



Quick scan: BEV availability for the Netherlands 2025 – 2030

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1. Reason for project

Are there enough BEVs for the NL business market to have 100% BEV sales?

Mandating zero-emission company cars

The Dutch government is contemplating a *mandate* on zero-emission vehicles for new company cars. The introduction of a mandate would mean that all new company passenger cars bought or leased from 2025 onwards *must* be zero-emission. This is to advance the market of BEVs in the Netherlands and move towards more sustainable mobility.

When such a measure would be introduced, the availability of zero-emission vehicles is key. When the full business market in the Netherlands would switch to zero-emission vehicles, a lack of supply could hamper economic growth. This is something that the Dutch government wants to prevent.

In this report, a quick scan is done on the availability of Battery Electric Vehicles (BEV) for the Dutch market. The following factors are considered:

- Number of different BEV models per segment
- Production volumes of current top brand-groups
- Potential new import, specifically from China
- Demand and availability of batteries

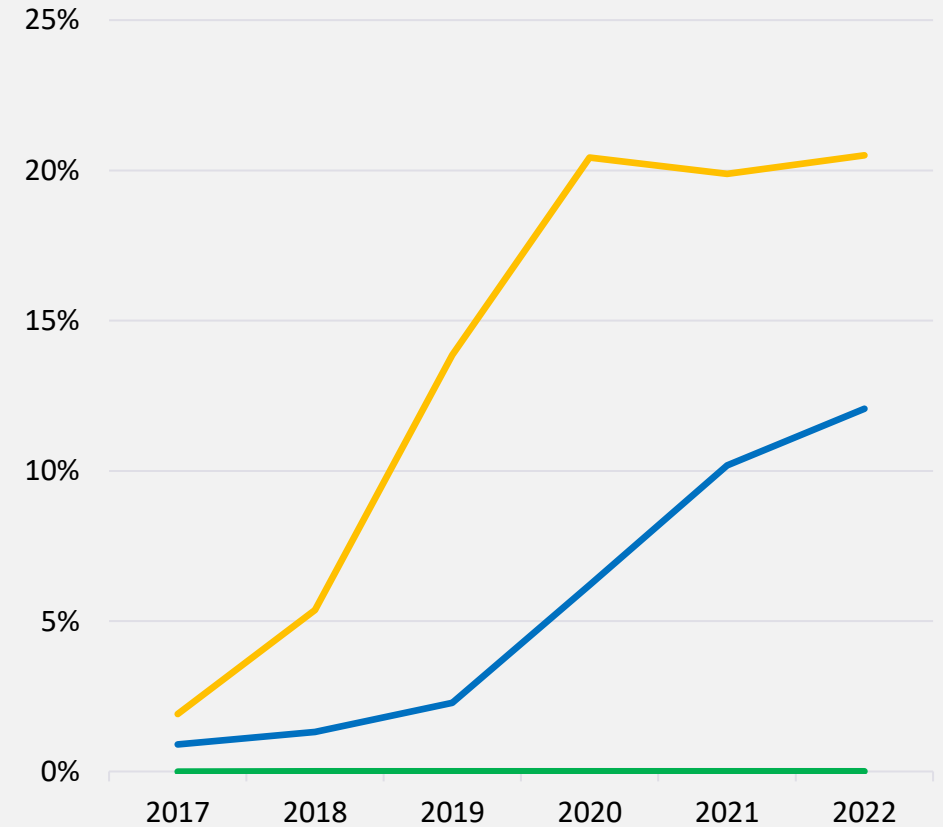
Focus on BEV; passenger vehicles

zero-emission vehicles include battery electric vehicles (BEVs) and fuel cell electric vehicles (FCEV). In this report, FCEVs are excluded. FCEVs make up a negligible amount of new car sales and are not expected to grow strongly in the coming years.

The focus of this research is on passenger vehicles (M1) by request of the Ministry of Infrastructure and Water Management. This is because the mandate will not likely include commercial vehicles of the N1 segment.

YTD: 09-2022

BEV and hydrogen new vehicle registrations



- BEV uptake in the Netherlands
- BEV uptake in Europe
- FCEV uptake in Europe

2. Market analysis

2.1 Global market

Global market analysis

The global market analysis, historic and forecasted, gives the necessary context of the global BEV market. The global market analysis shows the position of the European BEV market in the global BEV market.

2.2 European market

European market analysis

The European market analysis shows the BEV uptake in Europe in absolute numbers and uptake percentage. This analysis enables us to put the Dutch market in the right perspective and relate it to the European BEV market.

2.3 Dutch market compared to Europe

Dutch market compared to Europe

In the analysis of the Dutch BEV market, the focus will be on the attractiveness of the Dutch market. This will be analyzed through model introductions and share of BEVs in the total sales, compared to other European countries.

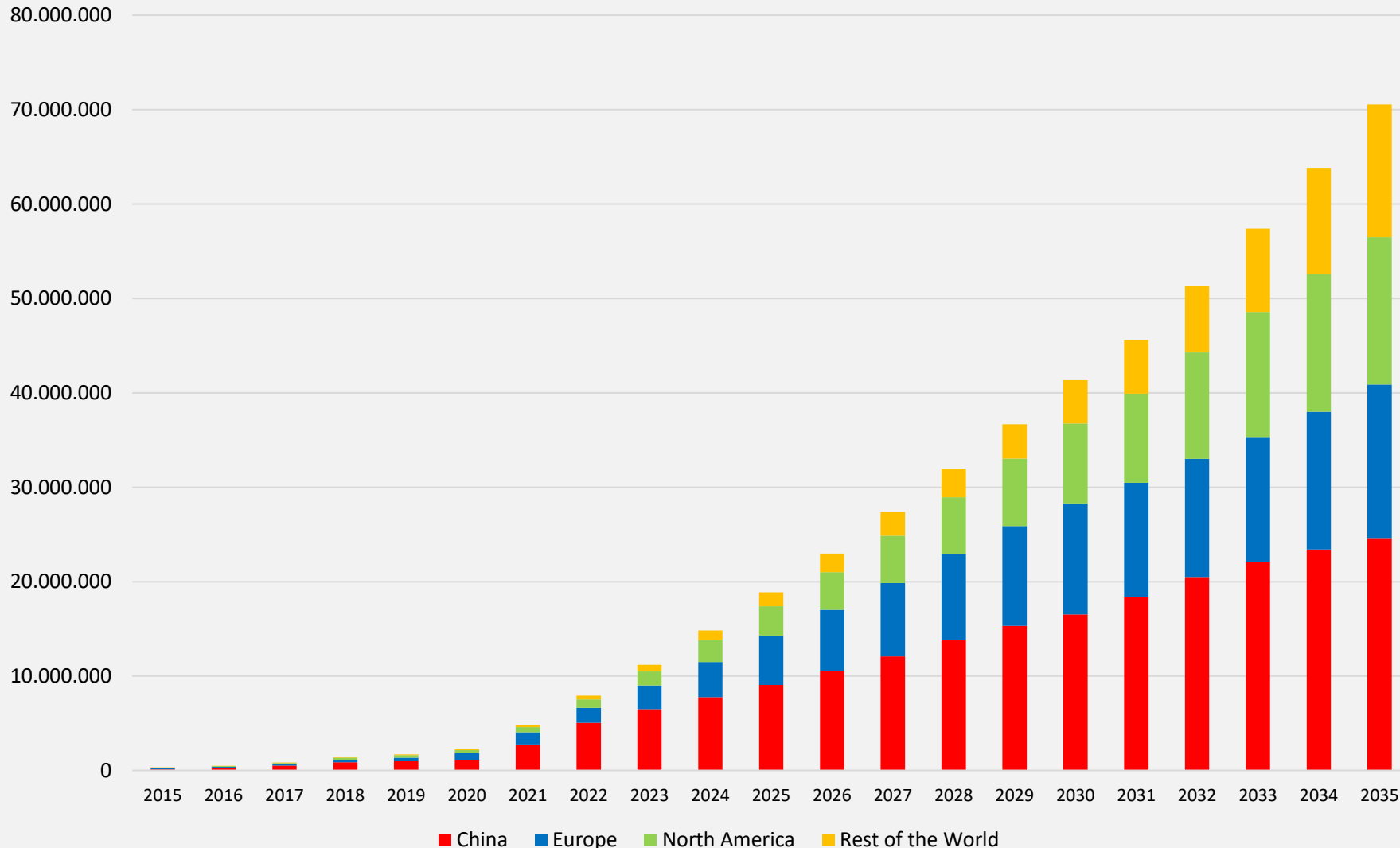
2.1 Global market

2.2 European market

2.3 Dutch market compared to Europe

China remains the largest BEV market

Historical and forecasted new BEV sales by region



China remains the largest BEV market

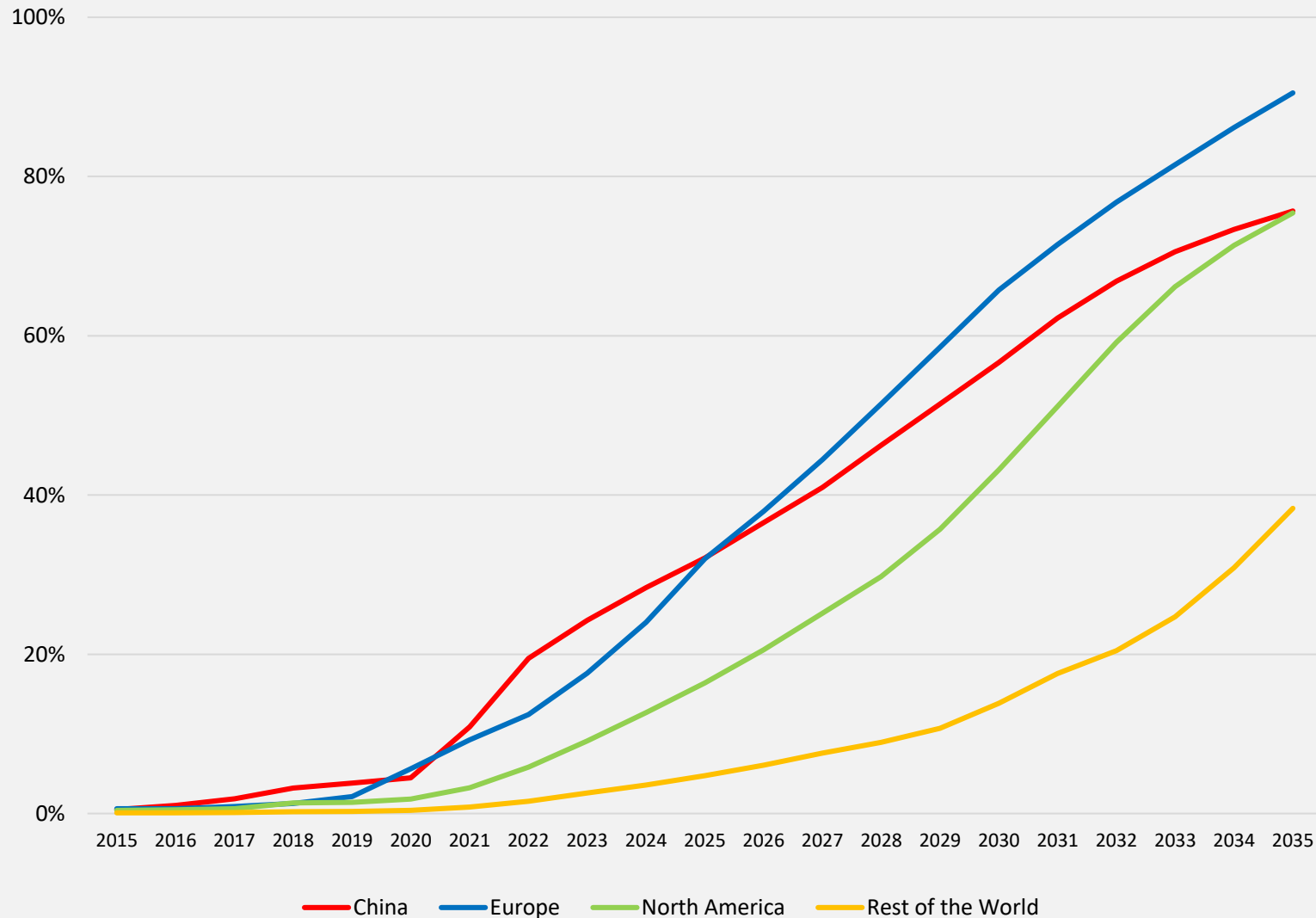
According to the forecasts, the largest amount of BEVs will be sold in China, estimated to be around 25 million in 2035. The other regions, Europe, North America (Canada and the US), and the Rest of the World are predicted to be equaling around 15 million per region in 2035.

The car market in China is still developing and, therefore, growing fast. The total number of BEVs forecasted is higher in China than in Europe.

In total, the global demand for BEVs is forecasted to be roughly 19 million in 2025, growing to 41 million in 2030 and 70 million in 2035.

China remains the largest BEV market, Europe to reach the highest BEV share

BEV market share by region



Comparison of BEV uptake worldwide

The largest amount of BEVs is foreseen to be in China, but Europe is forecasted to have the highest share of BEVs in total car sales.

Europe is estimated to surpass China in 2026 and grow through to 65% in 2030 and 91% in 2035. China and North America are forecasted to reach 75% BEV sales in 2035.

Globally, BEV sales are estimated to comprise 45% of all car sales by 2030 and 70% by 2035.

Why does Europe not reach 100% in 2035?

There are a couple of reasons why Europe does not reach a 100% share of BEVs.

- In the data Europe is represented, not solely the EU. The new legislation banning the sales of ICE cars from 2035 only concerns the EU.
- There will be exceptions to the mandate.
- There might be transfer periods surpassing 2035 for markets in the EU that are far behind in the uptake of BEVs.
- It is not fully clear if the mandate will be in effect on 01-01-2035 or 31-12-2035.

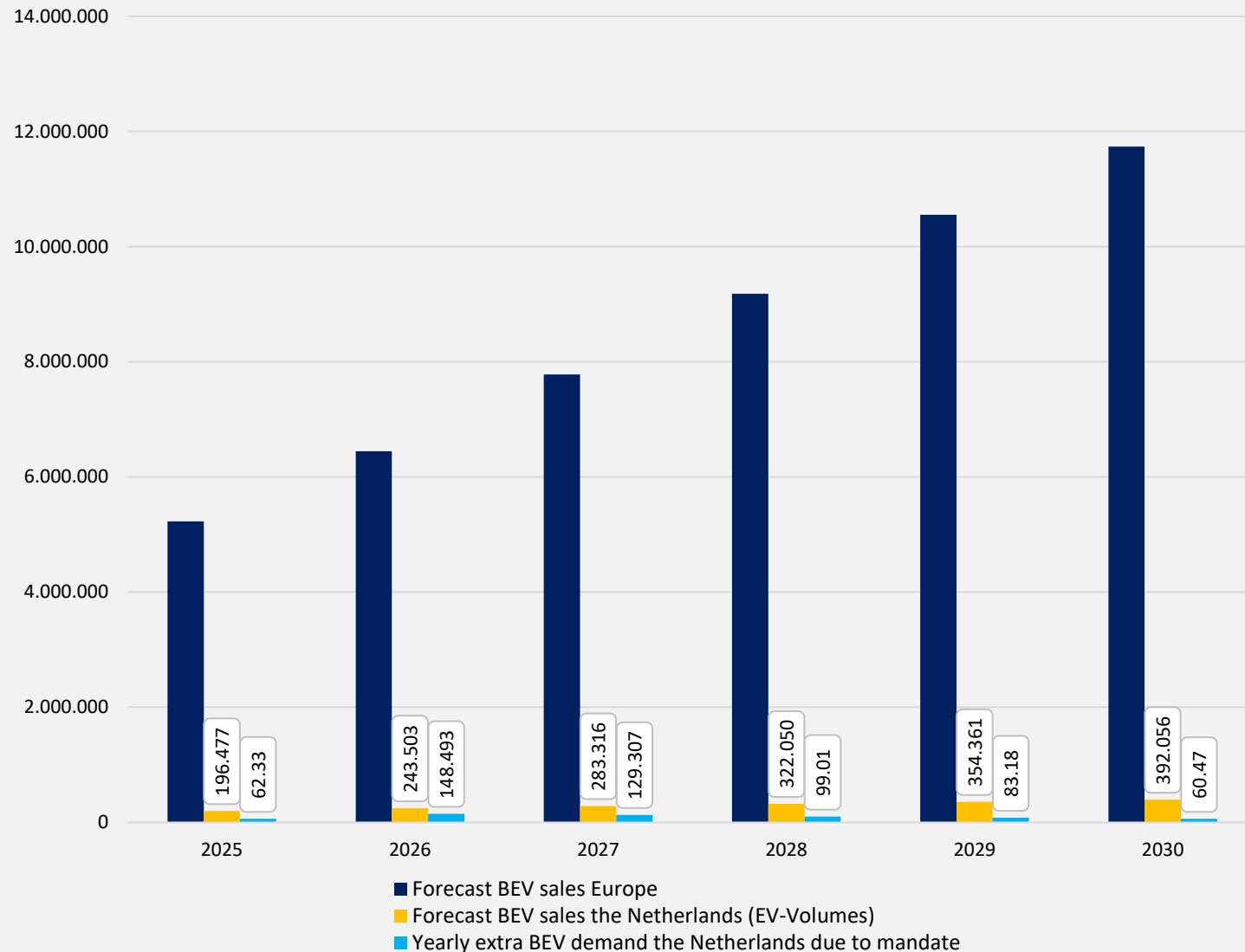
2.1 Global market

2.2 European market

2.3 Dutch market compared to Europe

The Dutch mandate only has a minor impact on the European BEV market

Dutch BEV uptake compared to the European BEV market



Europe remains a globally important BEV market

The BEV demand in Europe is predicted to be 5,2 million in 2025 and 11,7 million in 2030. The European BEV market is forecasted to make up 28% of the global BEV market between 2025 and 2030. Thereby proving Europe to be an important and attractive market to sell BEVs.

The Dutch BEV market is only a small market in Europe

Any changes in BEV demand in the Dutch market will have just a minor effect on the total European market. The absolute forecasted demand of the Dutch BEV market grows to 400.000 in 2030 in the predictions by EV-Volumes. The forecast by the Ministry, including a mandate for new company cars to only be zero-emission from 2025 on, is a bit lower than that, reaching 400.000 in 2035 (*not in the graph*). In both scenarios, the Dutch BEV demand makes up around 3,7% of the total European BEV market in 2025 and 2,7% in 2030. Again, showing that the Dutch market is a small market in Europe.

The predictions done by the Ministry foresee an extra BEV demand in the Netherlands between 2025 – 2030 compared to a scenario without a mandate. The extra demand is, on average, 97.136 BEVs yearly from 2025 – 2030. That constitutes 1,24% of the total European market.

The proposed mandate is projected to create an extra demand of 1,24% of the European BEV market, this is just a minor impact.

2.1 Global market

2.2 European market

2.3 Dutch market compared to Europe

The Netherlands has been one of the most attractive markets to sell BEVs in

Factors of market attractiveness

For successful BEV adoption in a country, there must be a sufficient supply of BEVs in the number of available models and total volumes. The supply of BEVs is determined by the attractiveness of the market from the supplier's point of view. The attractiveness is, amongst others, determined by:

- The demand in the market
- The price level in the market

Historic attractiveness Dutch BEV market

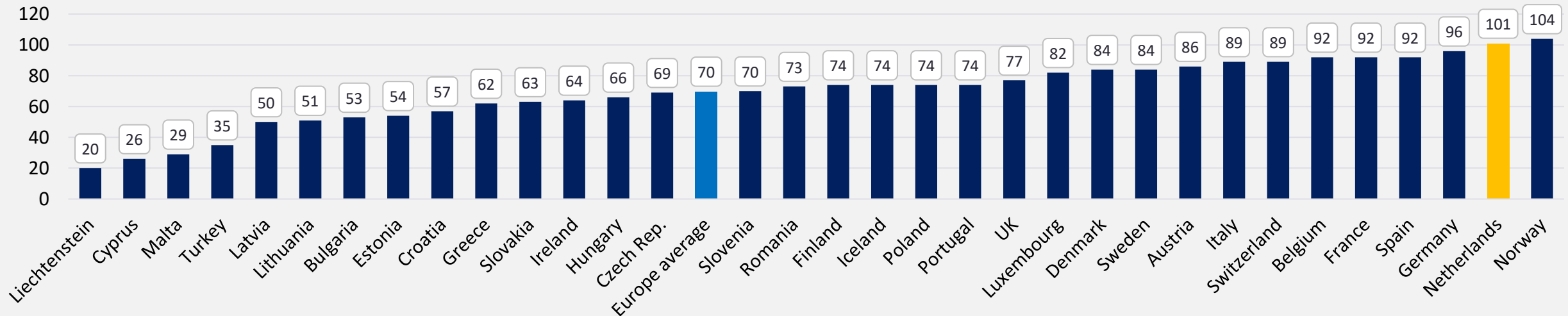
The Dutch market has always been attractive for OEMs to sell BEVs. The graph below shows the total number of models introduced in Europe, determined by the first registration of a new model in a country. Norway has always been the most attractive BEV market. The Netherlands is a close second.

This historical attractiveness reflects also in the new introductions by Chinese OEMs. They tend to introduce their models first in the Scandinavian countries and the Netherlands.

Future attractiveness Dutch BEV market

Historic results are no guarantee for future results, meaning that the attractiveness of the market in the future needs to be a priority. In recent years, the attractiveness of the Dutch market has been reduced compared to other European countries. The metric on this slide, the total introduced number of BEVs, is not the only measure that should be used to analyze the attractiveness of the Dutch market for car manufacturers.

Total introduced BEV models (until 2022)



The Netherlands has been an attractive market for the A and B segment

Market attractiveness can be segment specific

The previous slide showed that the Netherlands has overall been an attractive market for BEVs, shown by the BEV model introductions thus far, compared to other European countries.

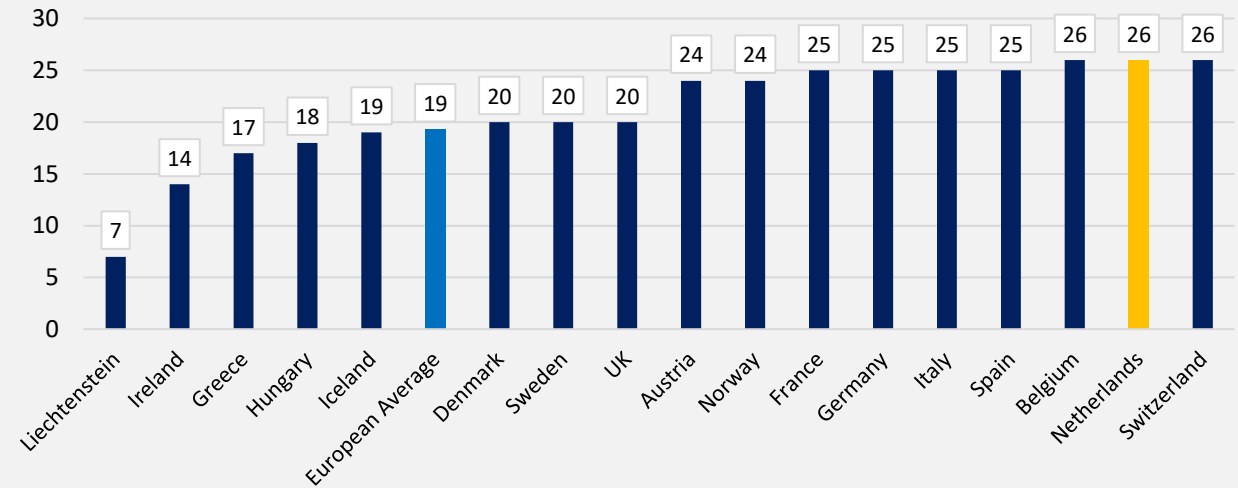
Analysis of model introductions show that the Netherlands is an important market for the A and B segment, together with Belgium and Switzerland, most models were introduced in the Dutch market. This shows that the Netherlands is an attractive market, also for the A and B segments.

A and B segment will likely remain attractive for OEMs

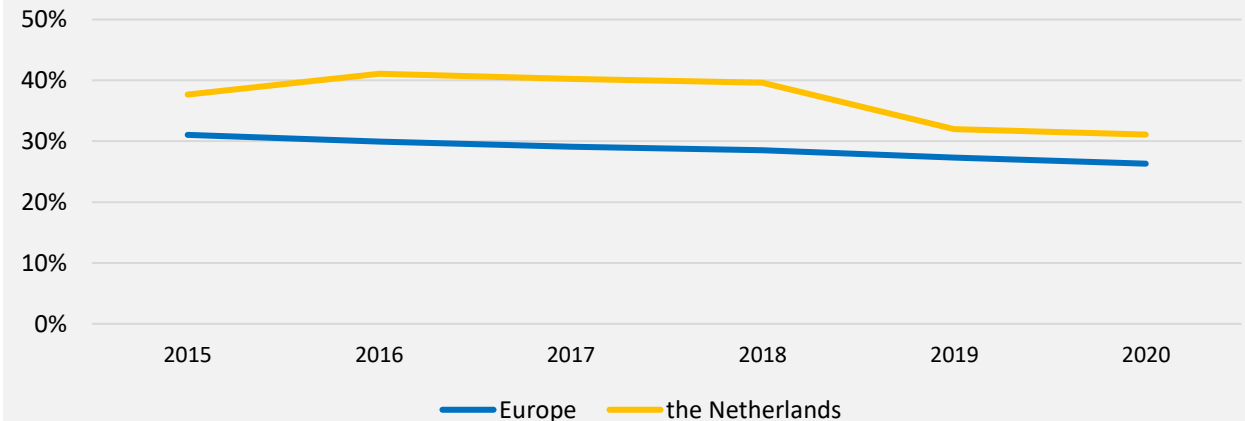
The Netherlands has, relative to the rest of Europe, higher sales in the A and B segments, seen in the lower graph. This is the data on the entire car market. Therefore, the Dutch Ministry of Infrastructure and Water Management has specific interest in the supply of vehicles in the A and B segments. In these segments, it is currently more difficult for BEVs to compete because the TCO of ICE models is, in general, lower.

As discussed earlier, the demand and attractiveness to sell are important determining factors of supply, albeit with no guarantee. A downward trend in the A and B segments is visible, both for the Netherlands and for the European market. If this trend continues, the market for the A and B segments could eventually become too small to be attractive for OEMs. However, because the total sales in the A and B segments in Europe were still above 2.000.000, it is estimated that the A and B segments will remain significant enough to remain an attractive market for OEMs.

Total introduced BEV models in the A and B segment



Share A+B segment in new vehicles registrations (total car market)



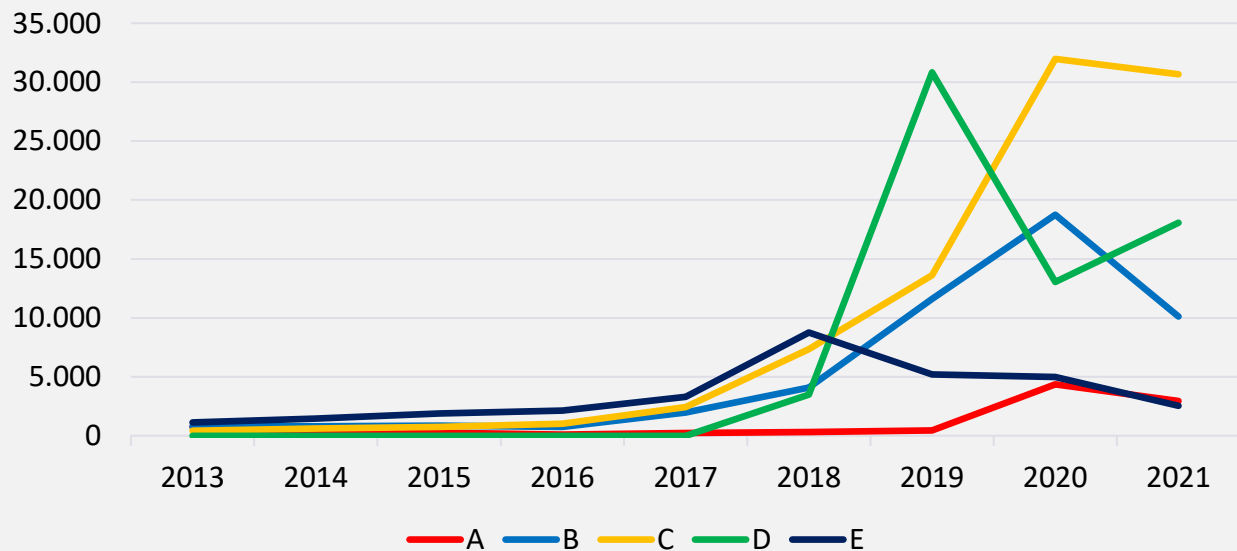
The Netherlands has been reducing the attractiveness to sell BEVs in recent years

The Netherlands is no longer an absolute frontrunner in BEV uptake

The uptake of BEVs in the Netherlands has long been at the forefront of Europe, only behind Norway. However, in recent years other European countries have had steeper growth. The right-hand graph shows the somewhat stagnating BEV uptake in the Netherlands. Norway is left out to show lesser known, but also successful countries in BEV uptake.

The supply will likely flow towards the most attractive markets. The Netherlands has lost some market attractiveness due to the introduction of counterproductive measures for the BEV uptake. To prevent the continuation of this downward trend, the BEV market must be made attractive again. The introduction of the mandate can be a good start to this, it could make the market more attractive.

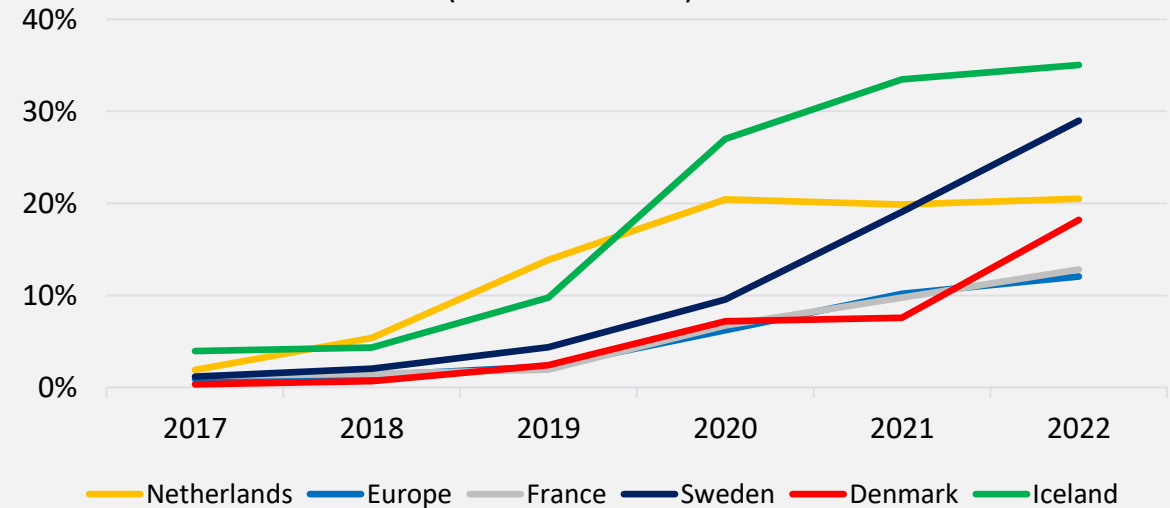
BEV registrations per segment NL



BEV sales per country and in Europe

(% of total sales)

YTD: 09-2022



Reducing BiK tax advantages likely caused stagnation in the BEV uptake

The most important BEV incentive in the Netherlands has been the benefit-in-kind (BiK) tax rate for BEVs. In steps, this advantage has been reduced. The BiK taxation has gone up from 4% to 16% and the cap of this discount has been lowered. This has likely caused a sales drop in the E segment after '18, the D segment after '19, and the C and B segments after '21.

Stimulating BEV sales is still needed until 2025

To keep the Dutch market attractive until 2025, it is advised to stimulate new BEV sales until then. It would, for instance, likely be needed to subsidize the A-segment BEVs to make the TCO more competitive. This is not needed for the C and D segments, but it is foreseen that these segments could need an advantage in the BiK taxation to keep demand of BEVs up until 2025.

3. Can the needed vehicles be supplied ?

3.1 Model availability

Importance of available BEV models

The availability of enough different BEV models is an important requirement for introducing the mandate in the business market in the Netherlands. In all segments, there must be plenty of choice in vehicles. In this section, new model introductions per segment are researched and an assessment will be made on whether this will be sufficient for introducing the mandate.

3.2 BEV production volumes

Importance of BEV production volumes

Besides the availability of enough different models, sufficient production volumes of those models are an important condition for introducing the mandate as well. In this section, an estimation will be made whether the production volumes will be sufficient to supply BEVs to the Dutch market in case of the mandate, for the period 2025 – 2030.

3.3 Battery supply

Importance of sufficient battery production

Battery availability is, for obvious reasons, important in determining the availability of BEVs. Without enough batteries, the mandate can not be introduced. In this section, an analysis is done of battery production until 2030.

2.1 Model availability

2.2 BEV production volumes

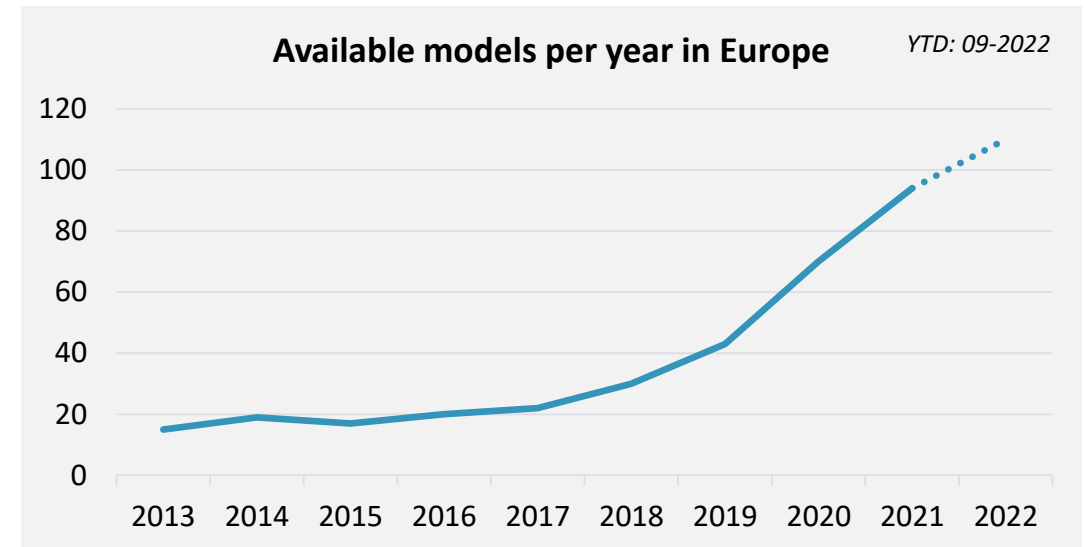
2.3 Battery supply

The number of available BEV models has been increasing year on year

The number of available BEV models has increased

The number of BEV models available for purchase has sharply increased since 2018, this is visualized in the graph on the right. The total number of models available for purchase reached 110 in 2022 (data until 09-2022). In this data, models that were discontinued are excluded, based on registration data of all of Europe. See the attachment slides for the justification of the method.

In this section, an analysis is done of the future BEV model availability. The model availability of the future can never be concluded with absolute certainty since model introductions in the future are not always known. Hence the further you go into the future; the fewer new model introductions per year will be known. The historic data on model introductions are used in forecasting future model introductions. This way, model availability of the future can be estimated as accurately as possible.



Method for analyzing future BEV models: three penetration scenarios are selected

Known BEV model introductions are provided by EV-Volumes. Data analyses were done on the number of models per year in the coming 5 years (2022 – 2027). This data is retrieved through intensive research into documentation by car manufacturers. The further into the future, the more uncertainty there is regarding the number of BEV models on the market. In recent times, car manufacturers have had a shorter *time to market* than in the past (PWC, 2019), model introductions can therefore follow the announcements shortly. Announcements of model introductions for 2027 are, therefore, not representative of the actual new models that will be introduced in 2027.

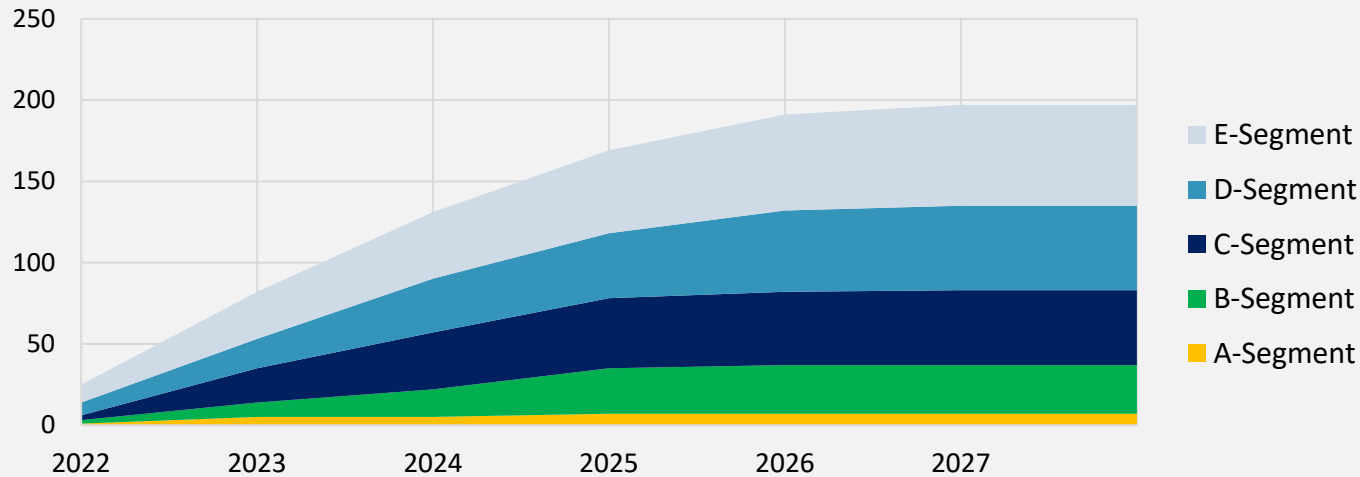
The announcements of model introductions are categorized into 4 classes of certainty that the model will indeed be released. These classes are 25%, 50%, 75%, and 100%. Based on these classes, three scenarios are developed:

1. High BEV model penetration, this includes all certainty classes (25%, 50%, 75%, and 100%)
2. Moderate BEV model penetration, this includes certainty classes 75% and 100%
3. Low BEV model penetration, this includes only the certainty class 100%

The segments in focus are A, B, C, D, and E. The segments F and SS make up a small part of the market and are not relevant.

The number of available BEV models is expected to continue its growth

Number of known new BEV models per segment in Europe



New BEV models for all segments

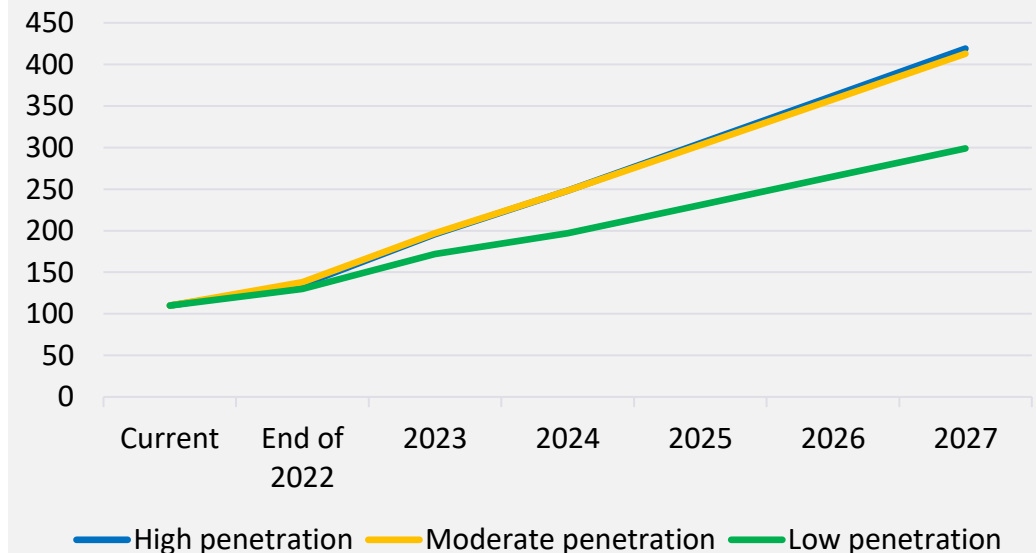
The graph on the left shows that for all relevant segments new BEVs will be introduced in the coming years. In the A segment, the least number of new cars will be introduced. However, because there are also fewer ICE models available in this segment, currently only 7 (Autoweek, 2022), the number of BEV models is still perceived as competitive. A detailed outlook per segment can be found in the attachment. Also in the attachment, per segment an overview of the total introduced BEV models thus far including the BEV models that were not registered in the Netherlands.

New BEV model introductions will continue to accelerate

In 2022, there were 110 BEV models available for purchase in Europe, based on the registration data (YTD 09-2022). The known known introductions point to an increase to around 200 in 2027 (graph on the left), projections of future introductions point to around 400 models in 2027 (graph on the right).

The graph on the left clearly shows that the known model introductions per year get fewer as we look further into the future. Historic data shows that the BEV models available in the market have grown year on year, and at an increasing pace, see the previous slide. The development of the available models in the future is likely to continue this upward trend. In the right-hand graph, the average of new model introductions in 2023 and 2024 is continued for 2025, 2026, and 2027. After 2025, the freedom of choice in BEV models are predicted approaches the freedom of choice of conventional models.

Number of new models per year (forecast from 2025)



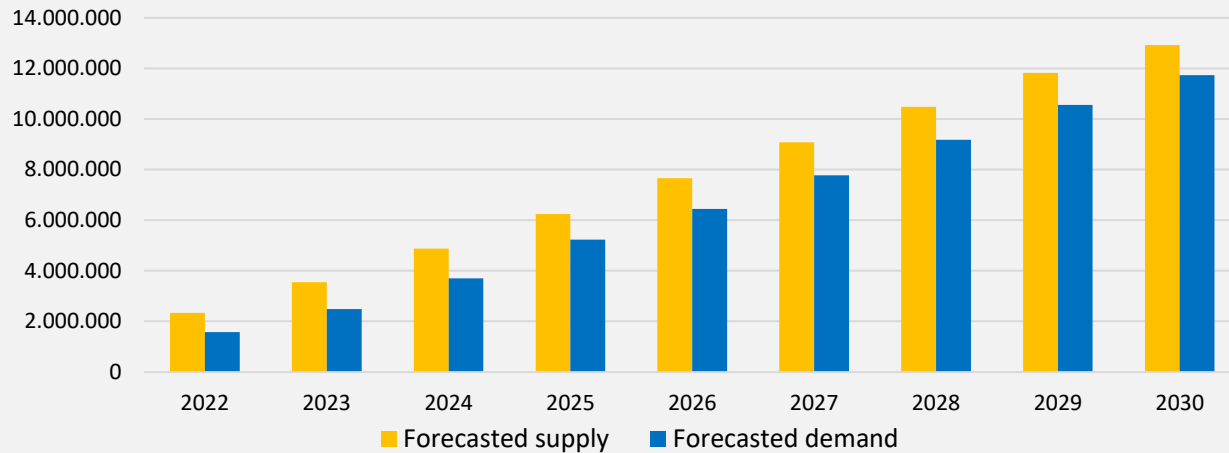
2.1 Model availability

2.2 BEV production volumes

2.3 Battery supply

BEV supply earmarked for Europe is forecasted to meet European BEV demand

Forecasted BEV supply for Europe



European BEV production estimated to meet the demand

In the graph above we see that the production of BEVs earmarked for Europe is forecasted to reach 13 million BEVs in 2030. This projection is based on the current total sales of the main OEMs in Europe and their targets in BEV sales. The blue bars indicate the forecasted demand for BEVs in the European market. It is estimated that the European supply can meet the demand.

Current long delivery times are no indication of production capacity issues

Currently, some OEMs have long delivery times. This is due to chips and sensors, components that are not specific to BEVs or even the automotive market. Long delivery times cause a shift in the market to OEMs that have shorter delivery times. The current delays do not indicate production capacity problems.

OEMs plan production capacity several years ahead, it is assumed that OEMs account for production capacity and battery availability in setting BEV goals.

OEM Group	2022 (current BEV sales)	2025	2030	2030-2035
VW Group	17%		70 % ZEV VW Group (34 % Global)	100 % ZEV in Europe
Stellantis	17%		Europe 100 % ZEV	
BMW Group	31%		50 % ZEV (global)	
Mercedes-Benz Group	34%		100 % ZEV in Europe (If conditions allow)	100 % ZEV Global
Hyundai Motor (incl. Kia)	23%			100 % ZEV EU (2040 Global)
Geely-Volvo Car Group	53%	50 % ZEV Global	100 % ZEV Global	
R-N-M Alliance	15%		100 % ZEV Renault in Europe	100 % ZEV Dacia in Europe 2035
Ford	14%		50 % ZEV (global)	100 % ZEV in Europe
Toyota Motor Corp.	4%			100 % ZEV in Europe
Mazda Motor Corp.	8%		25 % ZEV in Europe (&Global)	
Tata-JLR	26%	Jaguar 100 % ZEV Global		2039 Land Rover 100 % ZEV global
Tesla	100%			

Chinese production is estimated to cover any European supply deficit, may it arise

Historic BEV production volumes in China

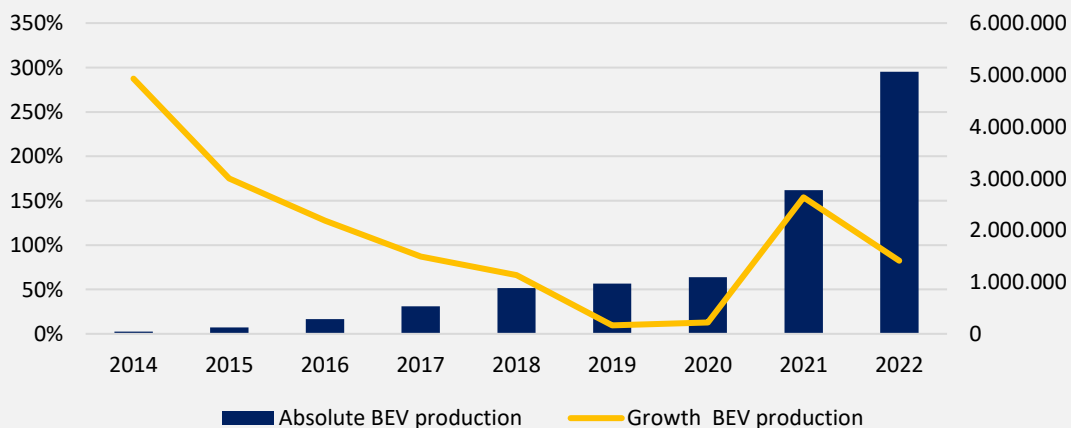
The demand in China has been met by domestic production, therefore, historic sales equal historic production. *See the attachment for the justification of the method.*

The average year-on-year growth of the Chinese BEV production volume has been 111% since 2014. This includes 2019 and 2020, two years that saw lower demand and production due to the ending incentives for BEVs and the influence of Covid-19.

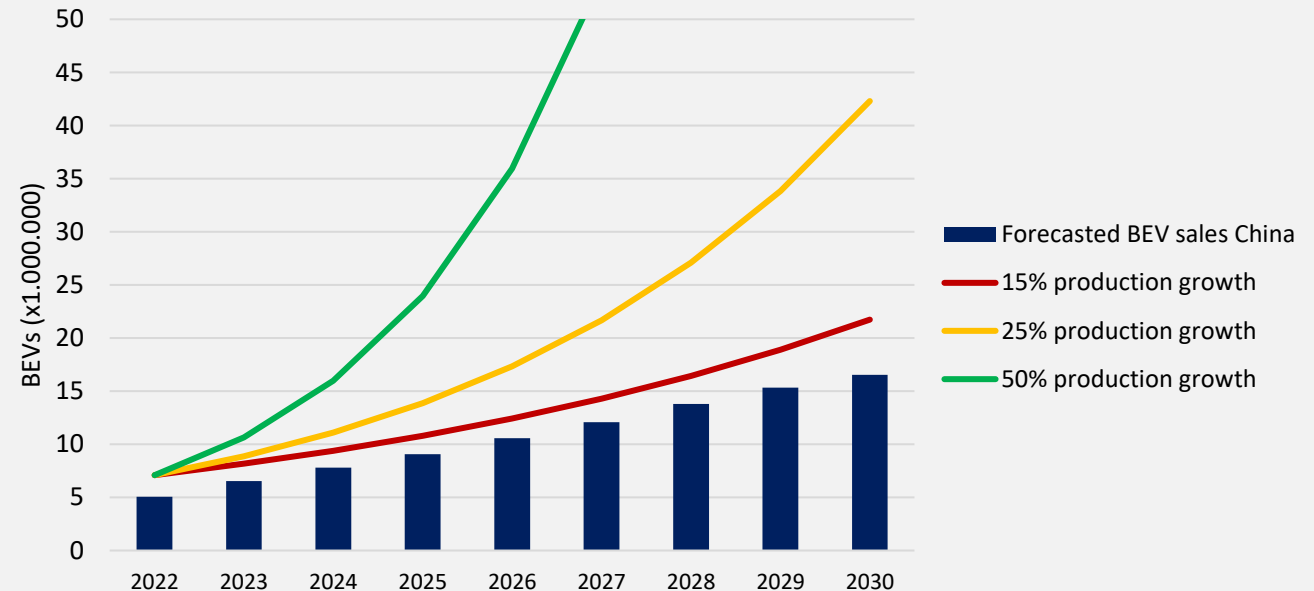
Forecasted BEV production volumes in China

If China averages an increase in the production volume of 15% annually, the average of 2014 – 2022 was 111% annually, the Chinese supply will exceed Chinese demand by 1,7 million in 2025. This increases to 5,2 million in 2030.

Historic BEV production volumes China



Forecasted BEV production and demand China



Chinese production is estimated to cover any BEV supply deficit in Europe

- The BEV supply earmarked for Europe is estimated to cover the European BEV demand. *See the previous slide.*
- If the BEV supply earmarked for Europe does not cover the European demand in full, Chinese supply is estimated to fill that gap with ease.

Even in the lowest growth scenario of 15% annually, the Chinese supply will exceed demand by several million. An important note is that supply in the automotive market only grows to follow demand, never to exceed it.

2.1 Model availability

2.2 BEV production volumes

2.3 Battery supply

Battery production is not expected to hamper BEV supply, further research warranted

Battery production is estimated to meet the battery demand

The battery demand is estimated to be 872 GWh in 2030 in Europe (EV-Volumes, 2022), shown in the left-hand graph. McKinsey (2021) has a slightly lower prediction, 786 kWh for BEVs. McKinsey totaled the announced battery production facilities in Europe to 965 GWh. If recent announcements are added, the production capacity will surpass 1100 GWh. This suggests that battery supply will meet demand. The IEA (2022) has a similar conclusion, they note that the announced battery manufacturing does not cover the forecasted demand for 2050 but does cover the demand for 2030.

There are some negative signs on the battery production capacity and raw material availability in the short run. BloombergNEF (2022) and McKinsey (2022) state that in the short run, supply chain-, and raw material shortages may arise. For instance, production may face delays since mega factories have a longer ramp-up time. However, both reports conclude that supply will increase heavily and estimate the battery supply to meet the demand for the period 2025 – 2030. Foreseen problems in battery availability are only predicted for the short-term future.

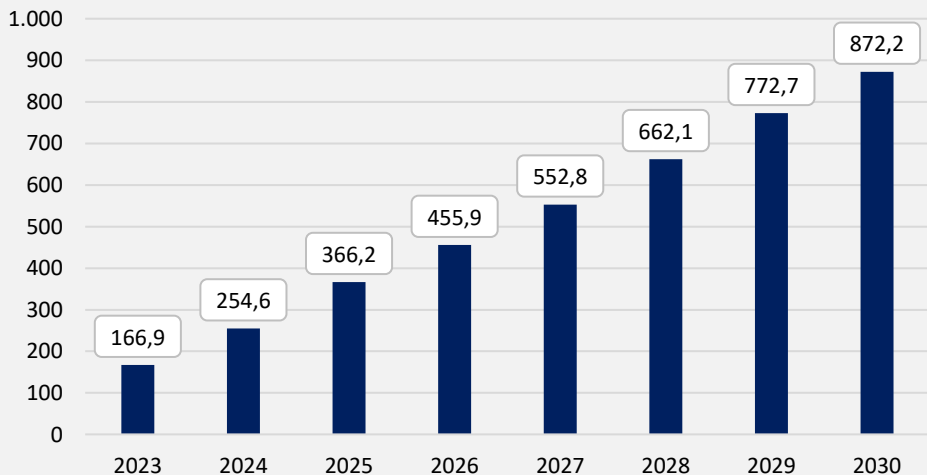
Geopolitical factors can play a role in battery availability. China is estimated to hold 69% of battery manufacturing capacity in 2025, down from 74% in 2022 (BloombergNEF, 2021 & IEA, 2022). The geopolitical factors are, however, difficult to estimate.

Further research raw materials

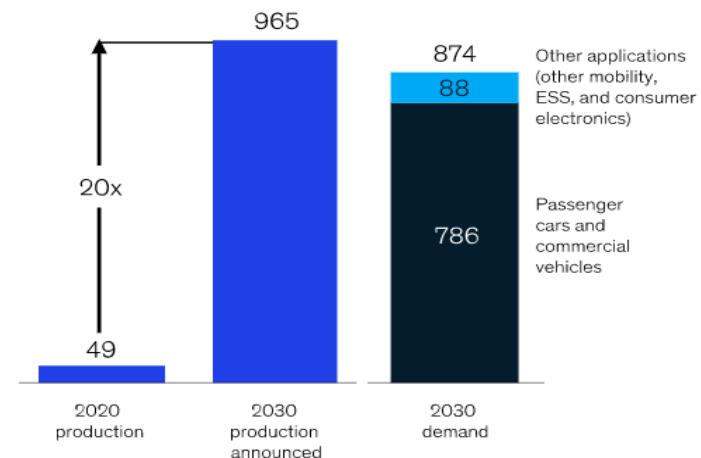
All reviewed sources point to raw materials not being a problem for the period 2025 – 2030, but the raw material availability does warrant further research. *If* there would be an issue in BEV supply, it would be the raw material for batteries.

Raw materials and supply chains for batteries are seen as crucial for BEV uptake (BloombergNEF, 2021 & IEA, 2022).

Battery Installations [GWh]



Battery cell demand and announced supply GWh, accelerated scenario for demand



McKinsey & Company (2021)

New battery technologies

New battery technologies, for instance, sodium-sulfur-, and lithium-sulfur batteries, will likely increase the battery availability in the future. Therewith reducing potential issues with battery availability for BEVs, if there are any.

An example of this is the reduced need for Cobalt. Forecasted demand for Cobalt in 2030 has reduced by 52% from 2019 to 2022 due to new technologies (BloombergNEF, 2021).

4. Conclusions

The BEV supply is estimated to meet the demand

Main research question

The Dutch government is contemplating mandating zero-emission passenger cars for the business market from 2025 onwards. The main question of this report:
Will there be sufficient BEVs available in the market to supply that demand?

Demand

Dutch mandate has but a minor impact on the European market

The Dutch BEV is between 3% and 4% of the total European market. The mandate increases Dutch demand by 1,24% of the European market.

The European BEV market grows to roughly 12 million in 2030

The total European BEV demand is forecasted to reach 5,2 million in 2025 and 11,7 million in 2030.

The Dutch market can remain an attractive market to sell BEVs

The available BEVs will likely flow to attractive markets. The Netherlands has long been attractive to sell BEVs but must take action to remain attractive.

Supply

There will be enough different BEV models on the market

In all segments, there will be a sufficient choice in BEV models. In the A segment choice is lower, however, this is in line with the ICE model offerings.

European supply is forecasted to meet the increased demand

Estimated based on the targets of the OEMs, which are in line with, or exceed forecasted BEV demand.

In case of a deficit in BEV supply, Chinese supply can fill the gap

Chinese production grew 111% annually over the last 8 years. Future growth of 15% already is sufficient to cover a BEV supply deficit in Europe.

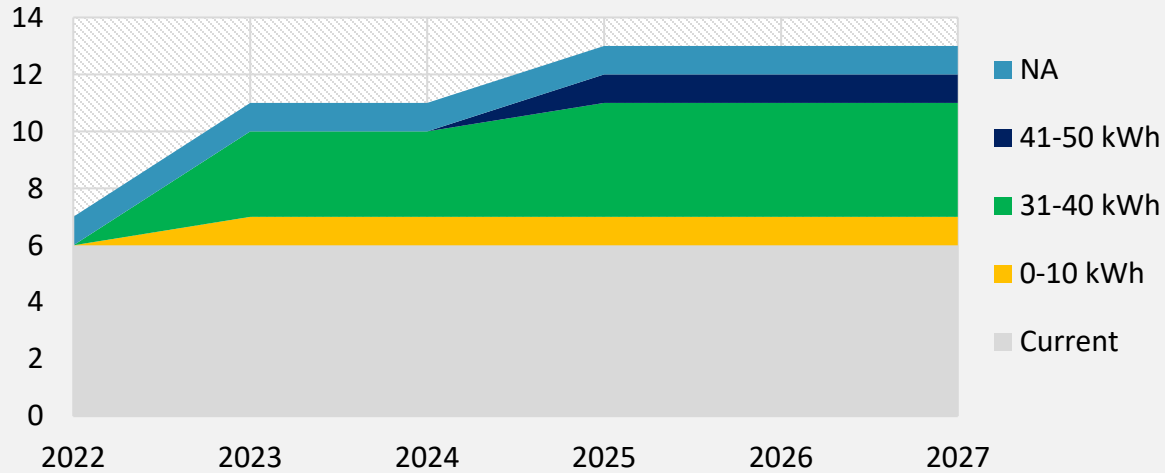
Battery supply is estimated to meet the demand

All announced battery plants for Europe exceed the estimated battery demand, battery availability is not forecasted to hamper BEV availability.

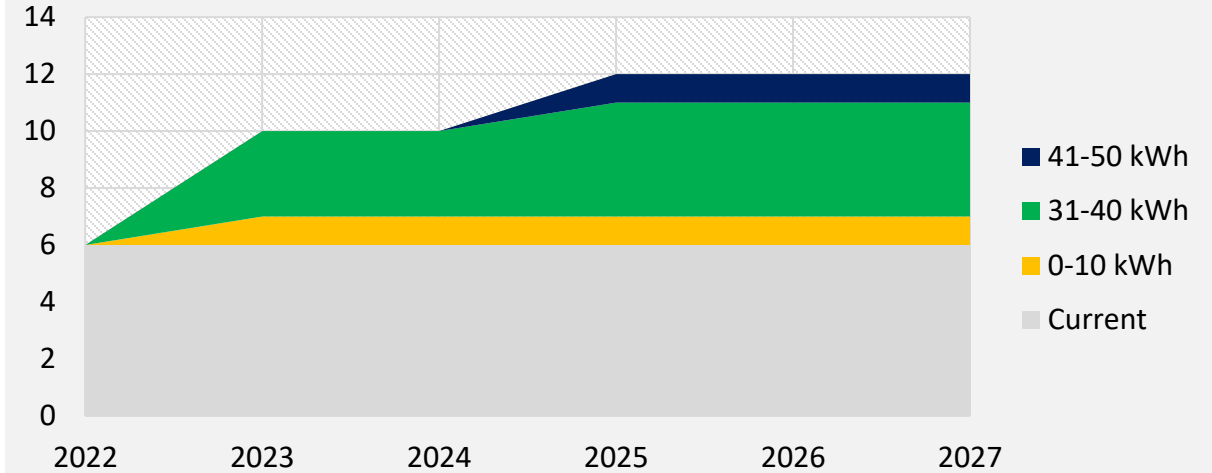
5. Attachments

Forecasted BEV model A segment

A segment high penetration



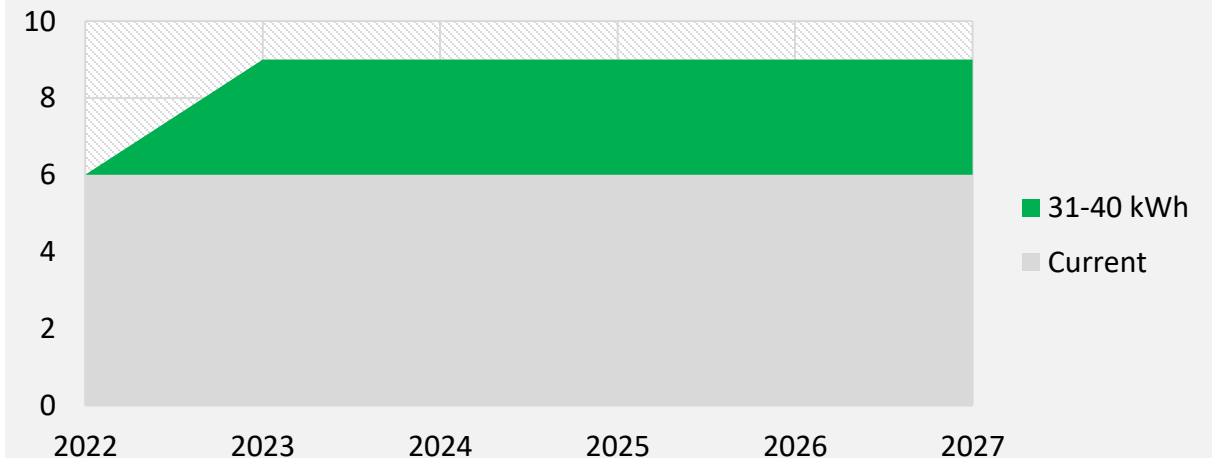
A segment moderate penetration



A segment model availability will increase less than other segments

In 2022, there are 6 A segment BEV models on the market in the Netherlands while in Europe there were 10 models available, based on registration data. Those 4 models that aren't available in the Netherlands don't have a significant impact on the market. Two of them are already discontinued in the Netherlands, one must still be released and the fourth is an exotic model. Over the coming years, the supply will be expanded but not by a lot. A minimum of 3 new models will be released in 2023. The growth of the known model introductions levels off further into the future. As explained on slides 19-20, actual model introductions will not level off but keep on rising. An important note, the entire A segment shrinking, currently, there are only 7 petrol-powered cars in the A segment, *see next slide*.

A segment low penetration



A segment – Available models in the A segment are low for BEVs and petrol cars

Recently registered models	
A segment	
	Dacia Spring
	Fiat 500e
	Renault Twingo
	Smart Forfour
	Smart Fortwo
	VW e-Up!

Not recently registered in NL		
A segment		
	Skoda Citigo-e	<i>Discontinued</i>
	Seat e-Mii	<i>Discontinued</i>
	Ora R1 / Black Cat	<i>Exotic model</i>
	E-Go Life	<i>Upcoming model</i>

BEV models in the A segment are not far behind petrol cars

From the data of Autoweek CarBase (2022), we can see that there are 4 BEV, and 7 ICE models available on the market in the Netherlands. This shows that there are only a few models available in this segment and that this is not specific to BEVs. The A segment is losing value for the car manufacturers.

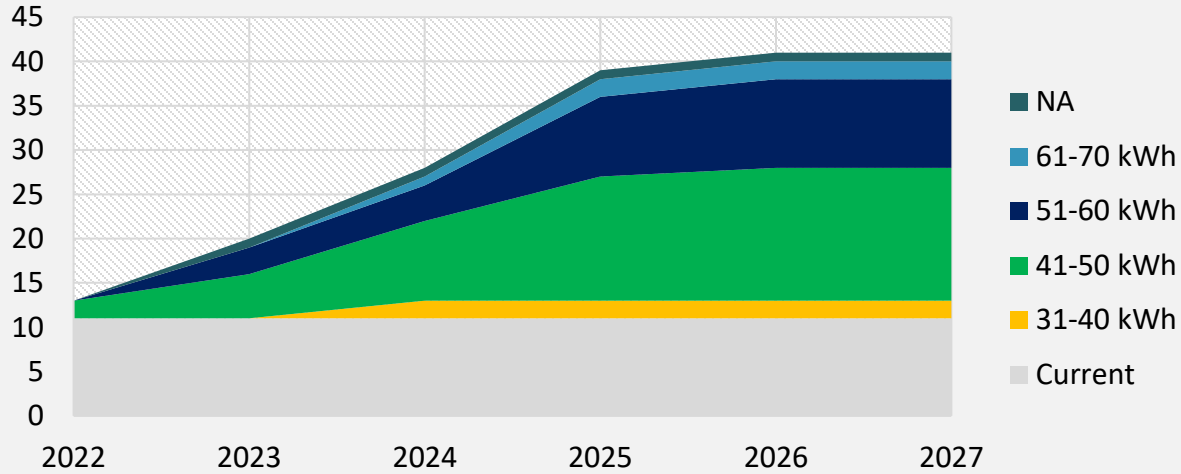
An interesting observation is that the Renault Twingo is still available as BEV, but no longer as an ICE model. This shows that the A segment is no longer interesting for car manufacturers.

Autoweek (A segment)	
Available BEV models	Available ICE models
Fiat 500e	Fiat 500
Renault Twingo Electric	Fiat Panda
Smart Fortwo	Hyundai i10
Dacia Spring	Kia Picanto
	Mitsubishi Space star
	Toyota Aygo X
	Volkswagen Up

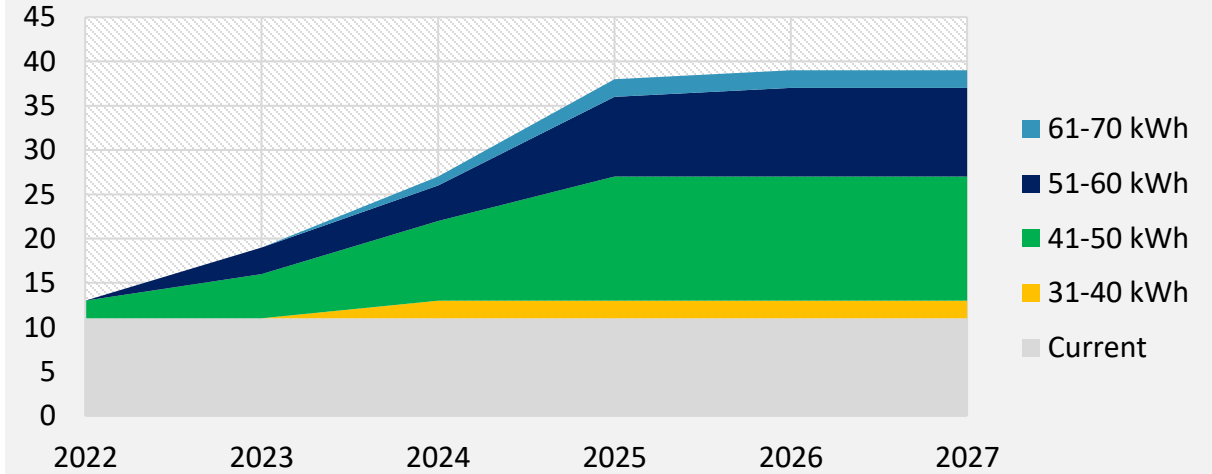
See the method justification slide for explanation on the segmentation

Forecasted BEV model B segment

B segment high penetration



B segment moderate penetration



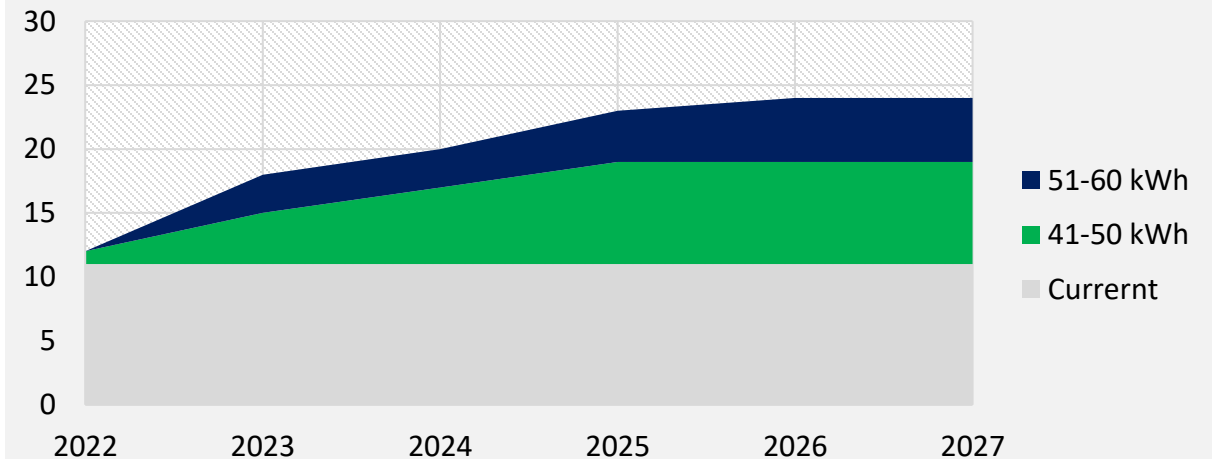
B segment model availability is expected to rise sharply

There are currently 11 B segment BEV models on the market in the Netherlands, based on registration data. Europe wide there are also 11 models available.

The steep growth of the model offering is forecasted in the B segment. The market is estimated to more than triple in the moderate penetration scenario.

More cars in this segment will have between 41 and 60 kWh batteries.

B segment low penetration



Recently registered models

B segment

BMW i3 / EREV

DS-3 Crossback

Honda e

Hyundai Kona

JAC iEV7S

Mini Cooper SE

Opel/Vxh. Corsa-e

Opel/Vxh. Mokka-e

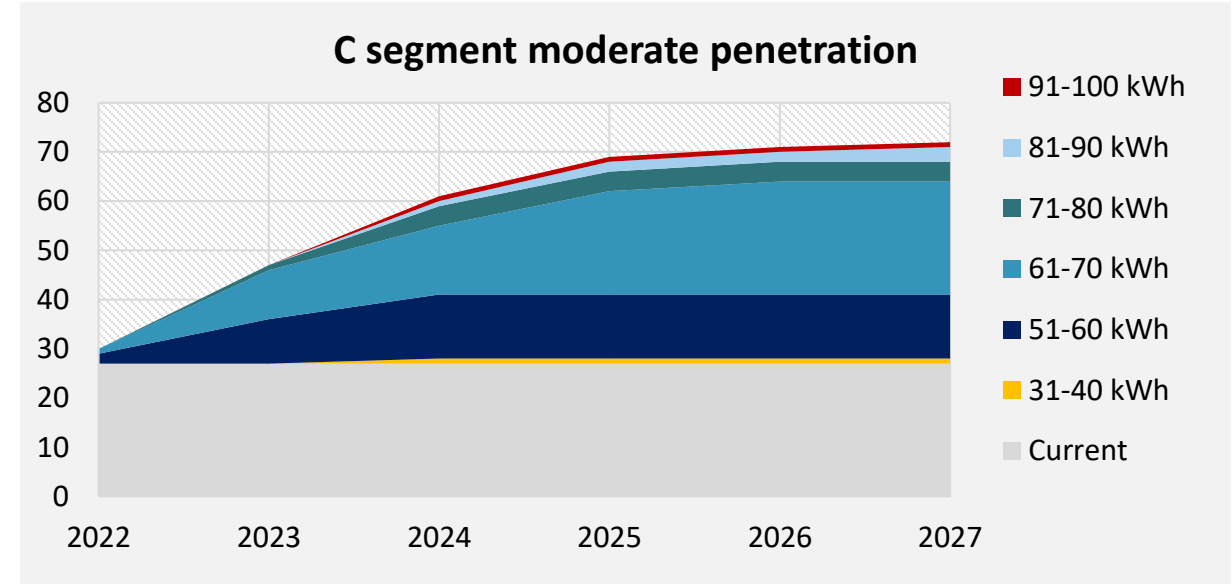
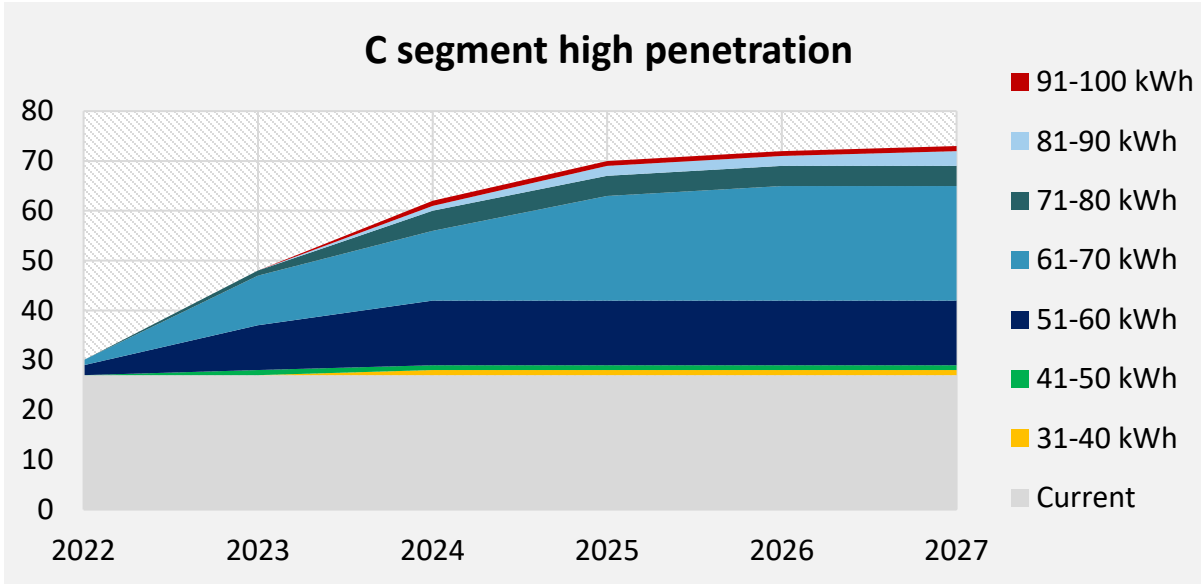
Peugeot e-2008

Peugeot e-208

Renault Zoe

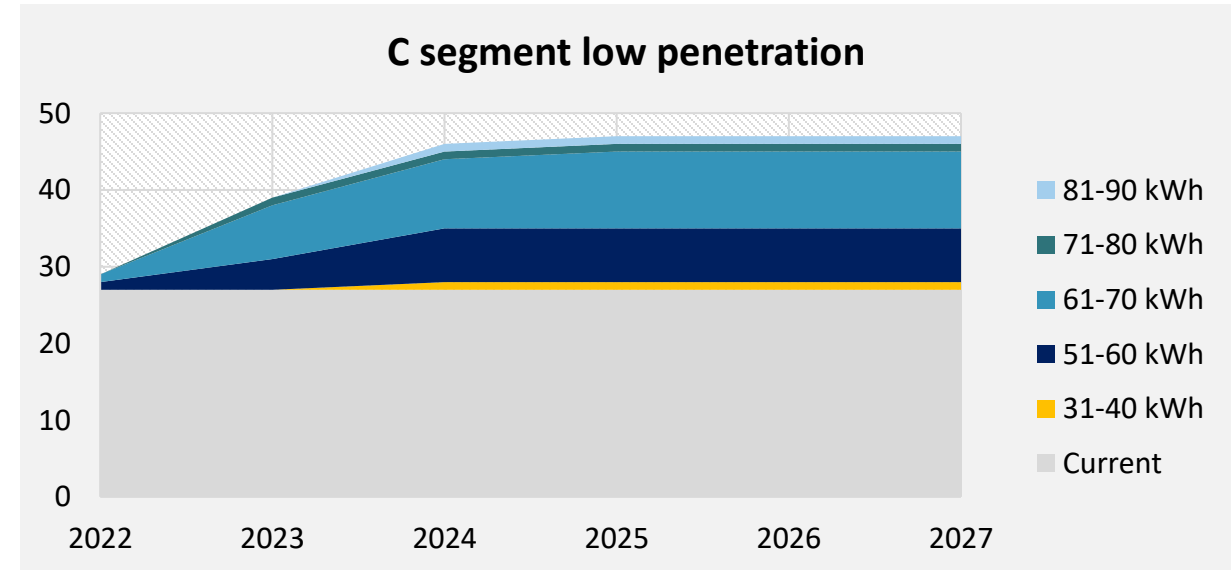
See the method justification slide for explanation on the segmentation

Forecasted BEV model C segment



C segment BEV models are in large supply

There are currently 27 C segment BEV models on the market in the Netherlands and a total of 37 models in Europe, based on registration data. Out of the 10 models that are available in Europe but not in the Netherlands, only 4 of them have considerable sales in 2022. Those models are the MG 4, Xpeng G3, Genesis GV60e, and Ssangyong e-Korando. All of these are still to be released in the Netherlands, they are upcoming models. This shows that there will be enough C segment BEVs available in the Netherlands. Also, no C segment models relevant to the market are being withheld from the Netherlands.



C segment – Only two exotic models not available in the Netherlands

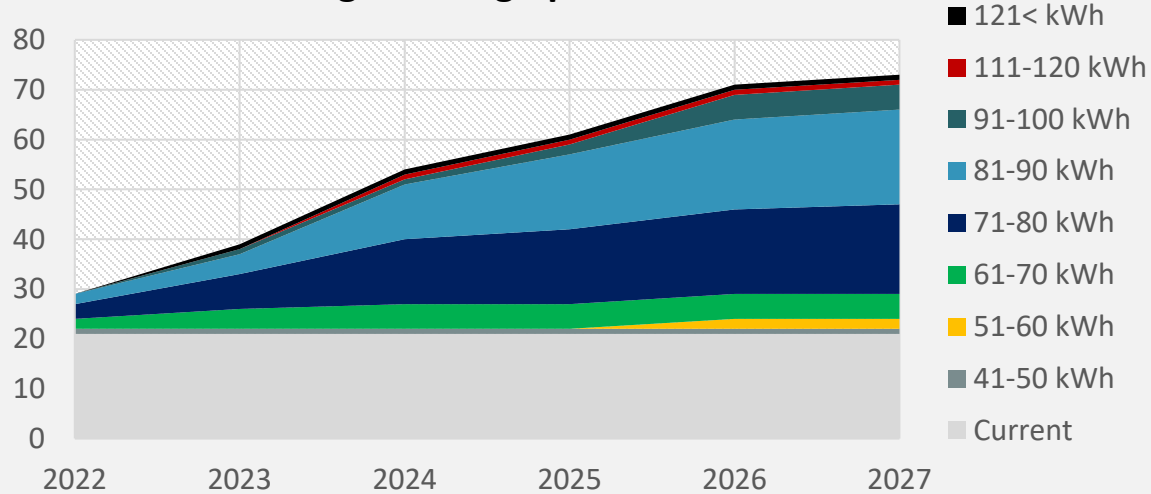
Recently registered models	
C segment	
Audi Q4 e-tron	MG EZS
BYD Yuan Plus	Nissan Leaf
Citroen e-Berlingo Multispace	Opel/Vxh. Combo-e Life
Citroen e-C4	Peugeot e-Rifter
Cupra El-Born	Renault Megane
Hyundai Ioniq Electric	Seres SF3
Kia e-Niro	Skoda Enyaq
Kia e-Soul	Toyota Proace City Verso
Kia Niro	Volvo C40
Lexus UX300e	Volvo XC40
Mazda MX-30	VW ID.3
Mercedes EQA	VW ID.4
Mercedes EQB	VW ID.5
MG 5	

Not recently registered in NL	
C segment	
Geometry-C	<i>Not available / exotic</i>
Mobilize Limo	<i>Not available / exotic</i>
Smart #1	<i>Upcoming model</i>
Nissan e-NV200 Evalia	<i>Discontinued</i>
Ssangyong e-Korando	<i>Upcoming model</i>
Citroen e-C4X	<i>Upcoming model</i>
Xpeng G3	<i>Upcoming model</i>
Genesis GV60e	<i>Upcoming model</i>
Mercedes eCitan Tourer	<i>Upcoming model</i>
MG 4	<i>Upcoming model</i>

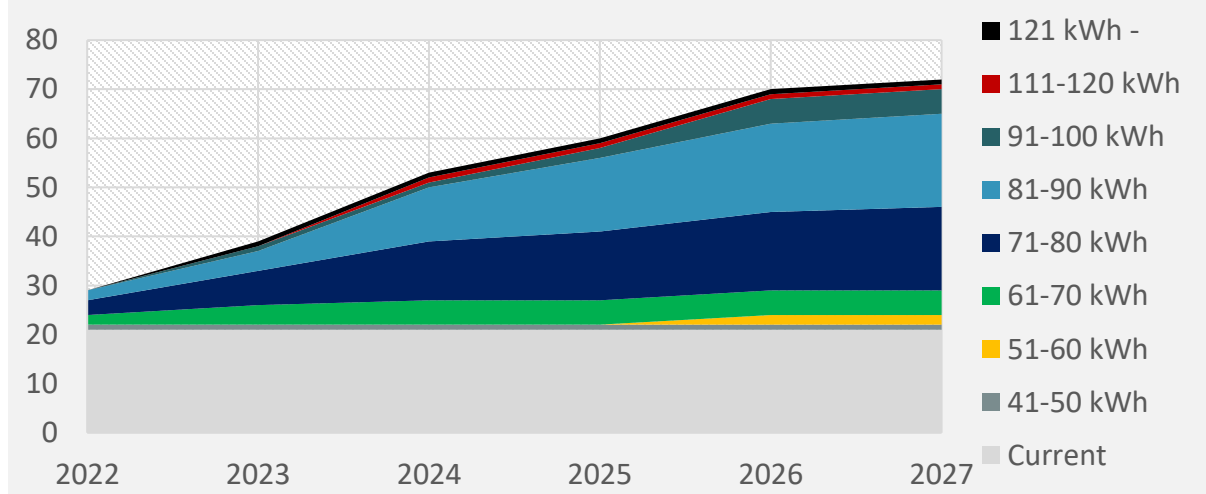
See the method justification slide for explanation on the segmentation

Forecasted BEV model D segment

D segment high penetration



D segment moderate penetration



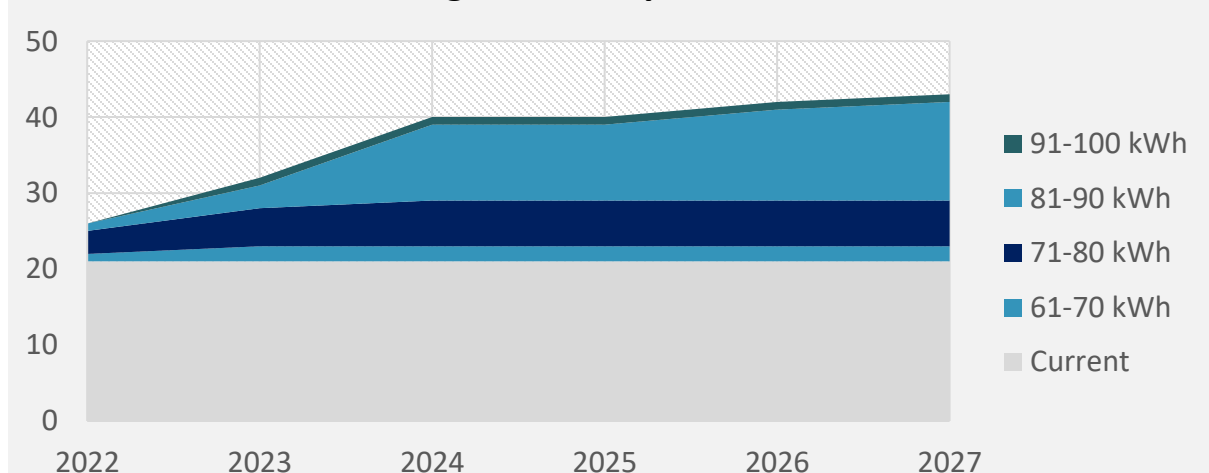
The D segment offers a wide range of BEV models and battery capacity

There are currently 21 D segment BEV models on the market in the Netherlands and 27 in Europe, based on registration data.

4 Out of the 6 models that were not registered in the Netherlands are expected to be available on Dutch market soon. These models are the Genesis GV70, Hyundai Ioniq 6, VW E-Caravelle and the VW ID.BUZZ.

The 71-90 kWh battery capacity is used in most coming models in the D segment.

D segment low penetration



D-segment – All important models that were not registered are still upcoming

Recently registered models	
D segment	
Aiways U5	Nissan Ariya
BMW i4	Opel/Vxh. Zafira-e
BMW iX3	Peugeot e-Traveller
Citroen e-SpaceTourer	Polestar 2
Fiat E-Ulysse	Subaru Solterra
Ford Mustang Mach-E	Tesla Model 3
Hyundai Ioniq 5	Tesla Model Y
Jaguar i-Pace	Toyota BZ4X
Kia EV6	Toyota Proace Verso
Mercedes EQC SUV	Xpeng P5
MG Marvel R	

Not recently registered in NL	
D segment	
Maxus Euniq 6 / D60e	<i>Not available / exotic</i>
Skywell ET5 / Skyworth EV6	<i>Not available / exotic</i>
Genesis GV70	<i>Upcoming model</i>
Hyundai Ioniq 6	<i>Upcoming model</i>
VW e-Caravelle	<i>Upcoming model</i>
VW ID.BUZZ	<i>Upcoming model</i>

See the method justification slide for explanation on the segmentation

E segment – all relevant models are or will be available in the Netherlands

Recently registered models

E segment

Audi e-Tron GT

Audi e-tron Quattro

BMW iX

BYD Han

BYD Tang

Mercedes EQE

Mercedes EQV

Mercedes eVito Tourer

NIO es8

NIO et7

Porsche Taycan

Tesla Model S

Tesla Model X

Xpeng P7

Not recently registered in NL

E segment

Voyah Free

*Upcoming model
(Source: Chinese media)*

Maxus Euniq 5 / EG50

Not available / exotic

Genesis G80

Upcoming model

Ford E-Transit Tourneo

Upcoming model

*See the method justification
slide for explanation on the
segmentation*

Historic and forecasted global BEV sales data

Global BEV market analysis, chapter 1.1

The sales data is provided by EV-Volumes. The historical data is based on actual registrations. The calculation method of the forecasts is an in-house method by EV-Volumes. The EV-Volumes data is reliable since previous forecasts have generally been >95% accurate.

Historic ICE sales in Europe

A & B segment analysis, chapter 1.3

The data partners of this project do not provide the specifics of ICE vehicle sales, only the total market. Open sources from ACEA were used to analyze the ICE market in chapter 1.3.

Forecasted BEV sales data of the Netherlands

European market analysis, chapter 1.2

The data used for the analysis of the Netherlands specifically was provided by EV-Volumes also. However, extra data projections of BEV sales including the BEV mandate that is the subject of this research were provided by the Dutch Ministry for Infrastructure and Water Management. This data was modeled by a contractor of the Ministry, the method of which is unclear to the author.

BEV sales data Europe

This data is only available for BEVs. The source of this data is the European Alternative Fuels Observatory. This data is controlled- and analyzed by the authors themselves. The data supplier for that portal is also EV-Volumes, hence why this is a perfect addition to the global analysis. This dataset is more complete, it includes the exact BEV sales per country. This data set is used to determine the number of BEV models introduced in chapters 1.3 and 2.1.

BEV model introductions per country, chapter 1.3

To determine the number of vehicles available, the actual registrations were analyzed. This is not a perfect method, it can for instance be possible that a car is already available but has not yet been sold and thus not been registered. Since the overall picture is of importance in this report, the first moment of registration has been used as a model introduction.

Model availability through the years, chapter 2.1

When determining the total number of BEVs available per year, only actual registrations are used. This has a similar problem; the actual introduction may vary slightly for specific models but the total number of available models per year is reliable. To determine the currently available models, models that were not registered after May 2022, and are likely discontinued, are excluded. The latest available data point is September 2022.

Segmentation of vehicles, chapter 2.1

Cars are divided into segments based on the length and segmentation by the OEM itself. There are different ways of determining the segment of a car. The measures used in this report are represented in the table on the right. The Dacia Spring, for example, deviates from the table based on the OEM's own segmentation. The length suggests the B segment, but the OEM categorizes it in the A segment.

Segment	Min. length	Max. length
A segment	-	3,6 m
B segment	3,6 m	4,1 m
C segment	4,1 m	4,6 m
D segment	4,6 m	4,8 m
E segment	4,8 m	5,1 m

Battery availability

For this research, publicly available sources were used via desk research. Conclusions were drawn from online reports and papers and compared to one another. Conclusions that had a grounding in more than one relevant report are used in this report.

To have a more elaborate and clearer picture of battery production, further research must be done via a raw material analysis.

Production volumes

There is no data available on future production volumes of BEVs. The forecast was made by using publicly available information combined with market data.

OEMs themselves can estimate the production volumes best, therefore, the goals on BEV sales pledged by the OEMs are used to calculate future BEV production volumes. The current percentage of sales that is BEV of an OEM is assumed to increase to their set goal linearly. This assumption gives a percentage that the OEM in question will produce BEVs for each year. The current sales of that OEM in Europe are multiplied by the percentage of BEV production per year to get the absolute BEV production volumes.

In the calculation, the growth of the total European market is also accounted for.

Project data partners



European
Commission

European Alternative
Fuels Observatory

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