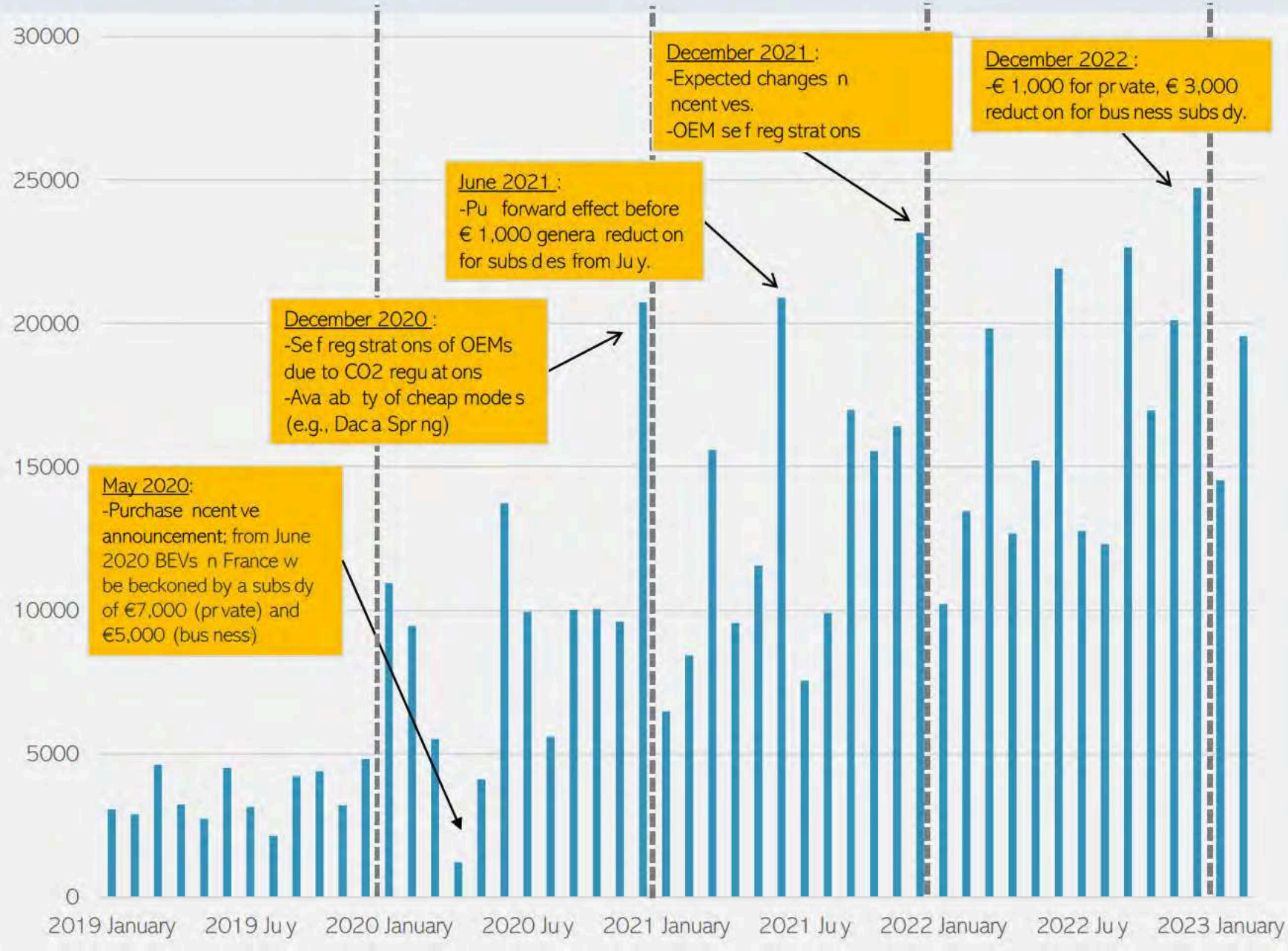
Norway - Chronology



Observations

- 2023 January sales dropped to unprecedented levels since 2019. This indicates the significant impact of the VAT discount for luxury BEVs.
- December 2022 sales was an all-time-high record.
- End of year (December) sales peaked in the last 3 years, indicating changes in policies.

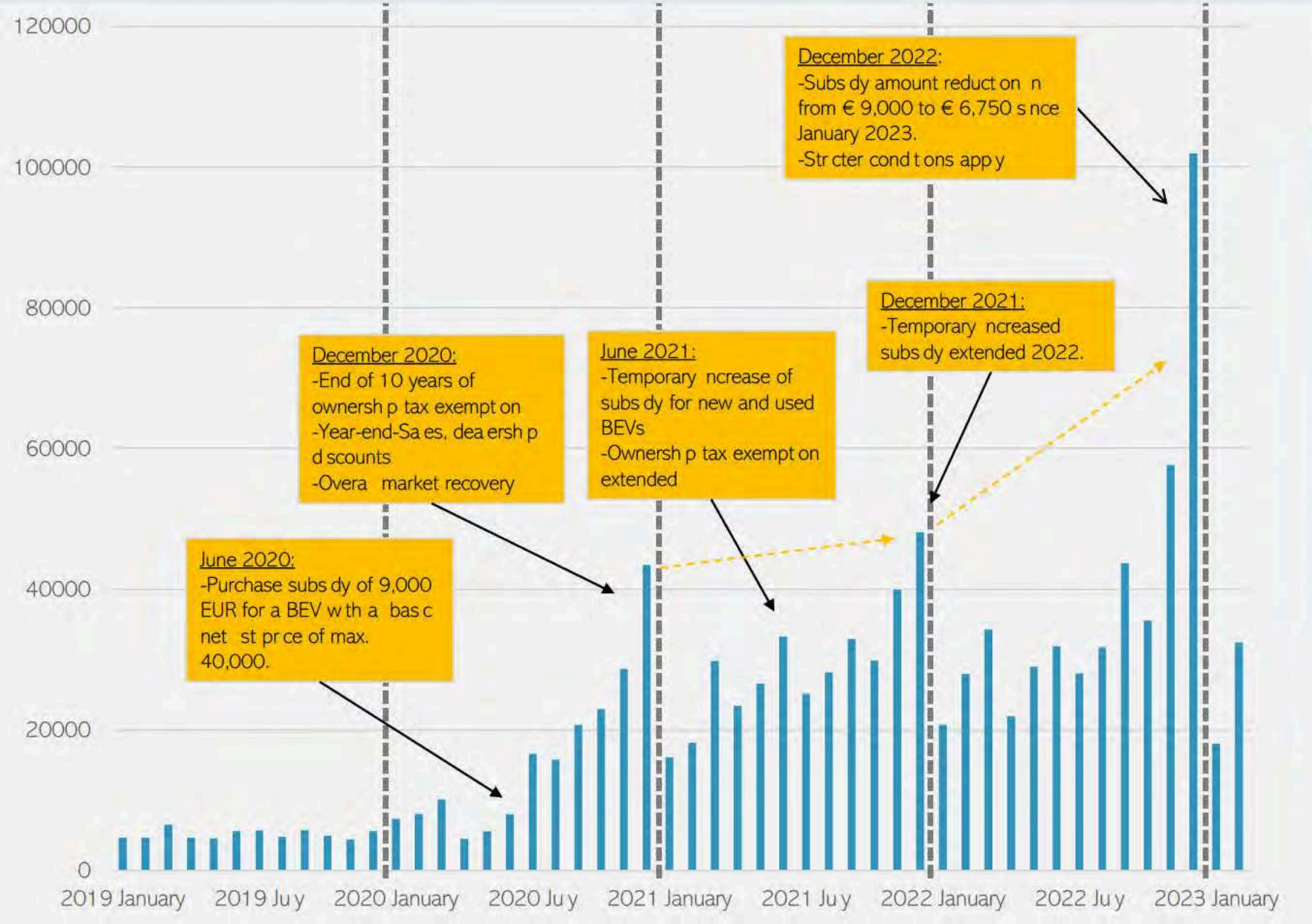
France - Chronology



Observations

- The purchase subsidy kick started the steady growth in the increase of BEV registrations, since June 2022.
- Various pull forward effects can be observed prior reduction or limitation of subsides.
- OEM self registrations in December distorts peak sales end of the year.
- The general unpredictability of incentives also boosted end of year sales.
- Availability of cheaper models also contributed to higher growth.

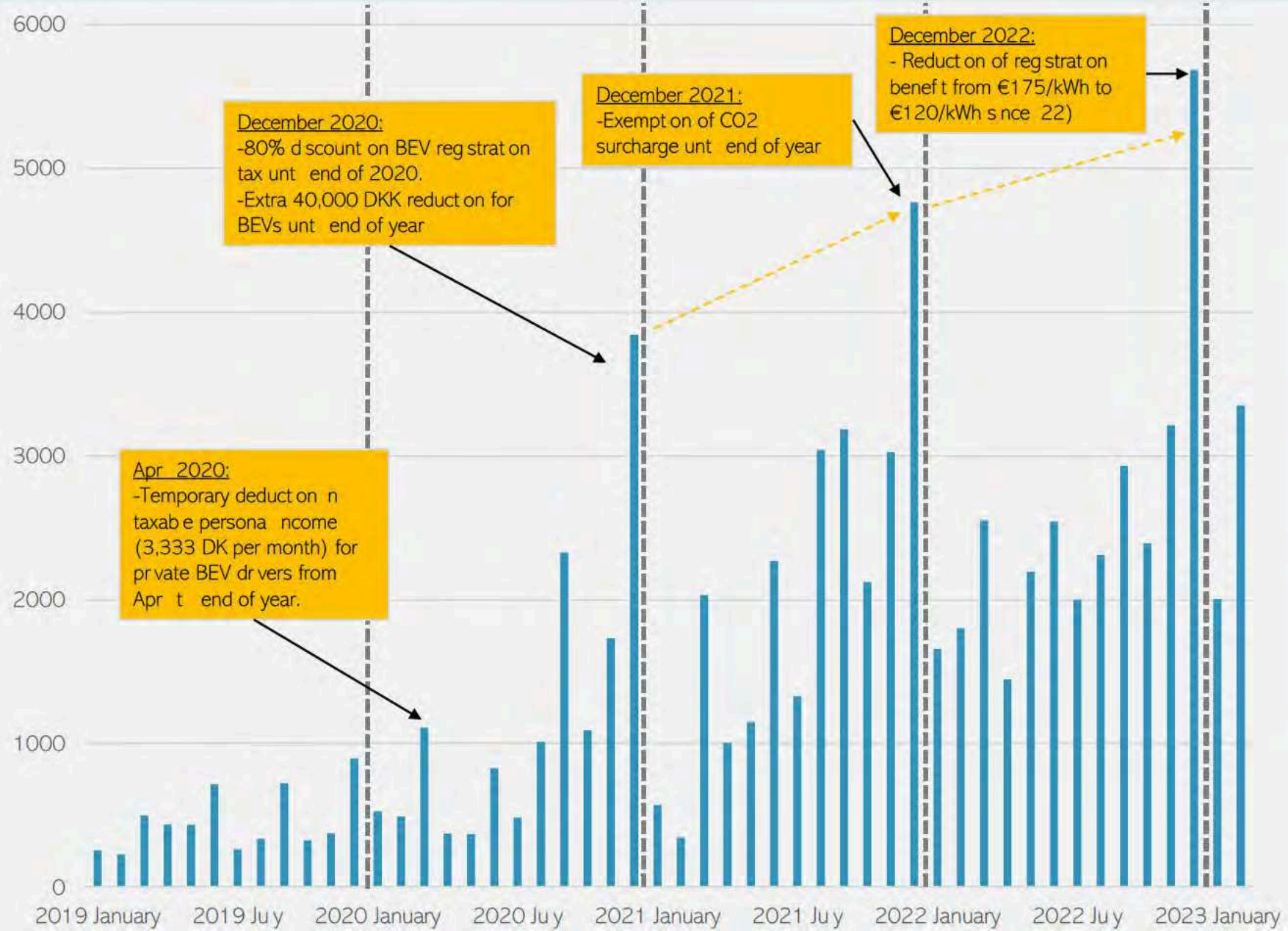
Germany - Chronology



Observations

- Purchase subsidy had key impact on the BEV sales.
- Annual trend of sales showed growth, with peaks at December, then.
- The stricter conditions applying since 2023, lead to lowest registration since 2021, but February sales showed quick recovery.

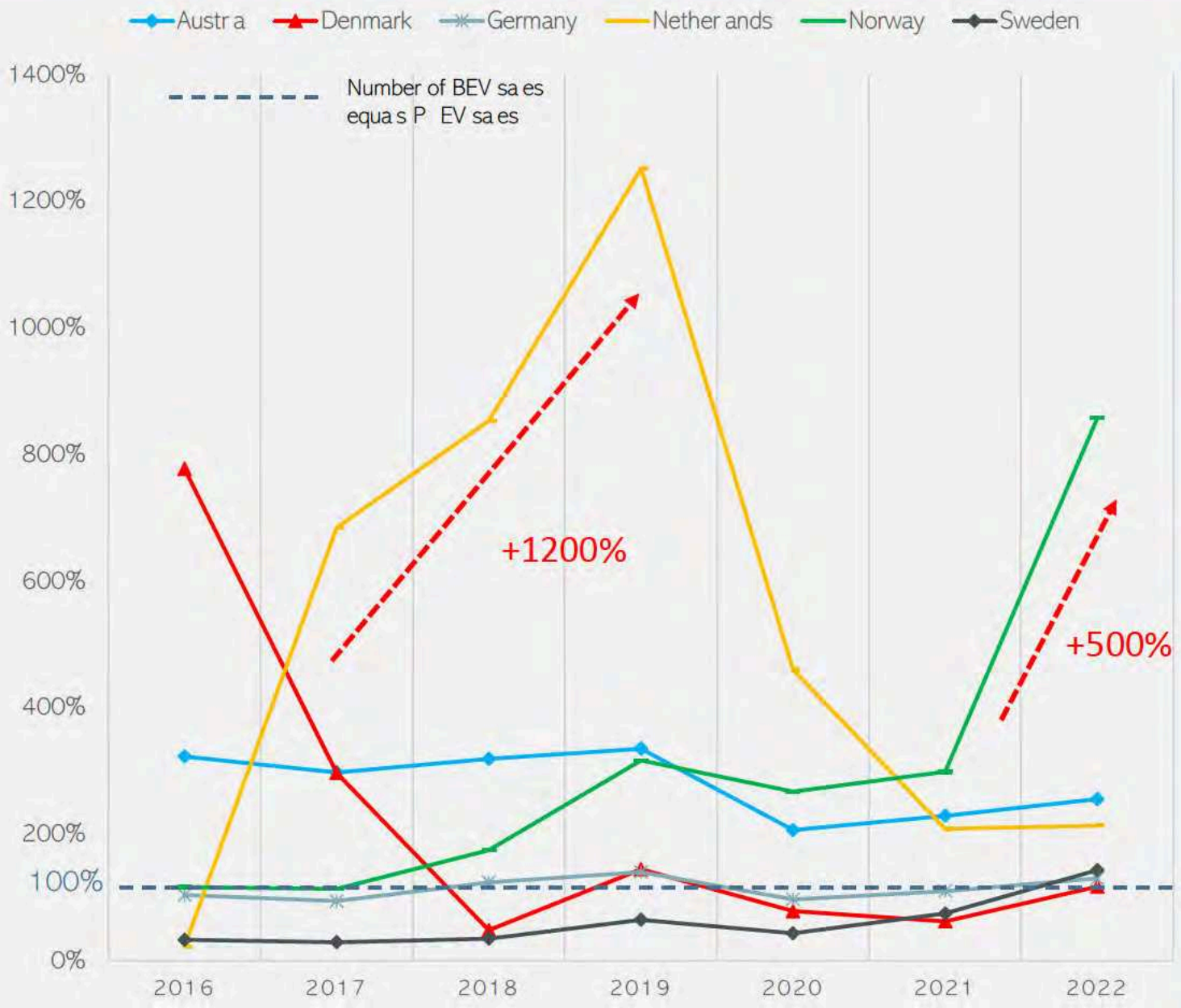
Denmark - Chronology



Observations

- Registration tax benefits and BiK tax rebates had key impact on the BEV sales.
- BEV sales soared after reducing benefits for PHEVs in the registration tax and BiK.

Share of PHEVs and BEVs in sales (BEV sales / PHEV sales)



Observations

Besides solely focusing on BEV sales, the ratio of BEV to PHEV sales is also an important factor to consider, because the relatively high emissions of PHEV can jeopardize transport emission reduction targets.

The Netherlands achieved a significant shift from PHEVs to BEVs since 2016 to 2019, which stabilized in 2021 and 2022 at above 200%. This means that more than two times more BEVs are sold than PHEVs.

A notable example of successful shift in Norway, with 300% in 2021 jumping to 857% in 2022, when one off tax on registration significantly increased for PHEVs (CO_2, NO_x components of the tax).

As another example, Denmark introduced the well predictable registration tax, yearly reducing benefits on various values, made the PHEVs overall less attractive.

Benchmarking the Netherlands

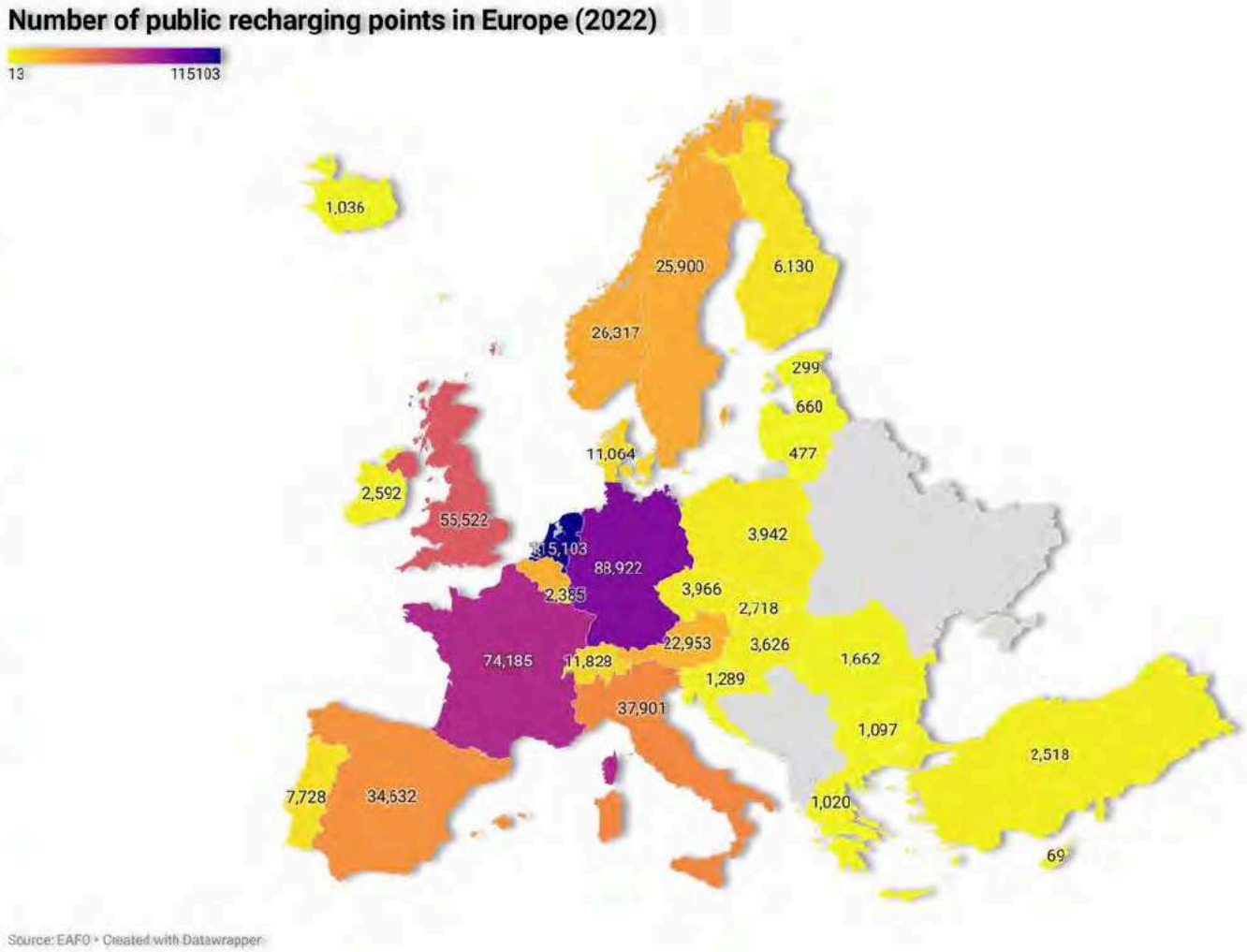
Market conditions, BEV sales and fleet
Development charging infrastructure
Effect on purchase price and TCO

Market conditions public recharging infrastructure

Observations

One of the most important prerequisites of a successful uptake of BEVs, is a sufficient number of (public) recharging points. Especially for (future) BEV-drivers that don't have the luxury of recharging their BEV on their private property. Therefore, public high power recharging points (above 22 kW) and normal recharging points (up to 22 kW) should be easily available and accessible to the user. Fast DC (50 kW ≤ P < 150 kW) and Ultra-Fast (150 kW ≤ P) recharging points are also becoming pivotal on the TEN-T network.

Since 2021, the amount of public recharging points in the European Union has grown from 156,779 AC and 18,267 DC to 402,018 AC and 45,570 DC in 2022. The Level 1 Ultra-fast DC recharging points (150 kW to 350 kW) grew significantly in 2022 (281%).



Source: European A ternat ve Fue s Observatory

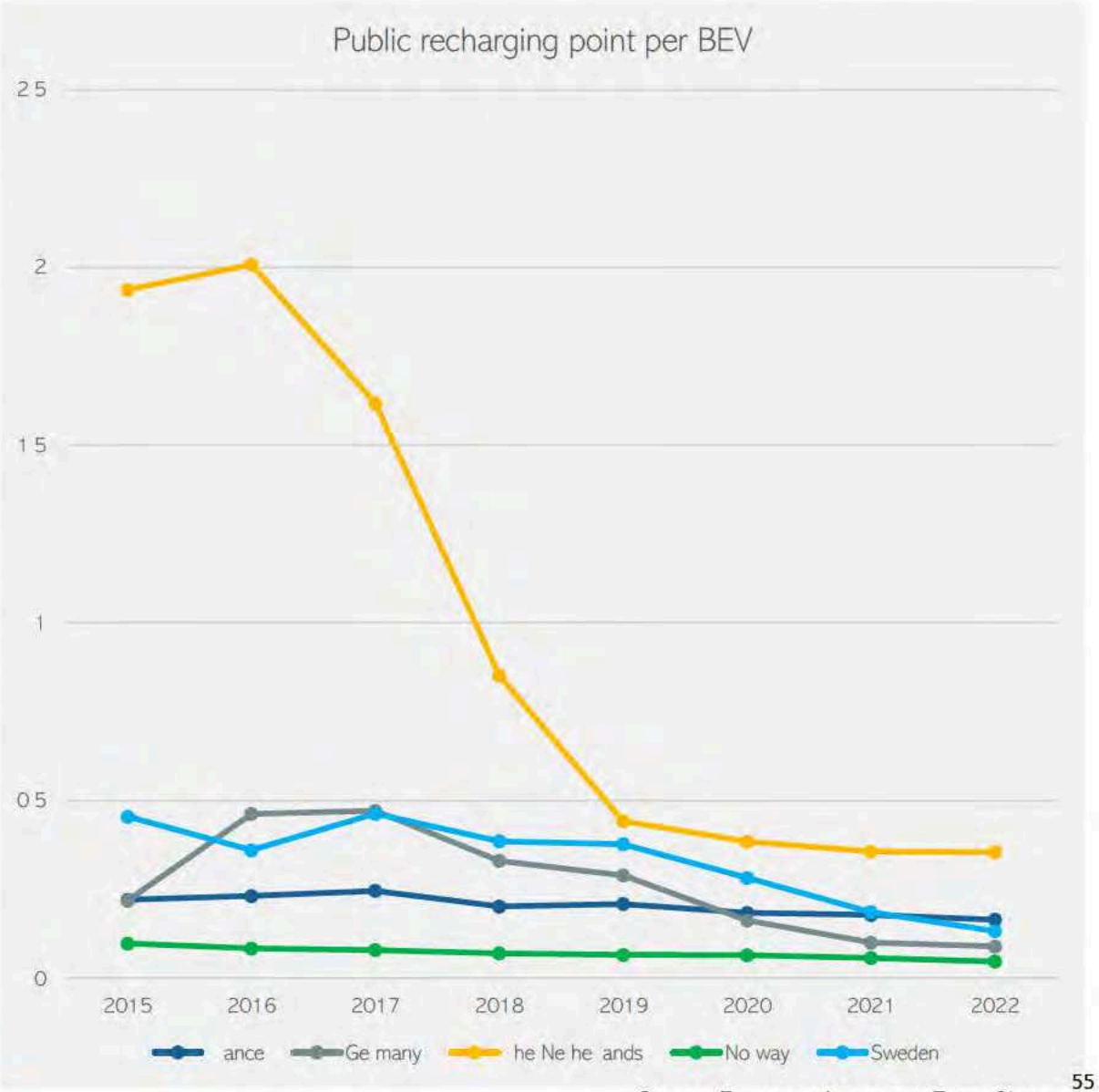
Market conditions public recharging infrastructure

Observations

The amount of public recharging points per Battery Electric Vehicle (BEV) in Norway continues to be low, with a further decrease observed in 2022. This is due to the rapid increase in BEV adoption in recent years. The implementation of new public recharging points has struggled to keep pace with the quick uptake of BEVs. However, the context in Norway differs from that of other countries. A larger proportion of BEV owners in Norway have access to a private recharging point, reducing the necessity for public recharging points. This trend was corroborated by a 2019 study from Elbil, which showed that BEV owners mainly recharge their vehicles at home overnight.

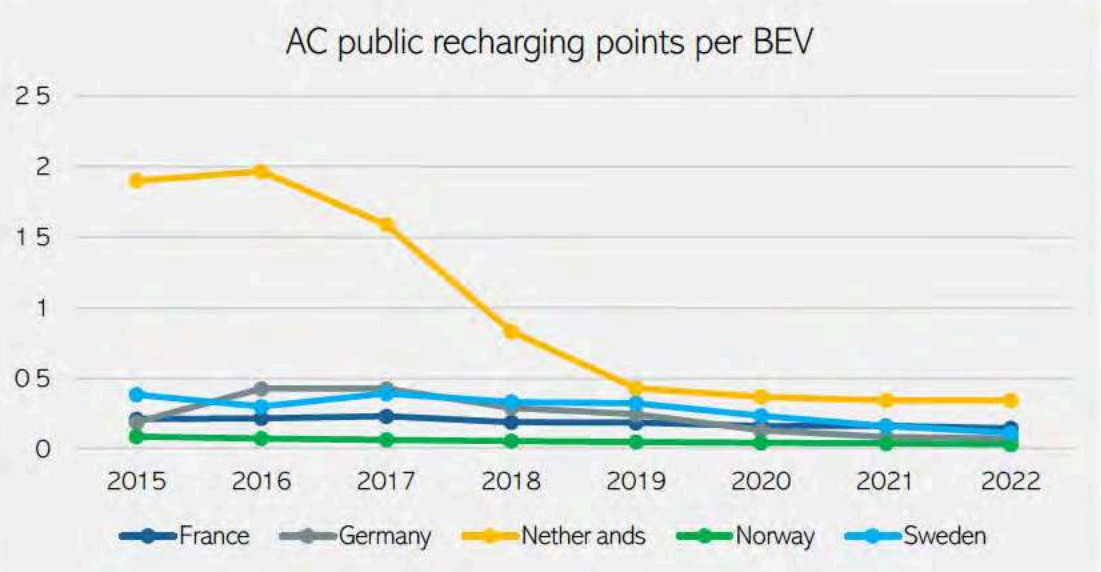
The high adoption rate of BEVs in Norway implies that these vehicles are increasingly being used for longer trips. High-power recharging is employed to facilitate these extended journeys. Studies show that the highest percentage of EV drivers experiencing queueing is found in Oslo. This seems to suggest that individuals living and working in Oslo city do not have the option to "slow charge" at home or at work due to a shortage of standard recharging points, and are therefore relying on high-power recharging points more frequently.

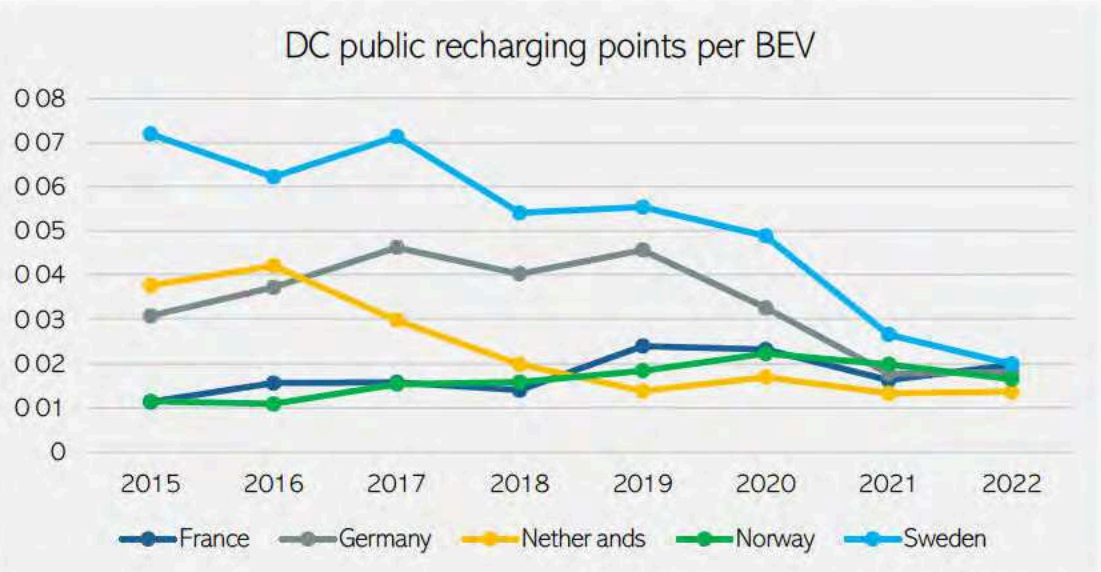
In countries like the Netherlands, Germany, Sweden, France, and Austria, a consistent downward trend is noted in the number of public recharging points per BEV from 2016 through 2022. BEV sales in these countries are growing at a pace faster than the installation of public recharging points. An uptick in the rate was seen in Belgium in 2022, but it's not yet clear whether this is the start of a new trend or an anomaly.



Source: European A ternat ve Fue s Observatory

Market conditions public recharging infrastructure





Source: European A ternat ve Fue s Observatory

Observations

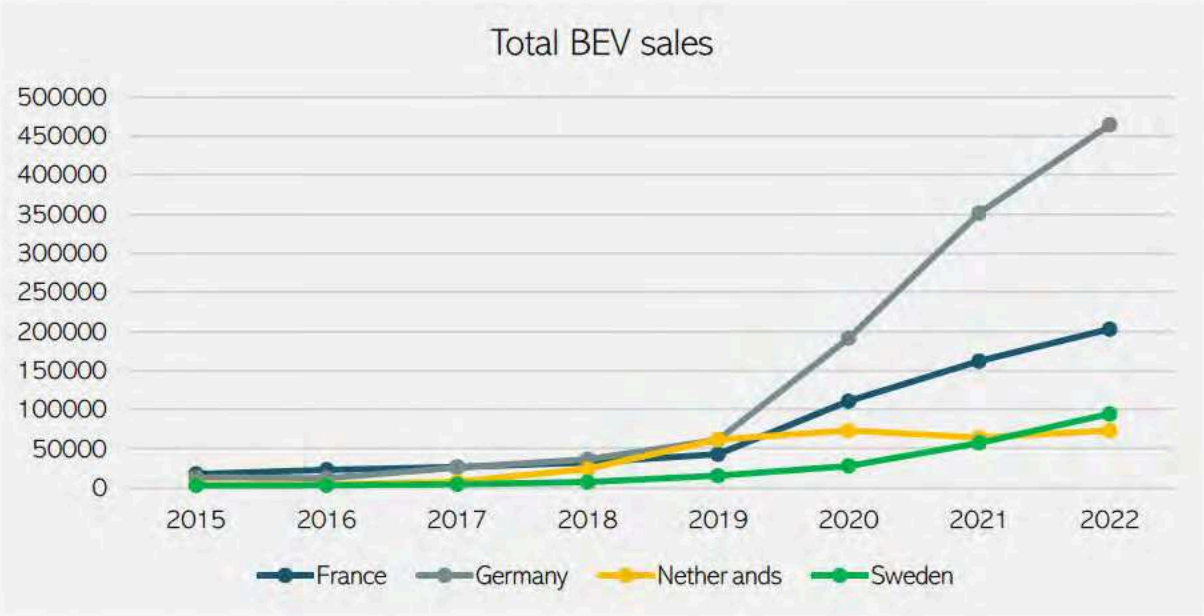
The amount of public recharging points per BEV is low in Norway due to the very fast uptake of BEVs in the last years. Clearly, the roll out of new public recharging points did not keep up with the fast uptake of BEVs. However, the context in Norway is different than in other countries. A higher percentage of BEV owners in Norway have a private recharging point at their disposal, therefore, there is a lower need for public recharging points. This was confirmed by a 2019 study from Elbil, it showed that BEV owners mostly recharge their car at home during the night.

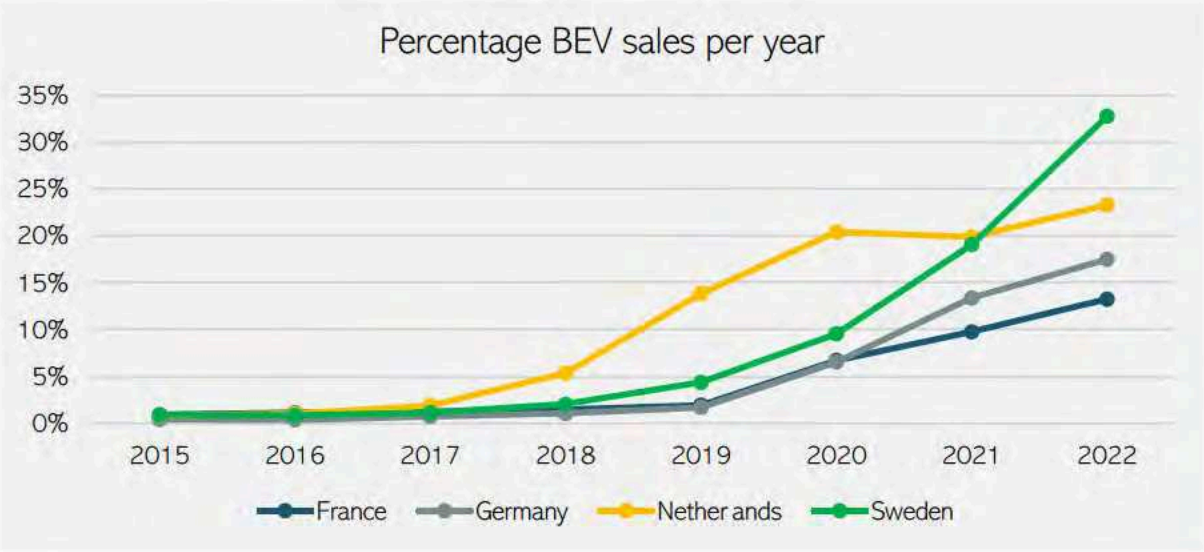
The high uptake of BEVs in Norway means that BEVs are more and more being used for longer trips. High power recharging is used to enable these longer trips. Research showed that the highest percentage of EV drivers experiencing queueing is found in Oslo, which seems to indicate that people living and working in Oslo city, do not have the possibility to "slow charge" at home or at work because of a lack of normal recharging points and are therefore using high power recharging points more often.

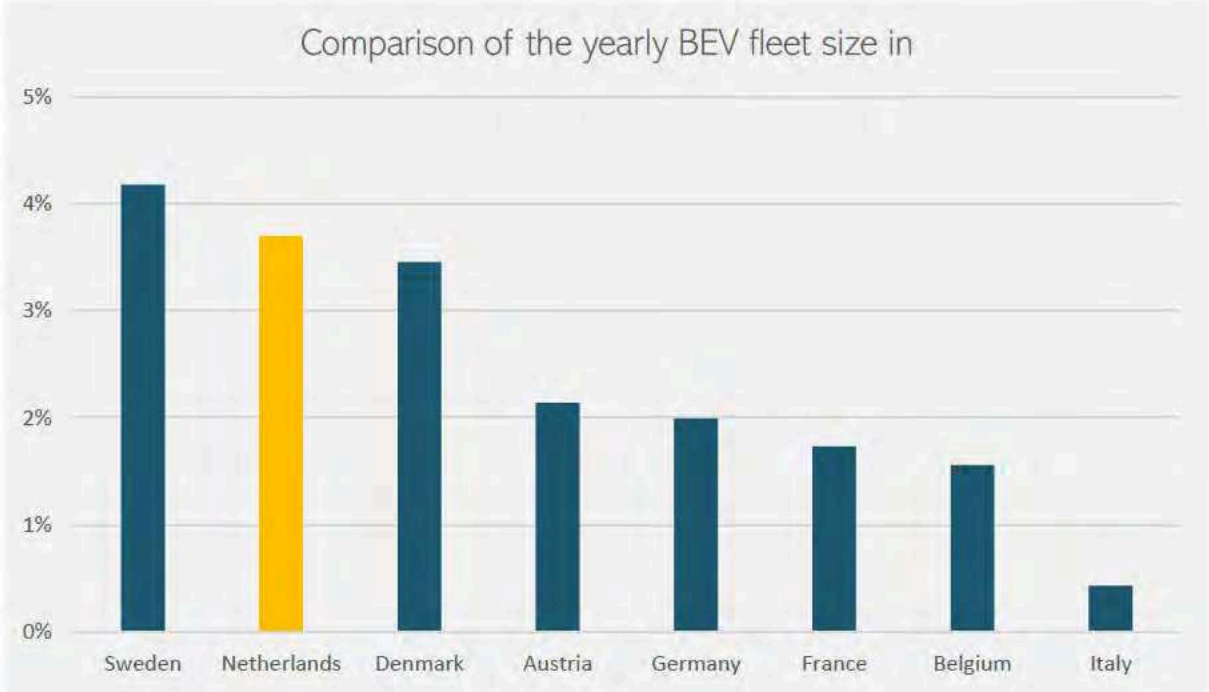
In the Netherlands, Germany, Sweden, France we can see a downward trend forming with the number of public recharging points per BEV decreasing from 2016 onward. The sales of BEVs are rising faster than the installation of public recharging points.

Source: Wor dbank.org

Comparison of the BEV yearly sales- and fleet development in the Netherlands, Sweden, France, and Germany





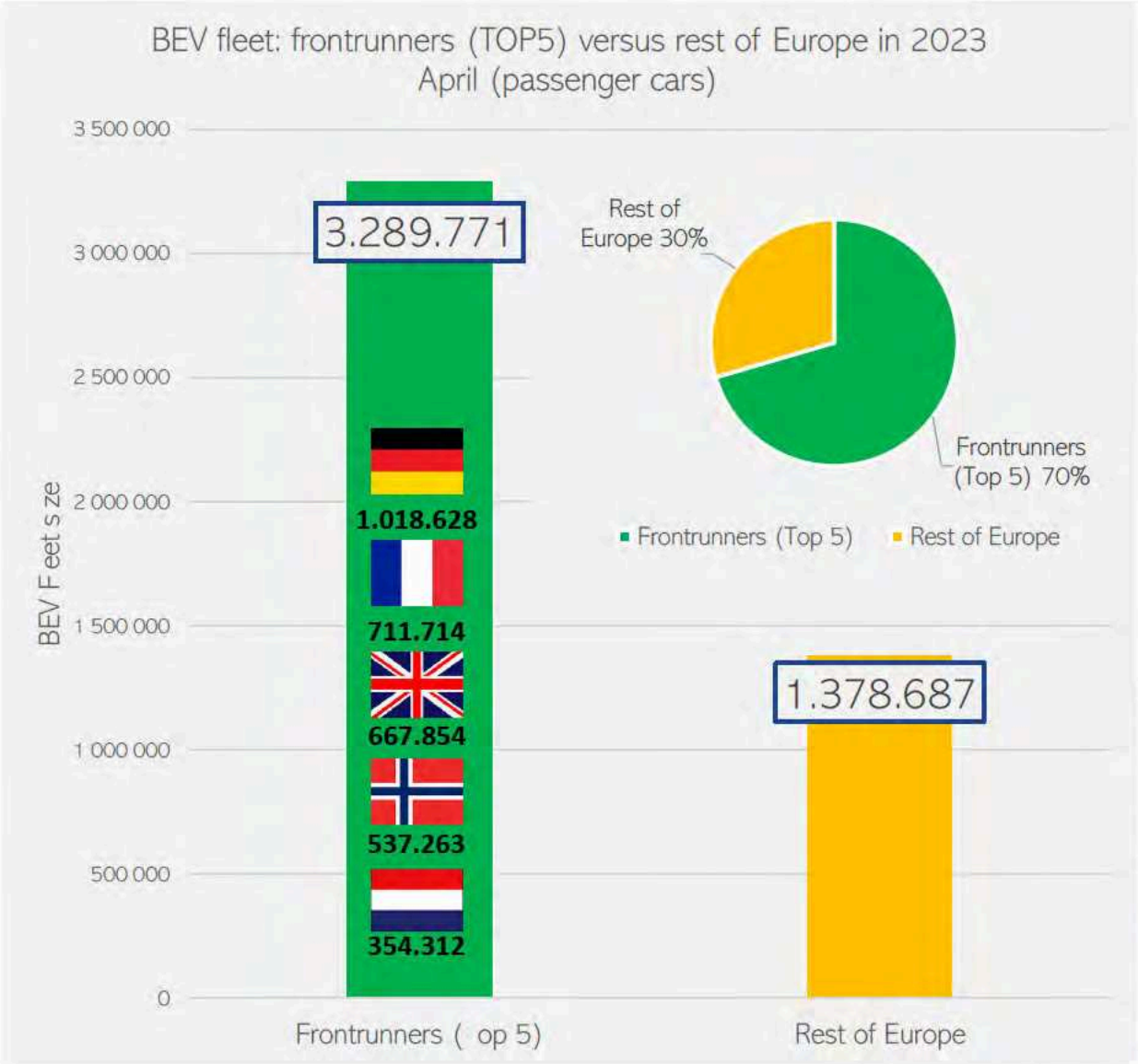


Observations

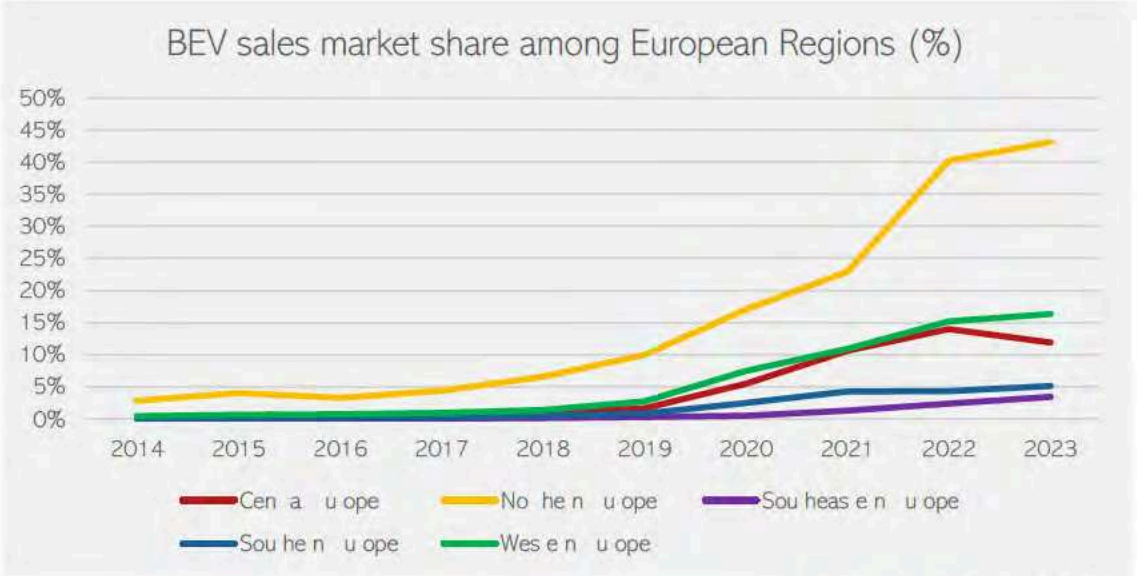
- In 2022, Sweden led the pack among non-Norwegian countries with BEVs making up 4% of their total fleet, followed by the Netherlands (3.69%) and Denmark (3.46%). Interestingly, despite having the highest BEV registration in 2022, Germany's BEV fleet percentage (2%) was lower than these countries, highlighting a slower transition.
- Comparing the percentage of BEV in registrations, we observe a massive growth from 2015 to 2022 in all countries, with Sweden leading in the EU. It shows an accelerating acceptance of BEVs, potentially indicating a faster transition in the near future.

Source: European A ternat ve Fue s Observatory

European differences: regional concentration



Source: EAFO (2023)

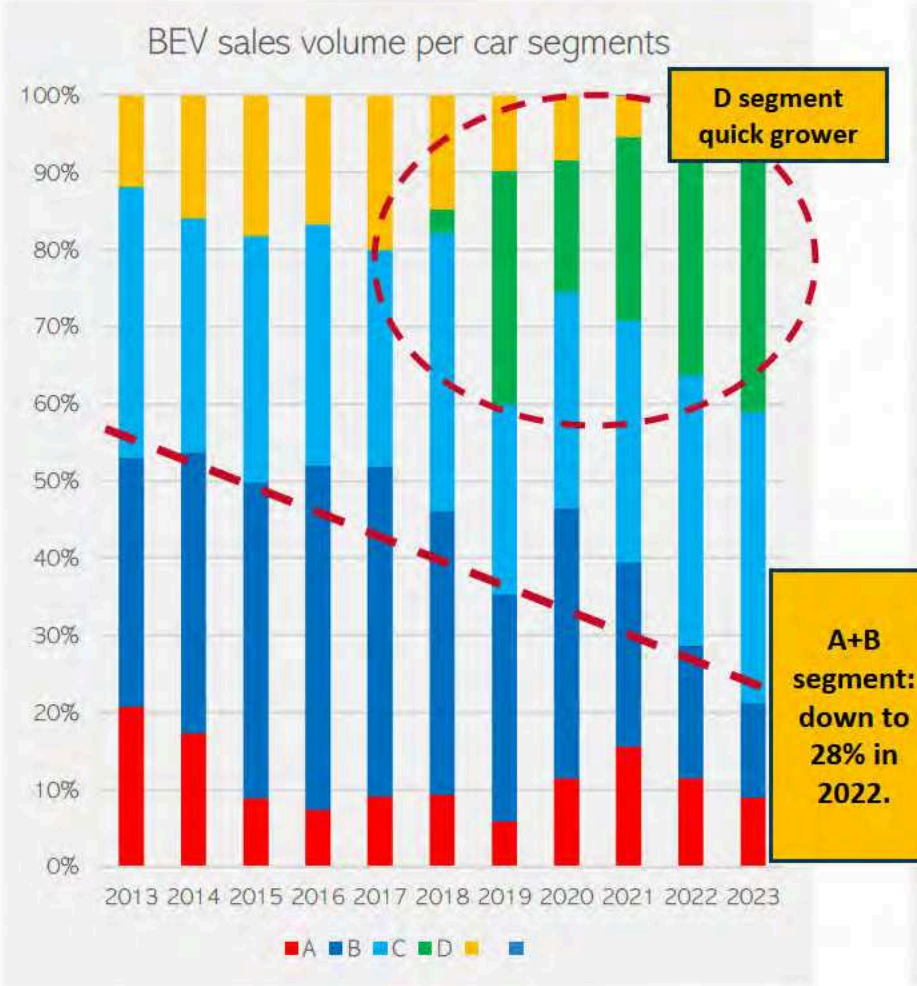


Source: EAFO (2023)

There is a high concentration of the BEV fleet in the TOP 5 frontrunner countries. Other regions such as Southern and Southeastern Europe are lagging behind.

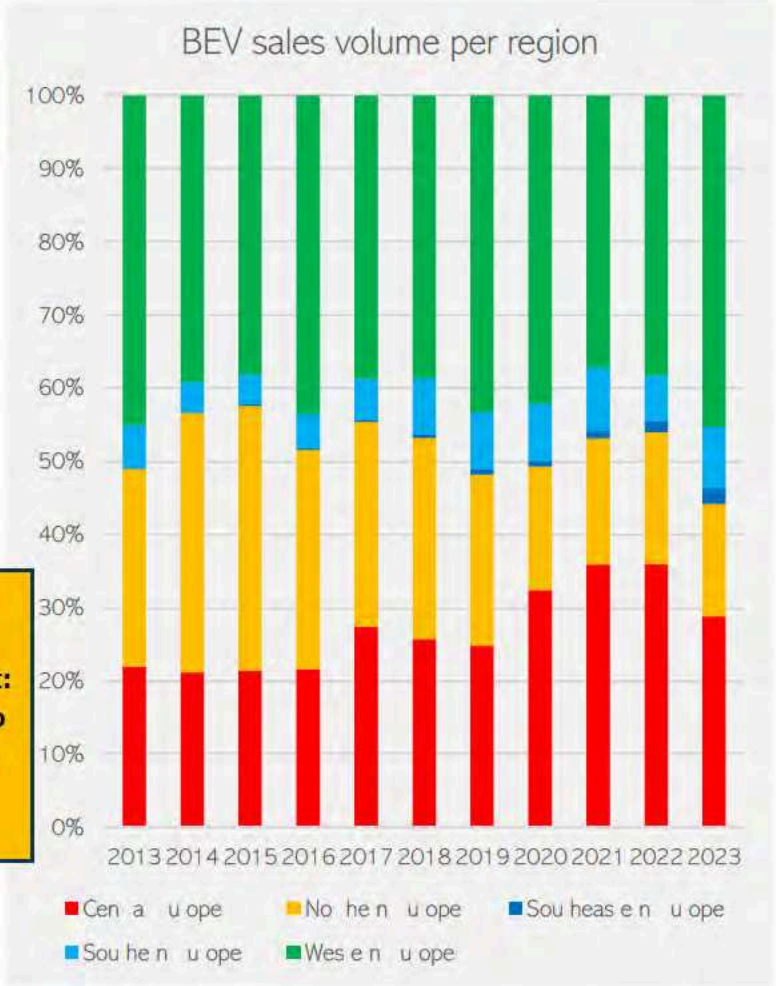
European differences: car segments, regions, private vs. business markets

Significant shift from smaller to larger segments (2013-2023)



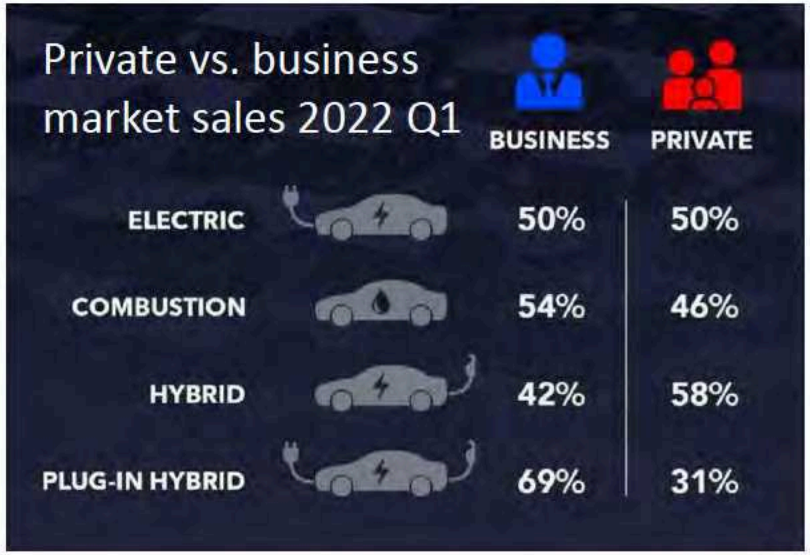
Source: EAFO (2023)

Significant shift from Northern region with Western and Central Europe catching up (2013-2023)



Source: EAFO (2023)

Even sales between business and private markets in overall Europe, but significant differences between countries



Source: JO A (2022)

Race for cheaper BEVs started

Hyundai Confirms Small, Affordable Electric Car Coming For Europe

Hyundai aims to price the entry-level offering from €20,000 (~$20,500).

New Volkswagen ID.2all concept previews future affordable electric car

The production version of the Volkswagen ID.2all concept will arrive in 2025 to rival the Peugeot e-208 and Vauxhall Corsa Electric

We've been waiting for a couple of years now to see how Volkswagen plans to make electric motoring more affordable for the masses – and, after one false start with the ill-fated ID. Life concept, here's the company's proposed solution: the ID.2all, an all-electric supermini that will be a rival for the likes of the Peugeot e-208 and Vauxhall's Corsa Electric when it goes on sale in 2025.

Tesla Did Introduce The Model 2 This Week At $29,000, But Kept It Quiet

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I cover robocar technology & previously worked on Google's car team.

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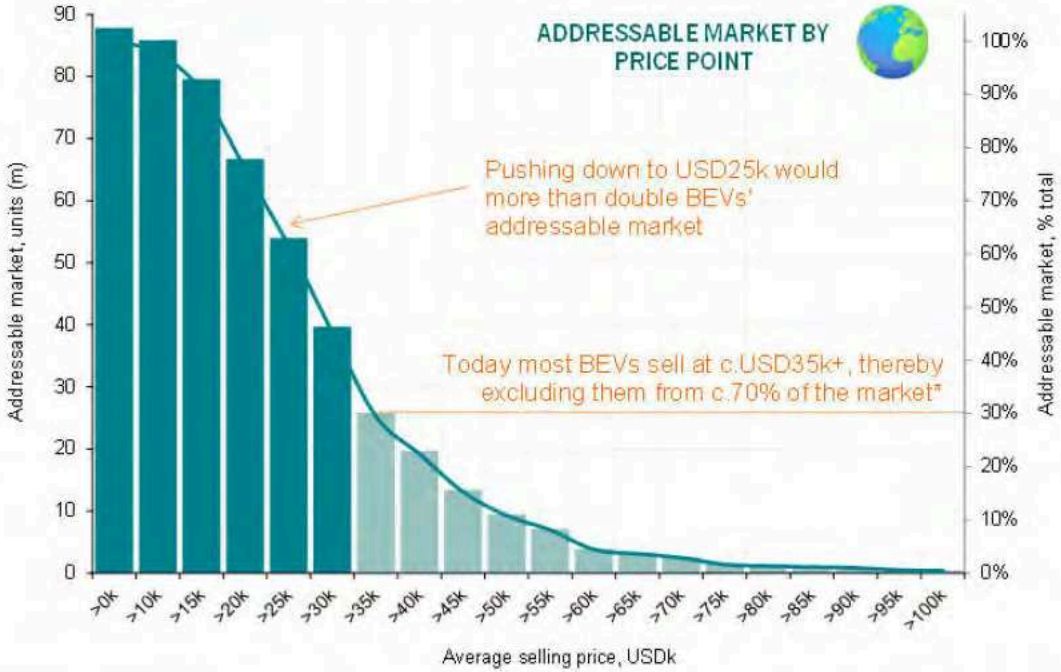
EX30. Credit: Volvo

Volvo's EX30 Is Shaking Up the EV Market with Its Low Price and High Performance

BEV addressable market will double with new models starting at 25,000 USD.



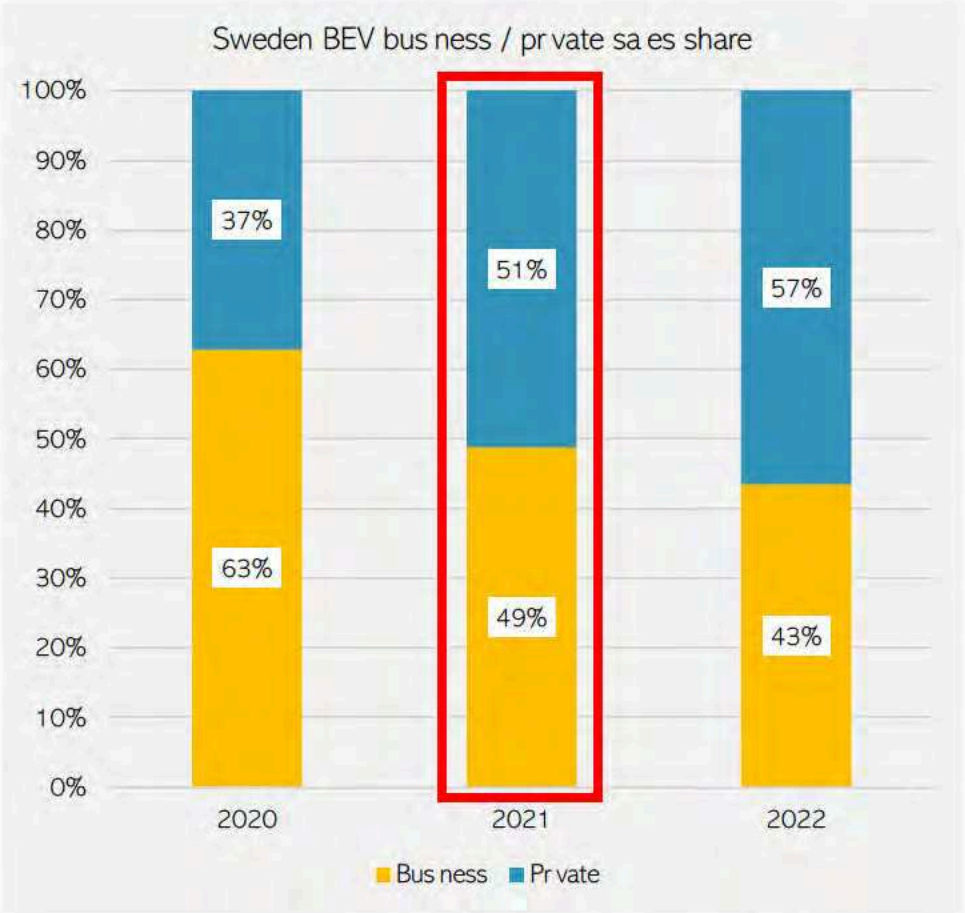
Source: S&P Global, BNP Paribas Exane estimates

Addressable market: appx. 55% of all car market transactions are below 25,000 USD.
If BEVs are more expensive, half of the market is missed.

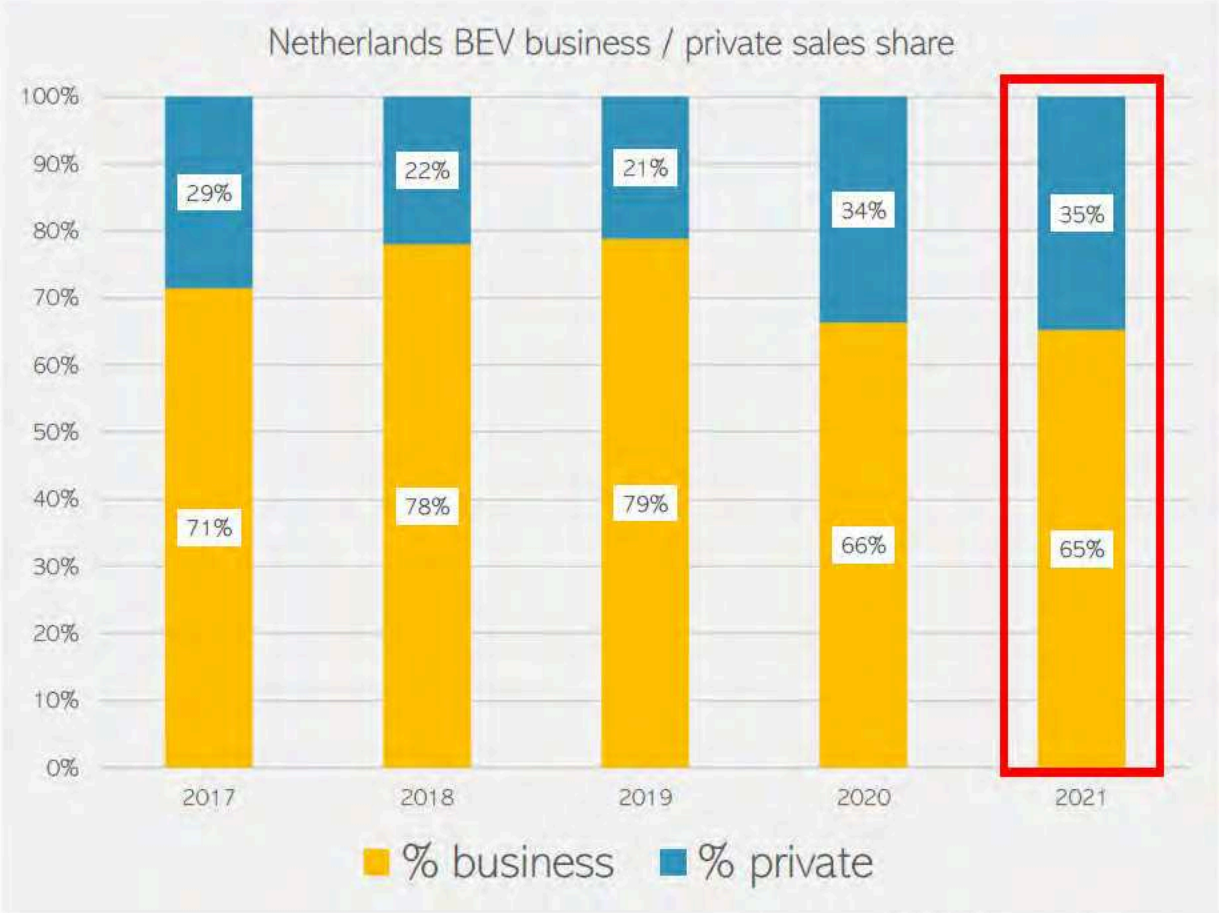
European differences: BEV private market and business market

2 leading markets in the EU, still totally different market compositions

51% private market share in Sweden vs. 35% in the Netherlands in 2021



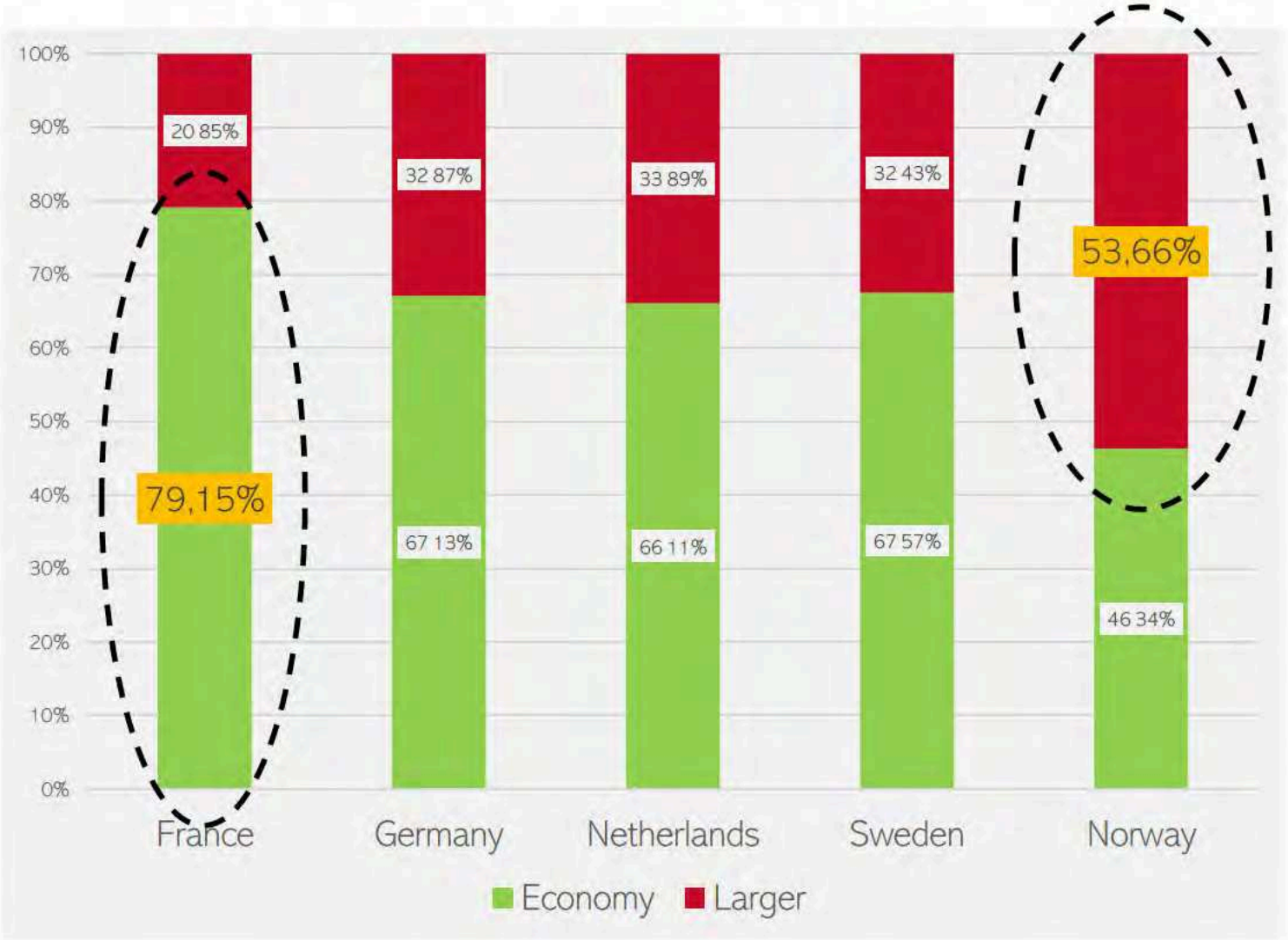
Source: Mobility Sweden (2023)



Source: RAI / Bovag (2023)

European differences: some countries support Economy and some countries Larger segments (sales market share in 2022)

The French policy favors smaller car segments (A,B,C)



The Norwegian policy favors larger car segments (D, E, F, +)

Source: EAFO (2023)

Deep dive comparing TCO

Netherlands, Germany, France and Sweden

Method and assumptions of purchase and TCO calculations

The methodology and assumptions used for the purchase price- and TCO calculation are explained below:

TCO Calculation and Vehicle Selection

- A usage period of four years was used in TCO calculation with the assumption of 28.000 km per year for the business market and 15.000 km per year for the private market.
- Vehicle selection was based on the best-selling BEVs of 2022, excluding Norway due to its unique BEV market dynamics.
- Calculations were performed on the cheapest variant of BEVs and the second cheapest of petrol cars, considering the typically superior equipment of BEVs.
- Energy costs: Calculations are based on 80% private charging and 20% public charging share; Household Energy Price Index s data has been used for private and EAFO s data has been used to calculate the public charging fees.
- Used an assumption to split home (80%) and public charging (20%) pattern to better reflect reality for BEV energy costs. Energy costs reflect
- The selection of countries were based on peer countries of interest. Due to the very restricted availability of new ICE cars in Norway, it was excluded from the analysis.

Residual value calculation

- The analysis for 2019-2022 focused on high-registration models in the studied countries, using INDICATA's database (March-April 2023) for current resale values.
- Each model's residual value was sales-share-weighted for each segment (B, C, D), ensuring realistic depreciation representation in the Total Cost of Ownership (TCO) calculations.
- The method typically resulted in higher BEVs' residual values, with respect to last years and benchmark TCO calculations (e.g., Formula E-Team) reflecting realistic resale values. The analysis incorporated vehicles' original retail prices from 2019.

Governmental Influence and Other Considerations

- The average prices of selected vehicles reflect the latest prices as of the end of April 2023, weighted with the related market share in 2022.
- Available subsidies for each selected model were considered in the pricing, deducted from the depreciation.
- The total effect of governmental influence on the purchase price and TCO includes purchase taxes, VAT, purchase subsidies, and road taxes.
- An annual income of €40.000 was assumed for determining eligibility for purchase grants.

Comparison average purchase price of private and business the Netherlands, Germany, Sweden, and France

Observations

The private purchase prices differences between BEVs and petrol cars are still slightly higher in the Netherlands. Except the B segment, other segments are close to parity, C and D in the business and C in private being positive.

The batteries for BEVs are, relative to the nett price of the car, more expensive in the smaller segments (segment B). That causes a bigger difference in the purchase price between BEVs and petrol cars.

For Sweden, the current high negative prices represent the removal of purchase subsidies and tightening of incentive conditions since 2023.

Purchase

	Business			Private		
	B segment	C segment	D segment	B segment	C segment	D segment
Netherlands	-€ 6 771	-€ 4 902	€ 955	-€ 6 174	-€ 4 138	-€ 562
Germany	-€ 3 106	€ 2 194	€ 4 788	-€ 4 917	€ 1 328	€ 4 899
Sweden	-€ 6 258	-€ 8 614	-€ 3 244	-€ 9 610	-€ 12 703	-€ 5 378
France	-€ 10 405	-€ 3 320	-€ 2 650	-€ 11 143	-€ 2 662	-€ 2 253

*Note: The deltas of the B segment are disproportionally negative for BEVs, especially in the Netherlands. For selecting the vehicles per segment, the method of the RAI was followed. This method was chosen to equalize the method over all countries. However, in the B segment this method includes rather expensive BEVs, compared to petrol cars, such as the BMW i3 and the Hyundai Kona electric.

Comparison average TCO of the Netherlands, Germany, Sweden, and France

Observations

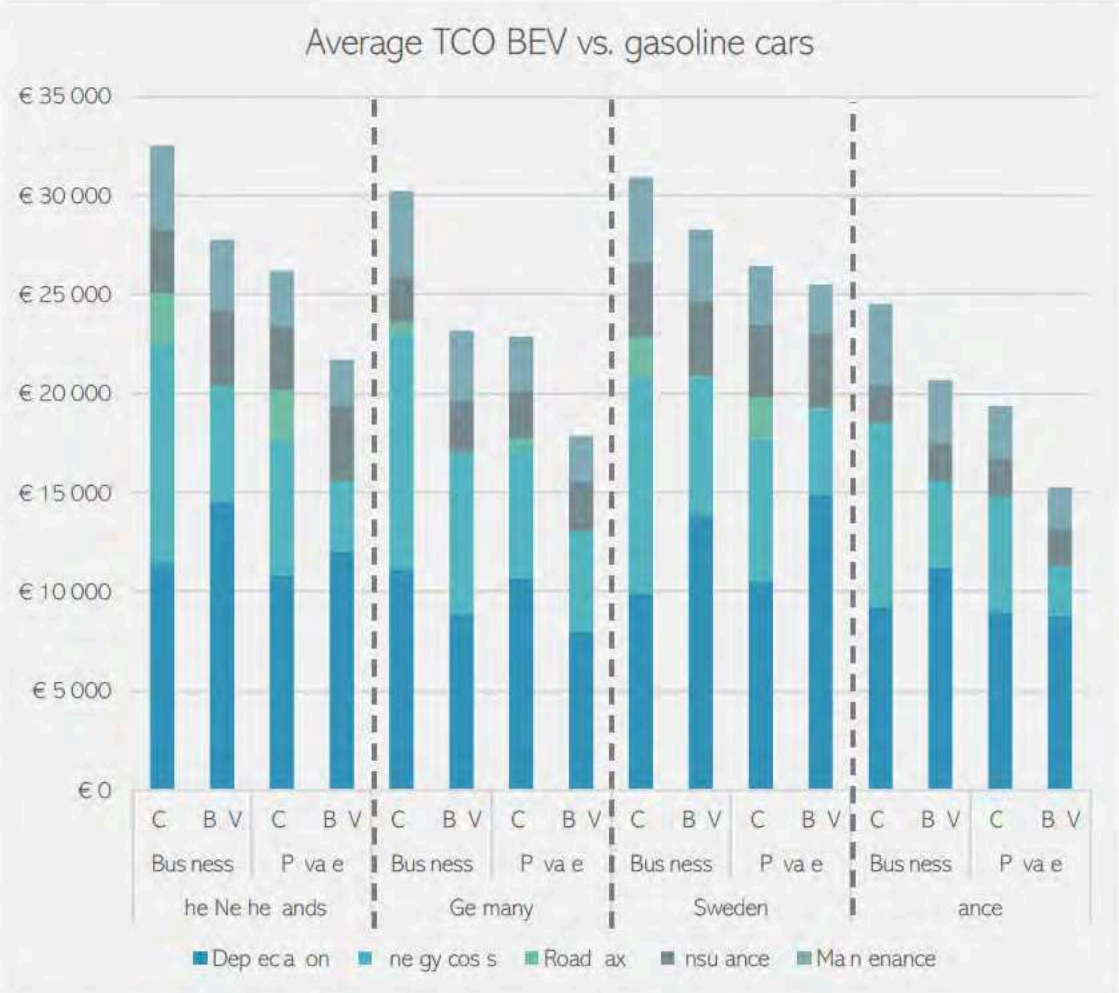
In the Netherlands, the TCO benefit of BEVs over petrol cars is smaller than in Germany. The private and business market in the Netherlands are both, where BEVs are more positive than ICE vehicles.

The depreciation of BEVs is, as of now, still higher than that of petrol cars. This difference is best seen in the Netherlands and Sweden. In France and Germany, the depreciation is compensated by the purchase subsidy and providing better depreciation for BEVs.

The TCO of the individual segments show the effect of a progressive tax system. Cars with higher CO_2 emission, generally in higher segments, are taxed higher. This creates a greater benefit for BEVs over petrol cars in higher segments as in Sweden. The introduced price caps and exclusion of luxury SUVs from benefits decreased benefit of D segment since 2021.

TCO

	Business			Private		
	B segment	C segment	D segment	B segment	C segment	D segment
Netherlands	€ 1 435	€ 4 849	€ 8 022	€ 2 990	€ 4 979	€ 5 479
Germany	€ 3 802	€ 8 356	€ 8 983	€ 3 409	€ 6 150	€ 5 469
Sweden	€ 1 729	€ 434	€ 5 762	€ 120	-€ 991	€ 3 657
France	€ 1 725	€ 5 666	€ 4 135	€ 2 178	€ 5 896	€ 4 243



The assumptions on prices of energy is in the annex.

No subsidies still make smaller popular segments unattractive, especially the purchase price for the private market

No financial incentives scenario applied to the purchase price of selected countries and car segments (2023)

Purchase price		B segment	C segment	D segment
Business	Netherlands	-€ 6.771	€ 34	€ 955
	Germany	-€ 9.533	-€ 4.556	€ 588
	Sweden	-€ 10.723	-€ 13.079	-€ 6.826
	France	-€ 13.703	-€ 6.681	-€ 5.759
Private	Netherlands	-€ 9.124	-€ 1.379	-€ 562
	Germany	-€ 11.344	-€ 5.422	€ 700
	Sweden	-€ 14.075	-€ 17.168	-€ 8.960
	France	-€ 16.441	-€ 8.023	-€ 6.902

No financial incentives scenario applied to the TCO of selected countries and car segments (2023)

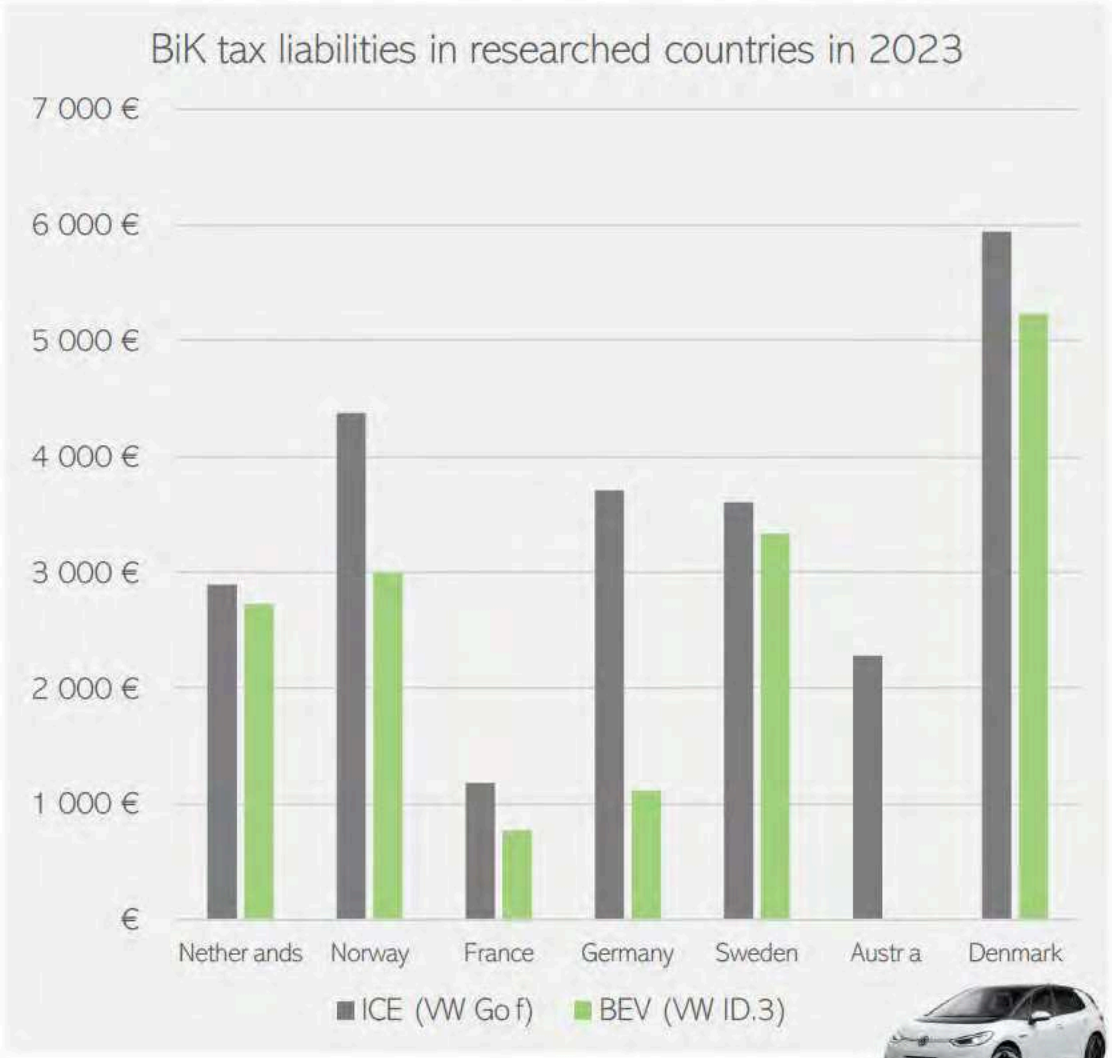
TCO difference		B segment	C segment	D segment
Business	Netherlands	-€ 3.501	€ 2.108	€ 522
	Germany	-€ 2.626	€ 1.606	€ 4.784
	Sweden	-€ 1.588	-€ 3.139	€ 1.790
	France	-€ 1.399	€ 2.515	€ 1.491
Private	Netherlands	-€ 4.279	-€ 401	-€ 1.149
	Germany	-€ 3.019	-€ 600	€ 1.270
	Sweden	-€ 2.816	-€ 4.182	-€ 9
	France	-€ 2.921	€ 777	€ 128

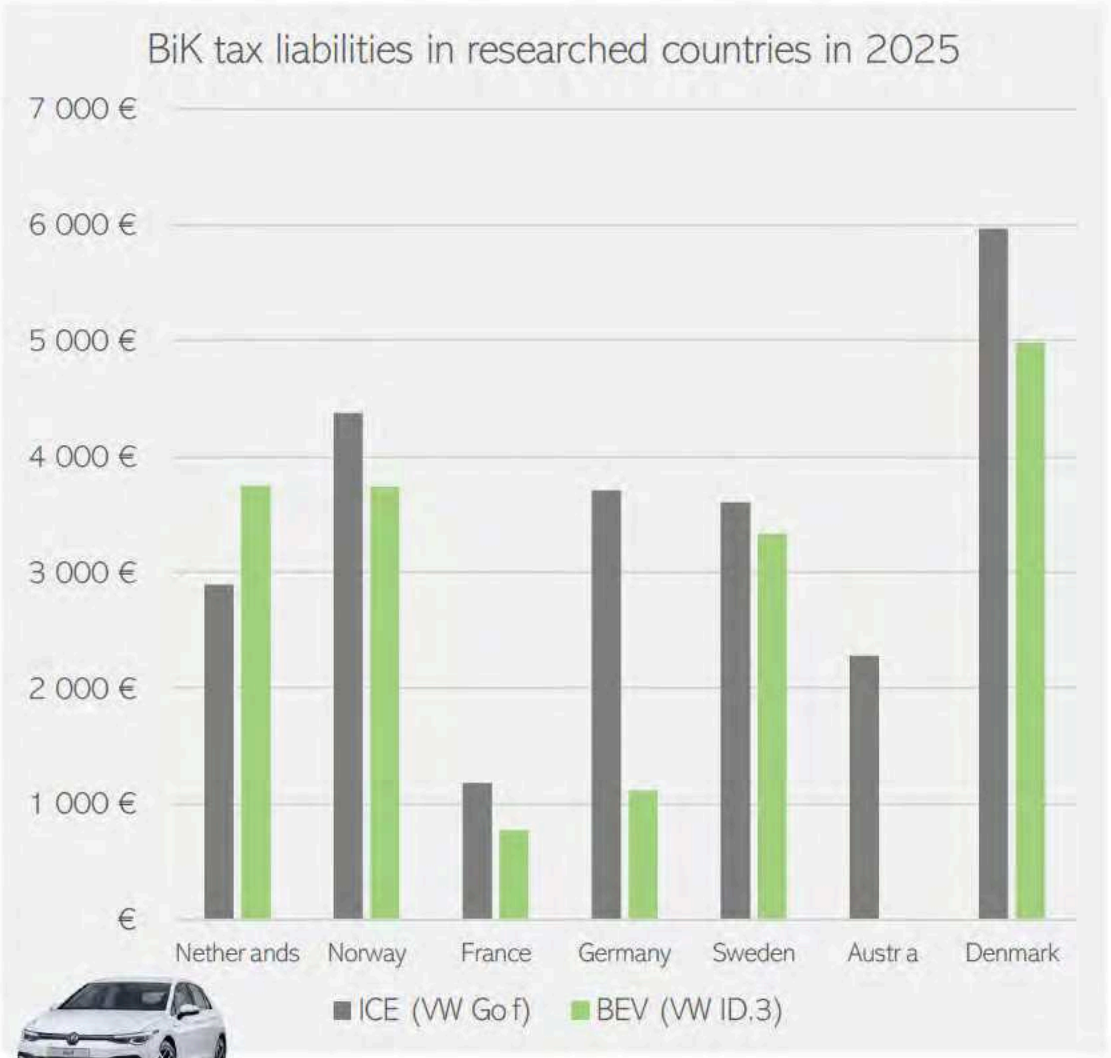
Assumptions: BEVs receive no preferential treatment

Comparison Benefits in Kind for drivers

Netherlands, Germany, France, Norway, Sweden, Austria and Denmark

Benefit-in-Kind: relative benefit of BEVs expected to shrink only in the Netherlands and Norway, until 2025.

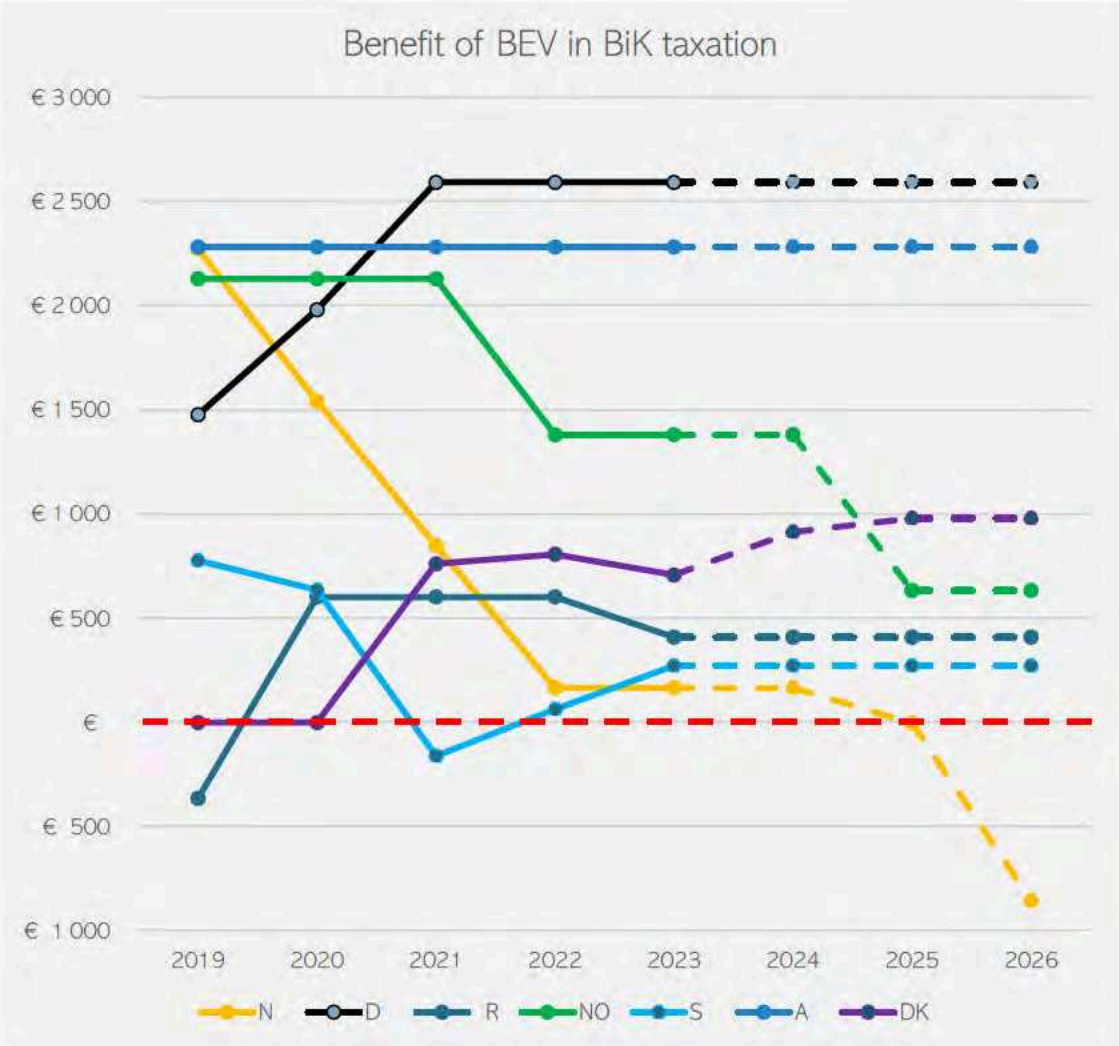




VW D.3 vs. VW Golf

Based on vehicle prices of 2023

Advantage for Driver: if the Benefit in Kind taxation difference is positive, it is benefit for the BEV driver



If the BiK taxation difference is above zero, then the BEV driver has an advantage over ICE driver.

Until and after 2025, all researched countries have a positive BiK difference for BEV drivers. Exemption is the Netherlands, which is phasing out the advantage with a disadvantage from 2025 onwards.

Conclusions

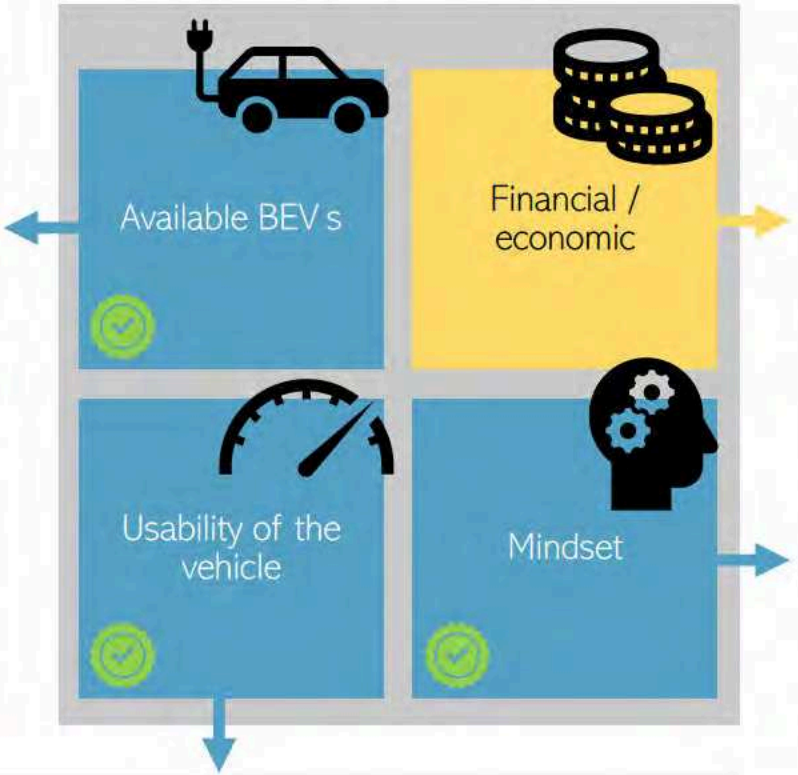
Observations & findings 1/7

Vehicle availability

The number of BEV models available in the B, C and D segment is rapidly growing in the last few years, from 25 in 2018 to 244 model variants in 2022. It is noticeable that in all popular vehicle type segments there is a choice of vehicle models. In the past, the decision not to buy a BEV because the 'right model was not available was a valid reason, but this now seems to be a lot less applicable. Considering this, the growing model availability has a positive impact the BEV sales.

In the Netherlands specifically, the relative growth of BEV models is higher than the growth in sales, resulting in a lower average number of BEV sold per model.

General factors in purchasing behaviour



Financial / economic

BEVs have a more balanced list price than petrol cars in C, D vehicle segments, the difference is relatively highest in the smaller segments (B). The predicted price reductions have been accelerated since 2023, Tesla starting the price competition. For smaller vehicles, car manufacturers sacrifice battery size, thus range, to limit the price differential somewhat.

The financial and economic factors are the largest roadblock for a further increase of the BEV uptake. This is discussed in depth on the next pages.

Mindset

In the Netherlands, public opinion on BEVs is shifting rapidly in favour of BEVs. For instance, the survey of EAFO from 2022 showed that 24% of respondents consider buying a BEV within 5 years.

There are, however, still problematic misunderstandings that negatively influence the public opinion. The survey, together with the "Elektrisch rijden monitor" by the ANWB shows that 41% of drivers don`t know about and understand the incentives in place for BEVs in the Netherlands.

Usability

Over the past few years, the usab ty of Battery E ectr c Veh c es (BEVs) has seen s gn f cant advancements. h s s ev dent from the ncreased dr v ng ranges across a segments, reduced charg ng t mes, and mproved battery qua ty. Desp te these str des, cha enges rema n. One such hurd e s standard zat on across borders, wh ch has not yet reached the des red eve . Even though BEVs have made remarkab e progress n terms of usab ty, they have not reached par ty w th the r petro counterparts. However, the gap s stead y narrow ng. Accord ng to th s research, the surge n BEV sa es has resu ted n a decreas ng rat o of pub c charg ng po nts per BEV. h s trend h gh ghts the cont nued necess ty for nvestments n pub c y ava ab e charg ng nfrastructure to ensure that the growth n BEV usage s supported by adequate charg ng fac t es.

Observations & findings 2/7

Trends in governmental incentives

All European governmental organizations discussed in this report encourage the purchase of BEVs. The incentives can influence either the purchase costs and/or the operational costs and can influence the costs of either the owner or the driver.

The Netherlands has decreased some of the key incentives for BEVs in 2022 and phase out many other from 2025 while other countries have increased some key incentives.	Generally, governments in all countries aim to remove the benefits for BEVs over petrol cars when the market completely moved to zero emission mobility, or when ICEVs are banned. Countries that are more ahead in the BEV uptake, like Norway, can remove incentives for BEVs sooner than countries with lower uptake of BEVs. However, they also started with specific segments, and still maintained benefits for smaller segments with more economic options. Despite having a policy of adjusting as we go ("Hand-aan-de-kraan-beleid"), the Netherlands is particularly rapid in dialling back the incentives, e.g., in the case of BiK or purchase subsidy (decreased with 400 EUR since 2022)
Norway mainly incentivizes the private market and the Netherlands mainly the business market. Swedish growth shifted from private to business after the phase out of purchase subsidy.	In Norway, the private market is incentivized more than the business market, mainly through a very beneficial VAT exemption of BEVs. Therefore, BEVs are predominantly sold in the private market. In the Netherlands, the business market is incentivized more than the private market. The 2020 introduced incentive would correct this difference, however, the available budget was very low (relatively and absolute). France and Germany do not make big distinctions between the private- and business market, but differentiate between households (income status), and also residence location (France).
Tax systems with a lower tax burden demand (larger) purchase subsidy programs to positively impact BEV sales.	France and Germany have a lower tax burden on cars. Therefore, incentivizing BEVs can only be done through subsidies. Countries, such as the Netherlands, that have higher tax burdens, usually have to implement lower purchase subsidies to create the same benefit for BEVs over petrol cars.

Observations & findings 3/7

Trends in governmental incentives

All European governmental organizations discussed in this report encourage the purchase of BEVs. The incentives can influence either the purchase costs and/or the operational costs and can have an effect on the costs of either the owner or the driver.

Purchase subsidies create a benefit for BEVs over petrol cars in lower segments, and emission-based taxes do so in higher segments.	All purchase subsidies in this report have a maximum list price as condition for eligibility of the subsidy. Therefore, in higher segments, where cars are more expensive, the BEVs are not always eligible for the subsidy. Emission-based taxes, however, are higher in the higher segments because the cars in those segment emit, on average, more CO2. Caps on maximum car retail price eligibility for incentives have been introduced all over Europe in 2022, showing a quick shift from luxuries larger BEVs to promoting smaller, economic segments. However, the relative benefit of larger segments shall still remain to be attractive in every market.
Depreciation is the biggest cost in the TCO currently, but the depreciation of BEVs has been lowered to petrol cars and the gap is closing since 2021.	The depreciation of BEVs is difficult to calculate, since the market is still maturing. Research showed, however, that the deficit in residual value of BEVs compared to petrol cars, is reducing. In Norway, the depreciation of BEVs is significantly lower than petrol cars. This indicates that the residual will go up as the BEV market matures.
There is a growing, but still limited focus on the occasion market in all countries within this research.	The Netherlands, France, Germany, Latvia, Lithuania, Austria are thus far the countries with purchase grants for second-hand BEVs, of a modest one- and two thousand euro, respectively. The number of countries increased, since 2021, however, Germany and Austria has a limitation of max. 1 years at the first dealership. On the other hand, France can provide an accumulative subsidy to second hand BEVs to 10k EUR (if all conditions apply). The Netherlands has plans to decrease the available subsidy to 1,000 EUR from 2,000 EUR.

Observations & findings 4/7

Trends in governmental incentives

All European governmental organizations discussed in this report encourage the purchase of BEVs. The incentives can influence either the purchase costs and/or the operational costs and can have an effect on the costs of either the owner or the driver.

Stop-and-go incentives have a disruptive effect on the BEV uptake, creating an instable market growth for BEVs.	New or higher purchase subsidies 'ignite a run on BEVs until the deflation of the budgets, which leaves potentially BEV buyers waiting until new budgets are open. The abruptly phasing out of BEV tax incentives creates a run before a certain financial advantage is removed. In the countries where the incentives are only changing a little, there are fewer disturbances in the sales figures.
Policy outlook 2020 – 2026: from 2026 onwards, several significant changes are expected which may affect the BEV uptake negatively	– BiK tax advantage for BEVs will be removed by the end of 2025, making ICEVs cheaper from a driver's perspective, unless BEVs achieve price parity by then. Furthermore, there's no mandate requiring all new company cars to be electric from 2025 onwards, which will likely reduce BEV demand. – The MRB exemption for BEVs will also end by 2025. The MRB is weight-based, and since BEVs are typically heavier, this means they could be more expensive than ICEVs in terms of MRB from 2026. It's worth noting that the MRB is not only an important factor for the Total Cost of Ownership (TCO), but also for the used car market, where relative benefits are larger. – Current subsidies will end by 2024. While no new subsidies have been announced for new vehicles, there is a reserved budget of €600 million for used vehicles. However, this includes execution costs and the reduced tax income for the Netherlands due to higher EV sales. Thus, the actual amount available for the vehicles will likely be less than half, spread over five years. The specific subsidy amount per vehicle is not yet set, although there are doubts whether a proposed €1000 per vehicle would be sufficient to make a significant impact.

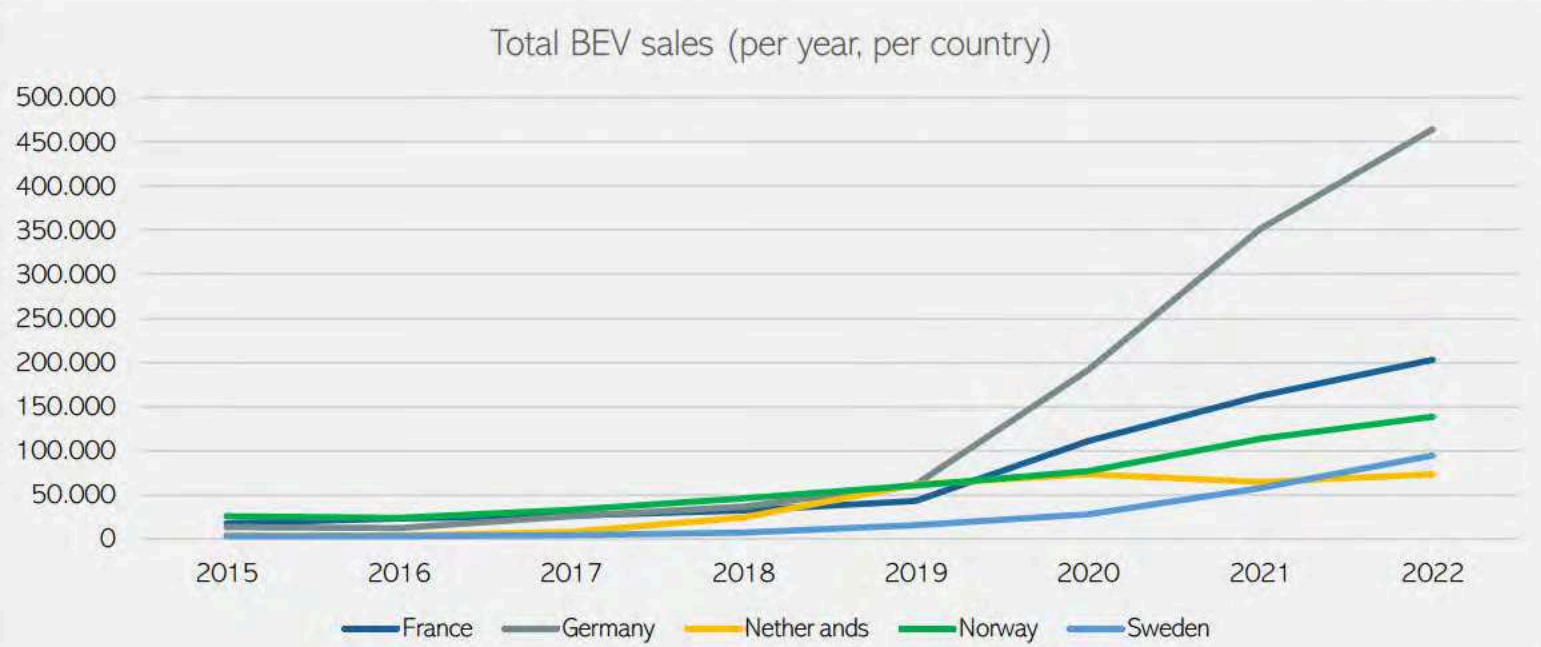
Observations & findings 5/7

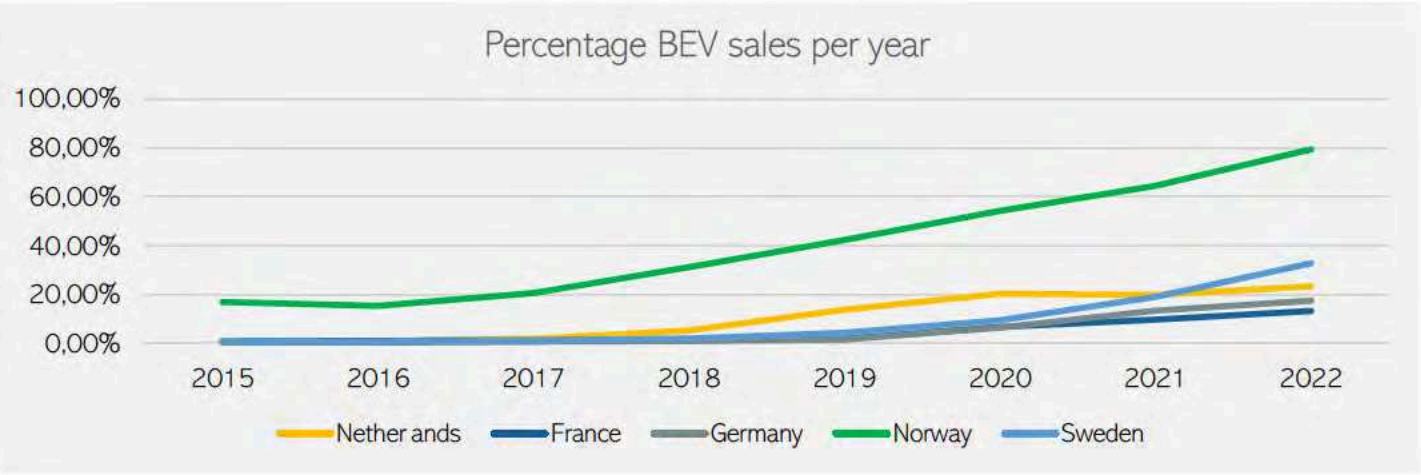
Gradually reduce incentives for plug-in hybrid vehicles (PHEVs)	As Norway aims to increase BEV adoption, it is reducing incentives for PHEVs to ensure that they do not hinder the overall goal of transitioning to zero-emission vehicles. Other countries can consider a similar approach, gradually phasing out PHEV incentives to encourage BEV adoption. PHEVs might cannibalize BEV markets, and greatly hinder CO2 target attainments.
Growing trends on tailor-made incentives	European countries are reshaping their incentive schemes for BEVs to focus more on equity and environmental benefits. These revised strategies primarily target lower-income households, support smaller-budget vehicle segments (price caps), and cater to residents living in low-emission zones. The aim is to make cleaner, greener mobility options more accessible to a broader demographic, thereby stimulating a more inclusive and fair transition to zero-emission mobility. By prioritizing those who stand to benefit the most from reduced vehicle operating costs and those living in areas with strict emission controls, these policies aim to mitigate climate change while addressing socio-economic disparities in access to sustainable transportation. Such a shift in incentive structures could be pivotal for driving BEV adoption at scale, reducing pollution levels in urban areas, and fostering an environmentally sustainable future.
The "carrot and the stick"	Disincentives for ICE vehicles must stay in place, and the phase out of incentives for BEVs shall ensure a still positive gap for BEV. As we see examples in Sweden or France, even with reducing, or phasing out incentives for BEVs, the burdens of ICE vehicles grow, or remain, so that the relative attractiveness of BEVs stay, and not a situation arises, where ICE vehicles become more attractive.

Observations & findings 6/7

Success of BEV uptake

Policy that creates a more beneficial TCO for BEVs, leads to higher BEV sales. The international results indicate that there is a threshold amount from which the incentives have a progressively increasing effect.
This research indicated that such a threshold value is reached when the TCO of a BEV is around €5.000 lower compared to a petrol car.
There is a notable difference between the private- and the business market, where the private market is more focused on the upfront investment costs and the business market more on the TCO.





Success of BEV uptake - *percentage*

In terms of percentage of BEVs, in the total car sales is Norway still well ahead of the other countries in this research. The trend in 2022 indicates a significant increase of the percentage of BEV sales in Sweden, and moderate in France, Germany.
In Q1 2023 the sales percentages increases for most countries, also the Netherlands, but other countries such as Denmark or Finland are overtaking the position of the Netherlands.

Observations & findings 7/7

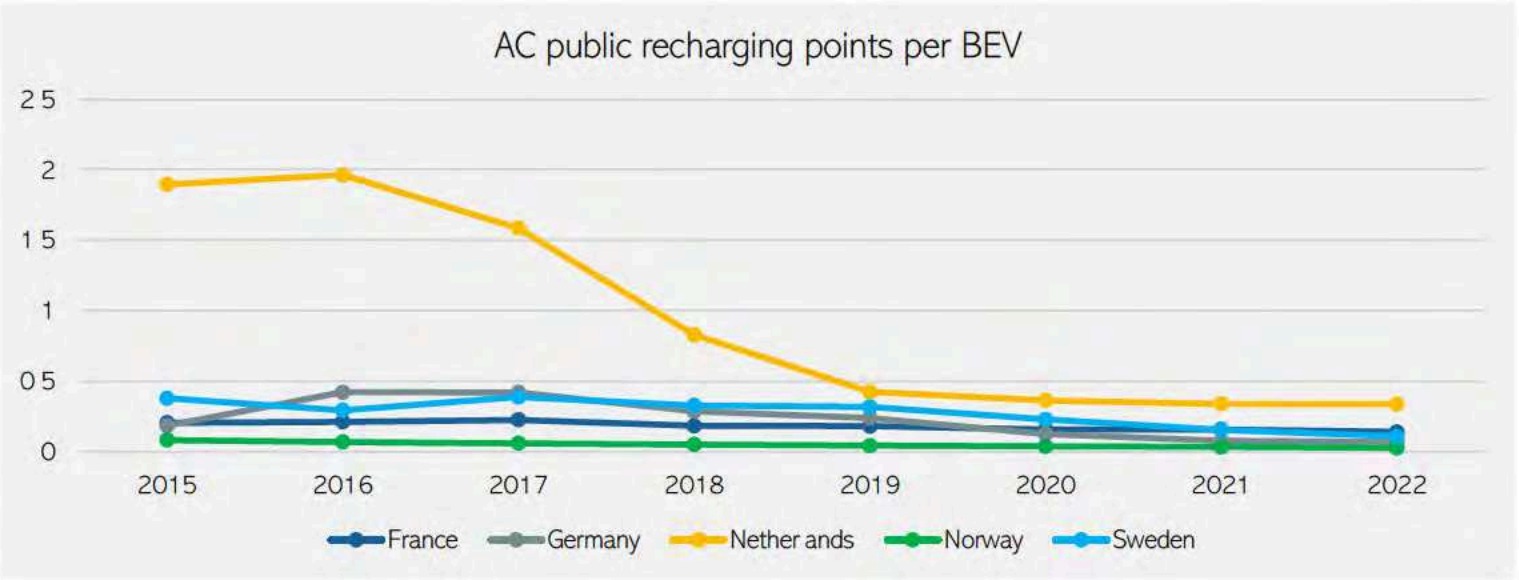
Recharging infrastructure

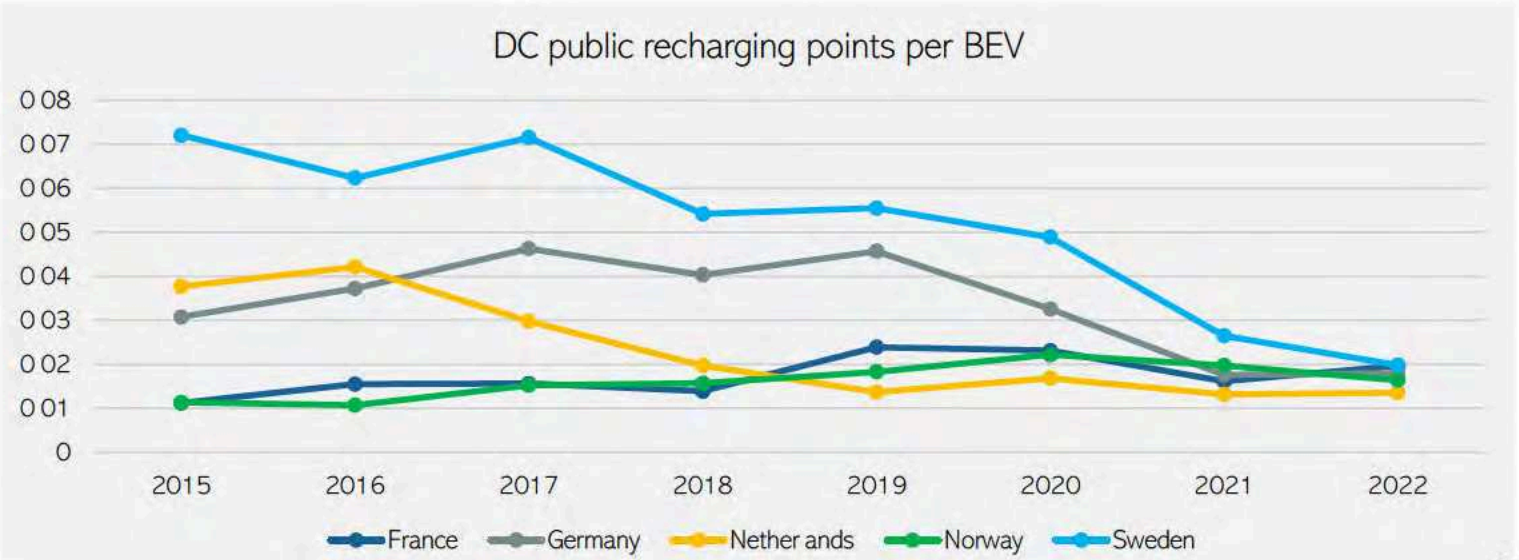
The number of recharging points per BEV is currently lowest in Norway. This is due to the national context. In Norway, having a private parking spot with recharging infrastructure is much more common. The lack of public recharging points does make the infrastructure of high-power rechargers a necessity, when undertaking longer trips outside of the usual leisure/commuting journeys.

Most countries are seeing a decrease in the number of recharging points per BEV as the fleet of BEVs increases. To keep the usability of BEVs high, a solid infrastructure is imperative. The exact number of public recharging points needed is country- and even neighborhood specific. In densely populated areas where people do not have their own driveway, inhabitants are dependent on publicly available recharging.

The Netherlands is a good example of this, it has the highest number of normal (< 22kW) recharging points per BEV. The Netherlands also has the highest percentage of urbanization (92%), meaning that it needs a high number of public recharging points per BEV

Besides the number of public recharging points per BEV, the accessibility of these recharging points is also important. Universal accessibility will increase the usability of BEVs.





Definitions, methods and source references

Definitions

- ICE(V): Internal Combustion Engine (Vehicle) (a car driven by fossil fuels)
- BEV: Battery Electric Vehicle (a car driven just by electricity that has been stored in a battery)
- PHEV: Plug-in Hybrid Electric Vehicle
- PEV: Plug-in Electric Vehicle (BEV and PHEV together)
- TCO: Total Cost of Ownership;
- BiK: Benefit in Kind:
- The net effect of the additional BiK: The income tax that has to be paid extra.

Methods and source references

Sources:

- TCO data, policies and incentives: proEME (https://www.pro-eme.eu/)
- Data and graphs BEV numbers and recharging infrastructure: EAFO (www.eafo.eu)
- Age passenger cars: CBS (https://www.cbs.nl/nl-nl/nieuws/2016/20/personenauto-s-steeds-ouder)
- Electric vehicles: models until 2022 EV Database (www.ev-database.nl)
- Relevant news articles and press releases: (www.electrive.com & www.europe.autonews.com, amongst others)
- Vehicle prices and technical information about the vehicle: (www.nissan.no, amongst others)
- National regulations regarding BEVs: (www.service-public.fr & www.rvo.nl, among others)
- Interpretation and clarification of regulations: (www.anwb.nl & www.elbil.no, among other independent organizations)
- Dutch public opinion on BEVs: "Elektrisch rijden monitor 2020" (www.anwb.nl)
- Price parity research: BloombergNEF (2021); ICCT (2021), among others
- CO2 emissions: Transport & Environment (2021); ICCT (2020)

Energy prices used across countries in TCO calculations

Countries	Petrol prices		Electricity prices*	
	Business	Private	Business	Private
Netherlands	1,60€	1,90€	0,28€	0,34€
Germany	1,44€	1,78€	0,46€	0,54€
France	1,41€	1,69€	0,21€	0,24€
Sweden	1,48€	1,85€	0,37€	0,44€
Norway	-	-	0,13€	0,17€

Countries	Energy fee (Public recharging)**
Netherlands	0,49€
Germany	0,48€
France	0,39€
Sweden	0,48€
Norway	0,38€

*https://www.energypriceindex.com/price-data
**EA O, Eco-Movement

Yearly driven kilometers (estimations):
Business: 28.000 km
Private 15.000 km

When calculating the energy costs for the BEVs 20% public and 80% home charging were assumed.

Disclaimer: All information in this report has been obtained from sources considered accurate and reliable. Nevertheless, due to the possibility of material, interpretation and analysis errors, the analysis and recommendations provided do not warrant accuracy, timeliness or completeness.

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