



Opportunities and concerns of today's EV charging industry

What you can learn from our latest
research and how to act on it

November 2021

The new index for EV charging intelligence

Roland Berger observed enthusiastic EV growth last year

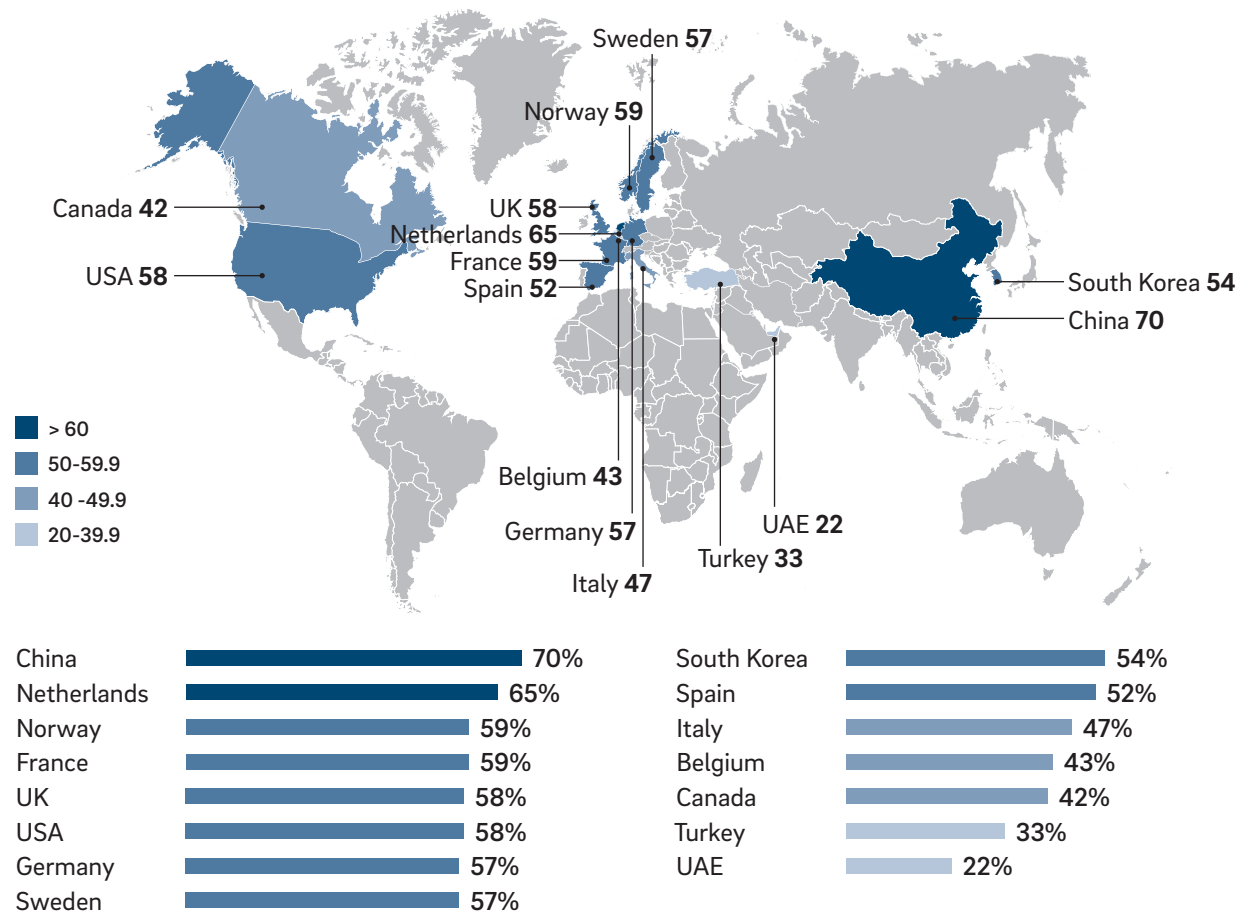
Roland Berger conducted our inaugural "EV Charging Index" to support OEM decision-makers, charging station operators, and utility companies in the electric vehicle industry. After conducting interviews with over 5,000 car owners in 15 major markets, dozens of leading experts in those same countries, and researching the latest industry data and analysis, our Index identified the leading markets, key trends, and what to expect from the EV charging industry within the next 5-10 years.

In reviewing the data, several things stand out. First, half of all internal combustion car owners are considering the future purchase of an electric vehicle. Second, over 70% of EV car owners are "satisfied" with their current charging experience, especially in America and Turkey. Third, while early-adopters have typically charged at home, the countries with high EV penetration are now seeing growth in public charging. Fourth, the following markets are leading the EV charging industry:

THE 15 FOCUS COUNTRIES' TOTAL SCORES RANGE BETWEEN 22 AND 70 OUT OF 100

China, NL and USA are the top scoring countries

EV Charging Index scoring results [total 100 points through 20 indicators]



Source: Roland Berger EV Charging Index

"Insufficient infrastructure" and "long charging times" are leading concerns

Considerable charging investments are required to keep with demand

Despite EV's enthusiastic early adoption and worldwide growth, "insufficient infrastructure" and "long charging times" were the leading concerns for EV owners. In our survey, more than 50% of respondents across the world cited insufficient charging stations as the biggest concern with owning an EV. Additionally, the lack of fast charging stations was another concern. The Netherlands, for example, boasts a strong public charging network of 82k chargers, but only has 3k fast chargers (still better than some countries but not enough to satiate EV owners).

These two concerns will only grow as the electric vehicle industry continues its upward trajectory. Thus, to meet the rapid adoption and penetration of EV sales, considerable investments in charging infrastructure are required.

INSUFFICIENT INFRASTRUCTURE AND LONG CHARGING TIME ARE THE MAJOR CONCERNS

Causes for concern among EV owners

Based on your overall charging experience, which of the following are sources of dissatisfaction with your charging experience? (Multiple selection)

	Public charging infrastructure not sufficient	Charging time too long/Unstable charging speed	Charging point not fitted for all EV models	Charging point broken	I don't have a home charger	Others
Global	54%	57%	32%	16%	10%	1%
Belgium	56%	54%	42%	15%	1%	0%
Canada	66%	50%	24%	3%	4%	1%
China	69%	61%	37%	25%	19%	0%
France	52%	56%	29%	18%	12%	1%
Germany	57%	60%	45%	24%	9%	1%
Italy	48%	58%	29%	23%	11%	0%
Netherlands	40%	50%	25%	11%	11%	4%
Norway	41%	52%	30%	10%	6%	4%
South Korea	42%	65%	36%	18%	6%	0%
Spain	59%	55%	30%	11%	13%	0%
Sweden	47%	56%	32%	13%	6%	1%
Turkey	58%	45%	32%	7%	7%	6%
UAE	51%	64%	34%	17%	5%	0%
UK	55%	52%	22%	12%	9%	1%
USA	60%	54%	28%	14%	8%	2%

Source: RB online survey September 2021 (5,225 participants)

Government must develop public charging stations

Early indications suggests targets are feasible

The installation of EV charging infrastructure is expected to be heavily subsidized (partially or fully) by governments across the world. Most countries have set ambitious targets in terms of the number of chargers they plan to install by 2030. For example, France, Germany, and others announced separate budget allocations towards charging infrastructure development.

In Europe alone, we expect infrastructure investments of over Euro 10 billion to meet the forecasted demand. Given the current market cap and balance sheets of publicly traded EV charging companies, however, this amount seems feasible. What's more, leading governments such as the US have committed to building over half a million chargers by 2030.

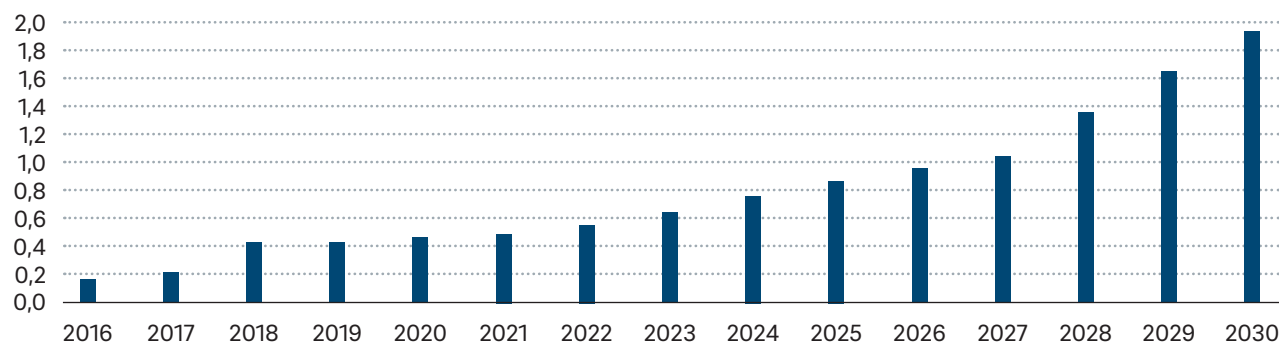
INFRASTRUCTURE MARKET DRIVEN BY xEV PUSH, LONGER RANGE AND SUBSIDIES

Charging infrastructure market development

Trends on charging infrastructure

	Trend	Description	Impact on Charging Point Operators
1	Strong push for xEVs	Especially driven by regulation significant increase of electric powertrain for passenger and commercial vehicles expected	↑ Raising demand for charging stations
2	Increase of average battery capacity	Shift in vehicle segments with pipeline impact on average battery capacity and increased range	↗ Better use case for high power charging
3	Public investment program in charging infrastructure	Public financing programs reduce CAPEX need for selling infrastructure	↗ Especially beneficial for CAPEX intense high power charging
4	Increasing competition	- Market actors from energy sector and oil industry intensify own activities - In general, fragmented market structure with local monopolistic structures in Europe, especially in Germany	↘ Margin pressure expected

Annual investment in public charging infrastructure (EUR Bn)



Source: Desk research, Transport & Environment, Roland Berger

Private investments in charging also doubled last year

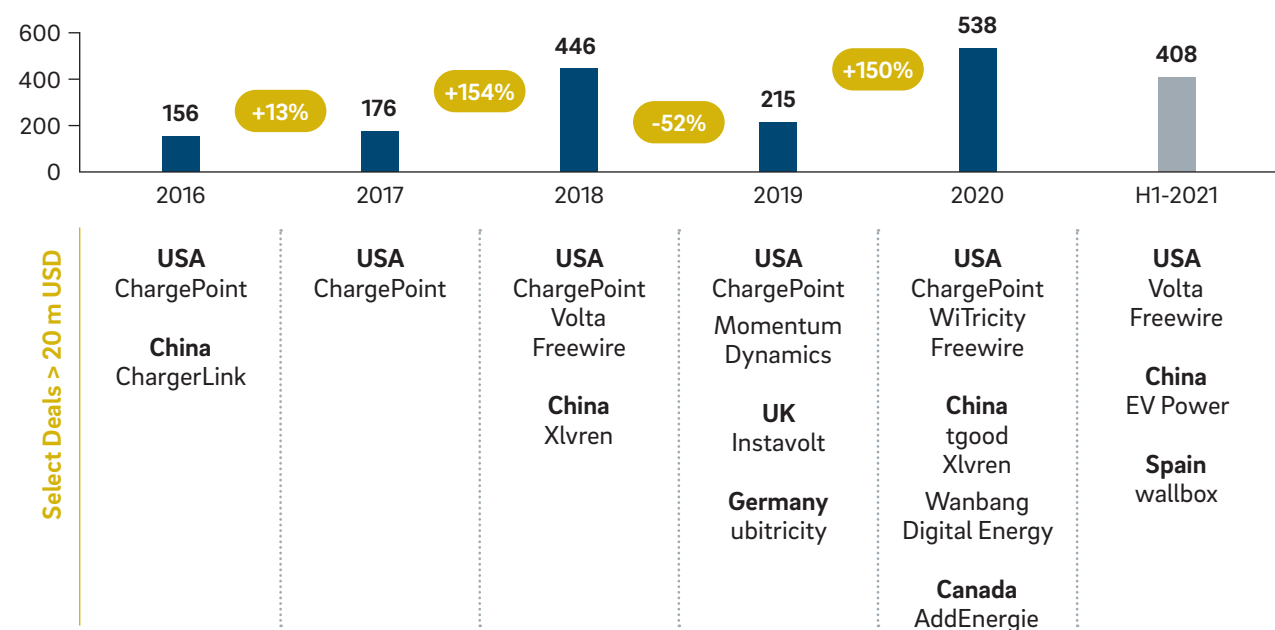
Charging networks are seen as a highly valuable supply-side business

Investment in charging station startups increased by over 150% in 2020, according to our research. This year is expected to achieve similar growth. Private companies such as AddEnergie, Electrify America, Gridserve, Ionity, and Freewire have secured significant funding. What's more, a portion of Tesla's trillion dollar valuation can be attributed to its vast global charging network, which operates over 25,000 superchargers.

VC INVESTMENTS IN CHARGING SOLUTIONS ARE TICKING UP

US startups are still a bulk of the fundraising

Venture capital invest, 2016 - H1-21 [USD m¹⁾]



¹⁾ Analysis on disclosed amounts

Together we can do this

EV charging infrastructure will become global within 10 years

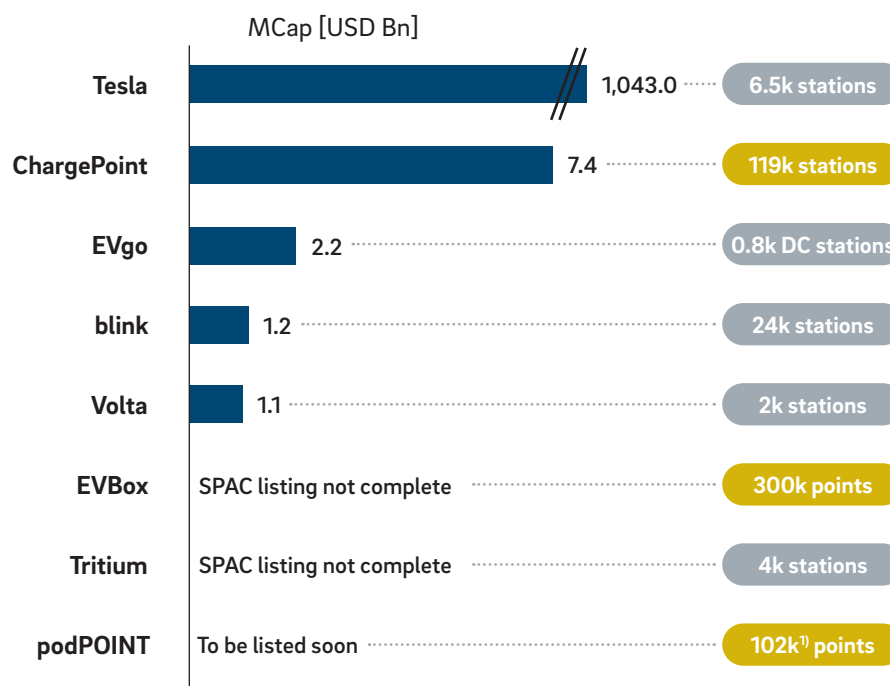
Since 2020, most key auto markets have doubled their EV sales penetration. Private investment has similarly doubled over the last two years. The majority of the capitalization is coming from public market listings. While ChargePoint has been the largest, several other newly public charging companies have also secured billion-dollar valuations. More are in process.

With strong demand and rapid EV adoption creating state-sponsored subsidies and considerable private investment, EV charging is truly poised to become ubiquitous across the globe within the next decade.

While current government policies are trending in the right direction to meet this demand, the deal is not yet done. EV concerns understandably remain. Thus, to support and sustain the rapid adoption of EV, charging infrastructure (either through plug or swapping) must be developed and supported by both private and public investment.

TESLA MARKET CAP SURGING, YET MUCH LOWER FOR CHARGING INFRASTRUCTURE BUSINESSES

Market cap of selected charging infrastructure providers



¹⁾ Manufactured and sold 102k private charging points across the UK and Norway. Public network consists of 5,200+ charging bays

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We welcome your questions, comments and suggestions

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