Powering through EV charging continues to grow despite global headwinds

EV Charging Index Edition 3 | 2022



The Roland Berger Center for Smart Mobility

Introduction

The electric vehicle (EV) and EV charging market remain two of the few bright spots in the global automotive industry, according to the third edition of Roland Berger's EV Charging Index. Rising geopolitical tensions, an economic downturn and the war in Ukraine have weighed heavily on the personal vehicle market in recent months. But our findings show EV sales and the development of charging infrastructure have grown in almost all regions.

The third edition of the Index, which looks at the first half of 2022, covers 30 markets, representing more than 93% of global EV sales. It is based on over 15,000 survey responses and in-depth research designed to assess the current state and potential of the EV and EV charging markets. China led the rankings for the third time running. This overview of the results includes the scores of the 30 markets, plus sections on three standout areas.

The first looks at customer perceptions. We find that soaring fuel prices triggered by Russia's invasion of Ukraine have increased overall interest in EVs. But the picture is not black and white – the very high power prices in Europe have seen interest there wane.

The second area focuses on EV sales. While the global picture is positive, with emerging markets such as Southeast Asia driving demand, Europe saw sales and penetration markedly decline.

Finally, we assess the development of charging infrastructure, which appeared more resilient in the face of geopolitical tensions, with the main challenge still in how to meet the fast-growing demand.

Overall scores and rankings: China takes pole position again, Germany in second

The Index scores each of the 30 participant markets based on 27 indicators. Total scores ranged between 16 and 81 points (out of 100), with China again finishing in top place overall. Germany (71) and the Netherlands (69) finished in second and third place respectively, knocking the US (68) out of the top three. Meanwhile, the UK (66) reclaimed its position in the top five.

Final scores:

Overall EV Charging Index results for the 30 focus countries



Source: Roland Berger EV Charging Index

After a drop in the average global score in the second edition of the Index, the strong performance of the fast-developing emerging markets in 2022 has seen the global average rise. The North American region was the best overall performer, followed by Asia Pacific (excluding Southeast Asia) and Europe. The Middle East region recorded the lowest overall score.

Chasing China:

Scores evolution across the three editions of the EV Charging Index



Consumer interest in EVs responded to sky-rocketing fuel prices

The third edition of the EV Charging Index included new survey questions on customer interest in adopting EVs to gauge the effect of the invasion of Ukraine and subsequent fuel price rises. The impact varied across the regions. But overall, it seems consumers are responding to cost and price signals. In Europe, for example, EVs have become more expensive to buy and run, and this has had a strong effect.

Price shock:

The war in Ukraine and rising energy prices have significantly affected interest in EVs [%]





Source: Roland Berger EV Charging Index

1 The survey was conducted in early Oct 2022

Source: Roland Berger EV Charging Index

Changing attitudes

In general, the higher energy costs have enhanced interest in EV adoption. Interest is particularly pronounced in the Asia Pacific (APAC) region, especially in Southeast Asia. But the picture is different in Europe, where responses were far more muted.

At the same time, the economic uncertainty and worries about energy security have shifted consumers' focus to consider EV adoption in a more practical and economic sense. This is especially true for European consumers.

Motivating factors:

Most customers now buy EVs because of their suitability for short journeys [%; results from global respondents]



The reasons behind the purchase of an EV have also changed. For the first time, the suitability of EVs for short-range journeys has become the most important factor, replacing environmental concerns. This is another indicator that consumers are increasingly aware of the cost advantages of EVs. Tax advantages and a superior driving experience were the other main motivating factors.

Perceptions on the acceptable price levels of EVs are also shifting. A large proportion (around 40%) of respondents in all regions think prices should be equivalent to traditional internal combustion engine (ICE) vehicles, a figure very similar to the result in the second half of 2021. But there has been a subtle rise, especially in Europe and North America, in the number of people who believe EVs should be cheaper than ICE-powered vehicles. For example, the figure rose by 7% in the UK and 5% in Belgium, and 1% globally.

Charged up:

Europeans are the most concerned about high public charging fees [%]



When it comes to public charging, what is your opinion of the cost of the electricity?



Source: Roland Berger EV Charging Index

Source: Roland Berger EV Charging Index

As for EV charging, the number of consumers that say cost is a key motivation when choosing a charging service has grown. The 2% global increase (compared to the second half of 2021) is again driven by responses from Europe and North America. Perceptions of public charging fees have also changed. Fewer respondents now believe that charging fees are higher than expected, and should be lowered. European consumers remain the least satisfied.

Impact of higher energy prices

It is clear from the findings that customer perceptions of the EV and EV charging markets vary by region, with particular divergence in Europe. A key factor behind the disparity is the different responses from regional energy markets to Russia's invasion of Ukraine.

Russia is the world's third-largest crude producer and the second-largest producer of natural gas. But it has responded to punitive sanctions by major economies, including the European Union (EU), US, UK and Japan, by limiting energy exports. This has pushed up global energy prices.

Europe is particularly affected as it is highly dependent on Russia for its energy needs, especially natural gas. Russia supplied 40% of the European Union's gas in 2021, with much used to generate electricity.

Energy rush:

Energy prices in major markets rose by unprecedented amounts between December 2021 and June 2022 [%]



1 Europe – the average electricity spot price from Germany, UK, France and Netherlands; China – proxy power purchase price; USA – US city average electricity price; 2 Europe – EU27 weighted average of Euro-super 95 (incl. taxes); China – gasoline price set by NDRC; USA – US city average gasoline price, unleaded regular

Source: EU Oil Bulletin, U.S. Bureau of Labor Statistics, NDRC, China State Grid; desk research, Roland Berger

As a result of the war and other challenges, electricity prices in all major European EV markets, including Germany, France and the Netherlands, soared in the first half of 2022. For example, prices jumped by 103% in the European Union between December 2021 and June 2022. The extremely high electricity prices are making more Europeans question the cost advantages of EVs over ICE vehicles.

Cost impact:

Higher prices and falling penetration rates have hit European interest in EVs [%]

Development of energy prices,¹ EV penetration and interests in driving and owning EV [end of Dec '21 – end of Jun '22]



 Has the invasion of Ukraine changed your interest in driving an EV?² (upper)
Have recent changes in (conventional) energy prices affected your interest in owning or using electric vehicles?² (lower)

				₽→
Much less	Less	No	More	Much more
interested	interested	influence	interested	interested



Source: Roland Berger EV Charging Index

1 Energy prices at the end of Dec 2021 and the end of Jun 2022 are used for comparison; 2 The survey was conducted in early Oct 2022

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Country	EV penetration rate 2022 H1	% change	Electricity price ¹ increase by
Germany	-24.4	-4.9	7 +224
France	-20.3	-1.5	> +185
Netherlands	-31.1	-8.2	> +153
UK	-20.4	3.0	16 ²
USA	~6.5	-0.9	7 +13
China	-24.8	7 +5.0	-4

Source: EU Oil Bulletin; U.S. Bureau of Labor Statistics; NDRC; China State Grid; desk research; Roland Berger 1 Europe – the weekly average electricity spot price; China – proxy power purchase price; USA – US city average electricity price; 2 UK already experienced an energy price increase of ~180% in Dec '21 compared to Jun '21

The effect on electricity prices in the US and China, however, was not the same. In these regions the Ukraine crisis had only a minor or even zero impact on power prices. This helps to explain why the level of interest in EVs in the US and China is significantly higher than in Europe.

Besides the US and China, several other markets across the rest of the world are embracing the trend towards electrification as conventional fuel prices rise. The enthusiasm for the technology in Southeast Asia and the Middle East, especially, suggests that there is significant potential waiting to be unleashed in emerging markets.

EV sales and penetration: Both rose despite industry downturn – but not in Europe

The EV market performance corresponds to the Index's findings on customer perceptions. Energy price rises and a supply chain crunch in the automotive industry combined to hammer global vehicle sales in the first half of 2022. Purchases fell by around 2% compared to the second half of 2021.

Sales boom:

While overall global personal vehicle sales have fallen, EV sales have grown in every region except Europe [change in % of 2022 H1 vs. 2021 H2]



Cutting though:

The APAC region has almost caught up with Europe's falling EV penetration rate [%]

Development of EV penetration rate

Europe is the only region with a declining trend of EV penetration



EV sales

EV sales bucked the trend, growing yet again despite the sluggish overall vehicle market. They grew by 6% globally compared to the second half of 2021, with total sales leaping from 3.8 million vehicles to just over 4 million, though at a considerably slower pace (growth rate from 2021 H1 to 2021 H2 was \sim 55%). The APAC and North American markets remained the main drivers of the growth, while emerging markets such as Southeast Asia and the Middle East recorded exciting jumps in EV sales.

The story is totally different in Europe. Despite overall vehicle sales increasing by 5%, EV sales plummeted by 9%.

EV penetration

The high electricity prices in Europe also hit EV penetration, which fell by 3% since the second half of 2021. Germany and the Netherlands were among the biggest losers, with 5% and 8% falls in penetration rate respectively.

Again, the US and China differed, with EV penetration continuing to improve in those regions, albeit at different paces. Europe was the only region that recorded a declining trend in both EV sales and EV penetration.

Europe has traditionally been the global leader when it comes to EV sales penetration, with major EU governments aggressively promoting the vehicles. But with their cost advantage now eroded, the APAC region is rapidly catching up.

Charging infrastructure: Networks continue to grow but sufficiency still a problem

While global EV sales and penetration growth rates largely held up at the beginning of 2022, the same cannot be said for charging infrastructure. Overall charging development slowed down, with Europe and North America showing particularly sluggish growth compared to the second half of 2021. But the drop was not as large as EV sales, and there were bright spots, with growth in the APAC region, and especially Southeast Asia, recording significant gains. The growth rate in the number of charging points in Southeast Asia leapt by 173%, for example.

Powering up:

The overall growth rate of charging points fell, despite strong growth in APAC markets [%]



²⁰²¹ H2 2022 H1

Source: National Govt./Statistics Bureau, desk research; Roland Berger

Figures for the growth in charging infrastructure alone do not give the full picture, however. Changes in EV-to-public-charger ratios reveal better insights and highlight the difficulties of rapid EV growth. For example, the APAC region (excl. Southeast Asia) led the way, reducing its ratio from 6.7 to 6.5. The growth was mainly driven by China's fast development in public charging infrastructure – about 33% increase compared to the second half of 2021.

But the ratio in Southeast Asia and the Middle East rose dramatically as the development of EV charging infrastructure failed to keep up with skyrocketing EV growth. And while the ratio decreased in Europe, this was largely due to falling EV sales.

Charging down:

The ratio of EVs to public charging points continued its overall downward trend [%]

Development of vehicle-to-public-charging-point ratio



Source: National Govt./Statistics Bureau, desk research; Roland Berger

The Index also revealed that insufficient charging infrastructure is still the biggest concern among all respondents, with 53% choosing it as their key concern. The figure was as high as 70% in Southeast Asia. Other major concerns included high upfront costs (42%), low range and long charging times (both 41%).

The overall decrease in the EV-to-charger ratio also reflects the rapid growth in public charging points around the world. China is again the leader, having installed around 381,000 public charging points in the first half of 2022. France (around 15,800) and the US (around 14,600) are the respective leaders in Europe and North America. The expansion of charging networks is likely a major reason behind the finding that almost 70% of respondents say it has become easier to own or rent an EV in the past year.

Market leaders &

arowth rate

Access all:

Every region except North America showed strong growth in the development of public charging points ['000s of units]

Development of increase in public charging points



Source: National Govt./Statistics Bureau, desk research; Roland Berger

+70%

381

225

China

Market caps of leading public companies in charging business [Jan 2020 – Nov 2022, USD m]



Company	Peak market cap	Current ¹ market cap	% change
— снрт 틒	10,640	3,980) -63
- BLINK	884	447	1 -49
- EVGO	2,057	661	-68
- VLTY	1,620	106	93
- DCFC	1,359	246	N -82
— WBX	2,255	867	N -62
— Allego	4,012	975	9 -76
- PODP	427	111	N -74

Investment trends

Private and public investment is key to the development of charging infrastructure. While venture capital has previously been a strong driver, the picture in the third edition of the Index is more mixed.

Most big players in US and European EV charging services went public in the past two years, and there was a strong wave of market value growth in 2021. However, most of these companies have seen their value fluctuate since the second half of 2021, with a further down round of market capitalization in 2022.

This is partially due to worsening economic fundamentals, as well as the slowing penetration of EVs in many markets. To shore up the bottom line, some players already reduced their workforce and made significant cuts in general and administrative expenses. Meanwhile, pressure on unsustainable business models (burning money) is raising more market concerns.

Despite this, the fundraising activities of private companies in the EV charging space are growing, indicating that the market is still attractive in 2022. While funding of many top-performing startups in "Champion" markets such as Germany and China fell sharply, we witnessed growing investments in countries like India and Portugal. As the impacts of geopolitical tensions cast a shadow over more mature markets, opportunities are expected to mushroom in emerging markets.

Source: Yahoo finance; Roland Berger

1 Current market cap as of Nov 21, 2022

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