Focus

Roland Berger

EV charging: What will it take to win?
Successful business models for
a complex market

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Successful business models for a complex market

The European electric vehicle (EV) market is booming and sales are expected to continue to accelerate in the next decade. Growth is being driven by the European Union's ban on the sale of new internal combustion engine vehicles from 2035 and by increasing cost competitiveness of EVs vs. conventional vehicles.

The EV charging market is flourishing as a result, but in a rather unstructured way. It is a complex market, directly influenced by the unpredictable behaviors of EV drivers. Today, charging providers outdo each other in ingenuity to adapt to these behaviors.

No winning company has yet emerged. Competitors are testing different use cases, both public and private: charging at home, en route, at a destination, at the workplace, etc. with a large variety of relevant business models and strategies.

But the time to scale is now. We believe that four races are taking place at the same time. Winners will emerge in each of the four market segments obtained by combining two dimensions: CAPEX risk level (asset light or asset heavy) and charging speed (rapid/slow). This study details the criteria to win in each of these market segments.

Winners will be the companies who make the right moves within the next two to three years and raise the necessary CAPEX to deploy their network fast and smart. Not all market segments will develop at the same speed, but they will remain relevant as long as they meet the needs of EV owners.

We expect market consolidation from 2025. This will likely result in three types of players becoming central: pure players (first movers solely focused on EV charging); players owned by utilities/energy distributors (big spenders with significant knowledge/experience of power markets); and automobile OEMs (well-resourced players with a strong connection to the product).

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Cover photo fanjianhua/Gettyimages

1 / **All systems go**

THE EUROPEAN EV MARKET IS BOOMING – THERE'S JUST ONE THING MISSING

The European electric vehicle (EV) market[1] has come of age in the past few years. Sales have boomed from almost zero to EVs now making up around 2% of cars in the European fleet (EU 27, UK, Norway). By 2030 this figure is expected to jump to 18% and by 2050 to 95%, signaling the almost total elimination of the internal combustion engine (ICE) in light vehicles.

There is every likelihood that these projections will come true, as the key prerequisites are already in place. On the **regulatory** front, European, national and local authorities are pushing hard to enhance EV adoption. For instance, the European Union (EU) has set OEMs CO_2 emissions targets for 2030 that are 38% lower than in 2021. EVs will be crucial to achieving these. In addition, EU members have pledged to ban the sale of new ICE cars from 2035.

OEMs are also playing their part. **Manufacturers** are now fully focused on the shift away from ICE vehicles and are working towards improving the EV driver experience. This includes offering a larger and improved product range. The plans are to double the number of battery EV models in the next five years to increase choice for consumers. Technological innovations will also ensure increased production efficiencies and reductions in battery costs.

R&D successes at OEMs will be enhanced by wider **technological developments,** with many major technical obstacles to EV adoption now being addressed. For example, battery capacity has increased, ensuring longer ranges; security and fire risks have been minimized; grid operators are better able to balance power supply and demand; and the hardware and software used to operate charging stations are maturing.

Finally, EVs are becoming more affordable. Falling **total cost of ownership** and governmental incentives, such as **subsidies** and tax deductions, are making EVs affordable to an ever-increasing share of the population.

These developments have now pushed Europe past the tipping point for EV sales. Today, registrations of EVs are equaling or outpacing registrations of ICE vehicles in some EU countries, with the Nordic countries leading the race to electrification → A

From now on, EV uptake is expected to accelerate sharply across Europe. The EV light vehicle fleet will grow by an average of 34% a year from 4.4 million units in 2022 to 45.5 million in 2030. → B

THE CHARGING CHALLENGE

So it seems that the road ahead for EVs is sunny and wide open. There's just one problem – are there enough chargers to support the booming EV market?

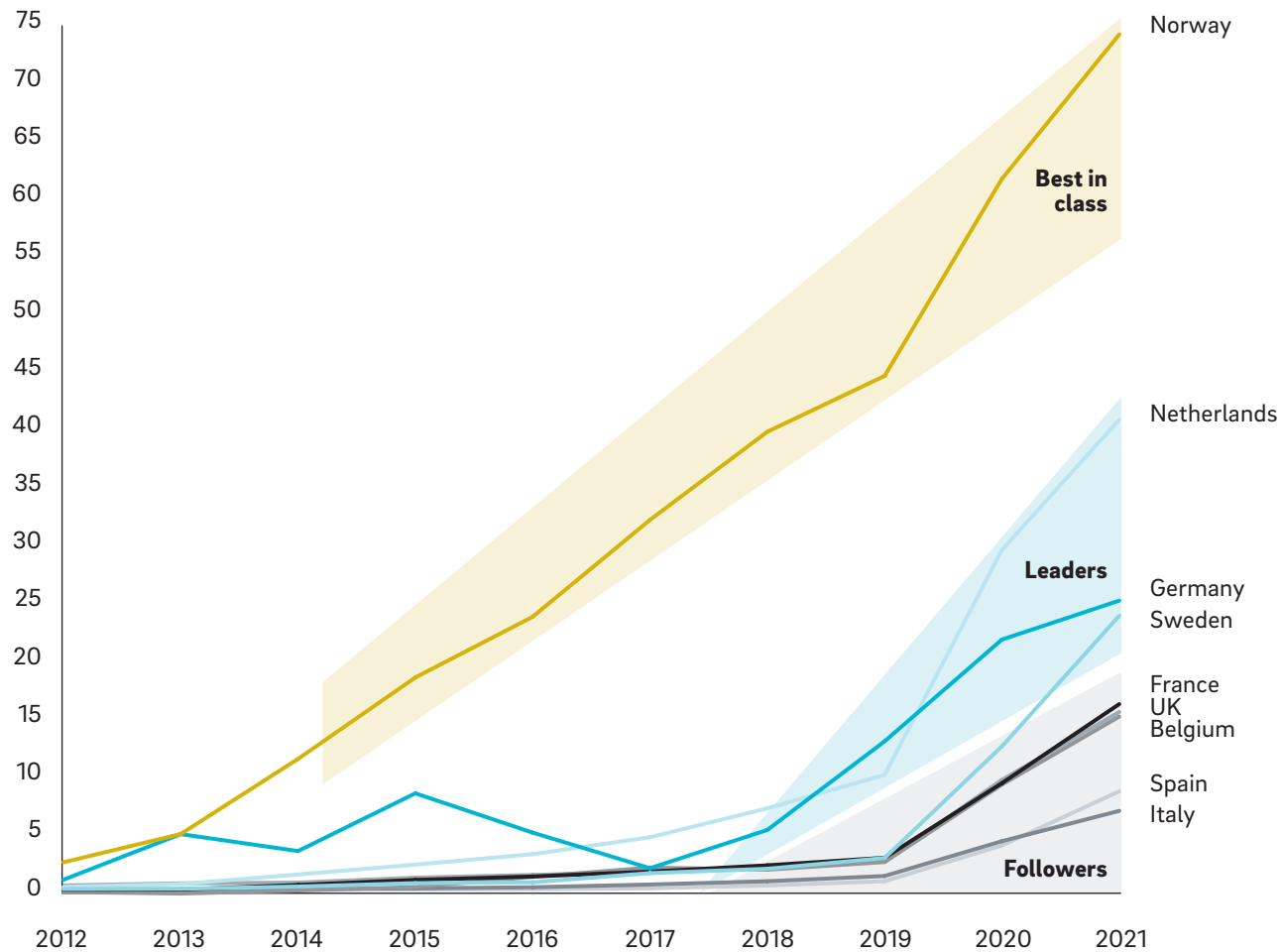
All prerequisites are already in place for a booming charging market: on the regulatory front, technology wise and even looking at the economic equation.

[1] This report considers only the European battery electric vehicle market

A: Leading the charge

The Nordic countries are well ahead in the number of electric car sales per year

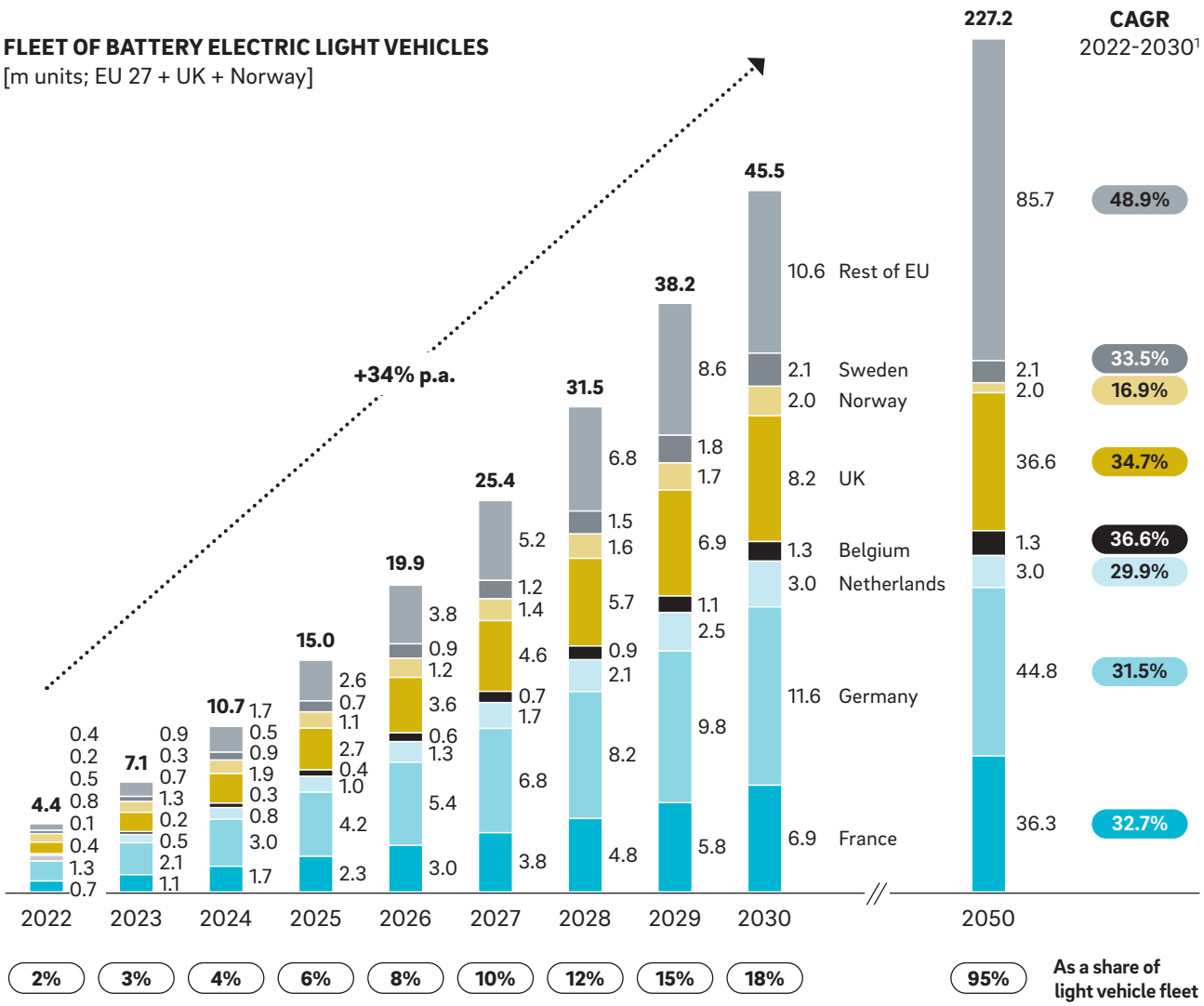
ELECTRIC CAR SALES VS. TOTAL CAR SALES [%]



Source: EV-Volumes, IHS

B: Fleets ahead

The European light EV fleet should grow by 34% per year until 2030, reaching 45 million vehicles



1 As of December 31

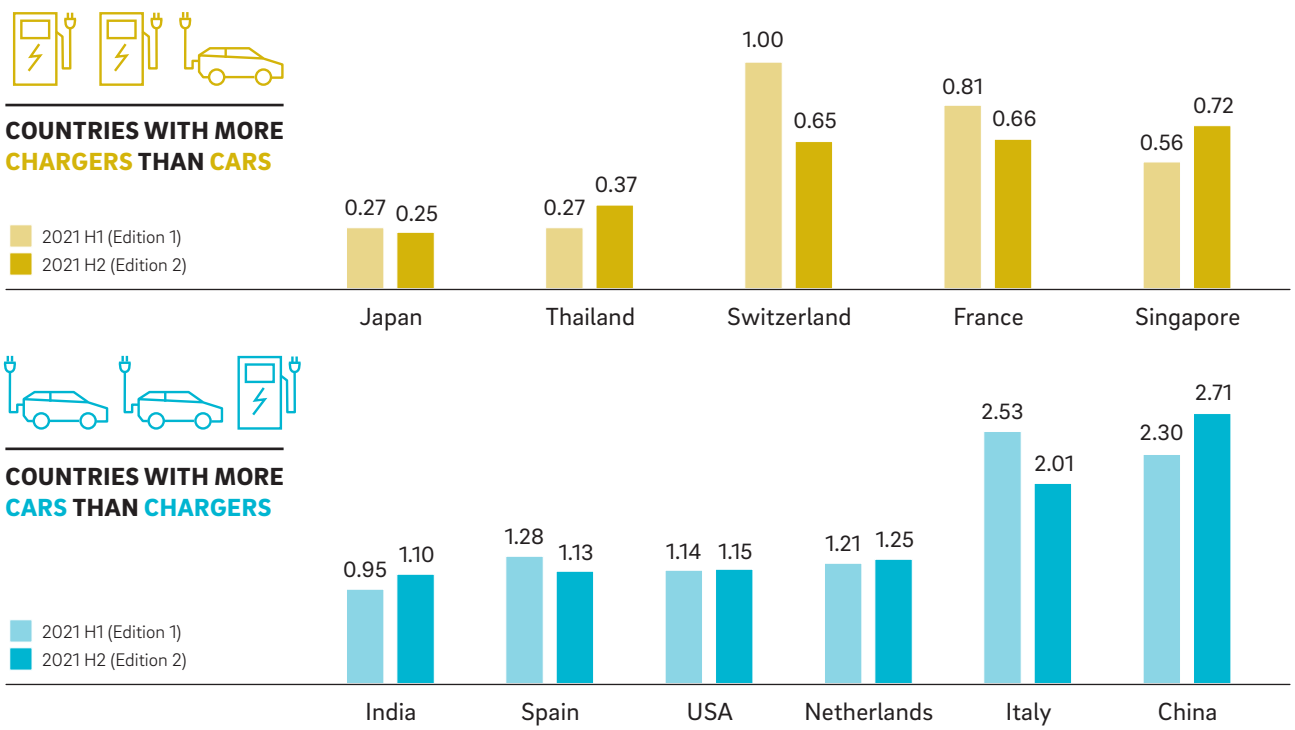
Source: Roland Berger market model, IHS

Charging infrastructure has long been a headache for EV owners and producers. But the situation is now vastly improved compared to just a few years ago. For example, EV range has now reached satisfactory levels for most short-distance users, with the average range expected to grow from 336 km in 2019 to 380 km in 2025 and 440 km in 2030 (OEMs are likely to focus on lowering battery costs rather than increasing ranges in the long term).

However, so-called "range anxiety" has made insufficient charging infrastructure the number one concern among EV owners and ICE car owners considering buying an EV. They fear being unable to charge their cars on certain routes, or having to wait a long time to do so. The only way to mitigate these concerns is to build a widespread charging infrastructure. → C

C: Charging up

In most major markets, the ratio of number of EV cars to number of charging points fell during 2021, according to the RB EV Charging Index



Source: National Govt./Statistics Bureau, secondary research, Roland Berger EV Charging Index

2 / **Charging ahead**

THE EV CHARGING MARKET IS READY TO SCALE

The EV charging market began life in the 2010s. Its first phase of development was characterized by test-and-learn strategies, carried out mainly by a group of specialized startups. Early European movers included Freshmile (2010), GreenFlux (2011), Fastned (2012), EnBW (2013) and Allego (2013). More recently, large oil and gas players, utilities and automotive groups have entered the EV charging space, with numerous initiatives and variable success. Shell, for instance, launched Shell Recharge in 2017 to offer rapid on-the-go charging, while in 2019 TotalEnergies launched EV Charge, its new international brand dedicated to electric mobility. It was developed by G2 Mobility, a French EV charging company acquired by TotalEnergies in 2018.

Players have tended to cluster around one of four use cases: Enroute specialists, for example, with charging at service stations (such as Fastned, IONITY); destination (restaurants, malls, hotels, etc.) and on-street specialists (such as Allego, Electra); private specialists, typically offering residential and workplace charging (ZePlug, ZeBorne); and generalists (Shell Recharge, Izivia).

This first phase of trial-and-error development is now over. We see strong signs that the market is becoming mature. Startups have grown up, and record funding rounds have been announced. We see IONITY's EUR 700 million fundraising in 2021 as a notable milestone and an early signal to all subsequent investors.

Most of the main charge point operators (CPOs) have now set their strategies and chosen their position in the EV market. The ambition now is to scale and expand faster than competitors, as securing prime public charging locations or having a big enough network with economies of scale is crucial to achieving high IRR.

Fortunately, the market environment is highly favorable for EV charging players to scale:

Strong demand: With the European EV fleet already quite large and growing by 34% a year, EV charging companies can bet on strong demand in the near future. Utilization rates of the best public charging points are soaring too, with high power chargers (HPCs) at airports recording rates of more than 40%, for example. → D

Technological readiness: Charging firms already have in place the necessary CPO/MSP software and interfaces, as well as proven communication protocols. For example, Allego claimed during its IPO that its proprietary Allamo technology allows the company to select prime charging sites to add to its network. It does this by analyzing traffic statistics and proprietary databases to forecast EV charging demand using more than 100 metrics, including local EV density, driving behavior and EV technology development.

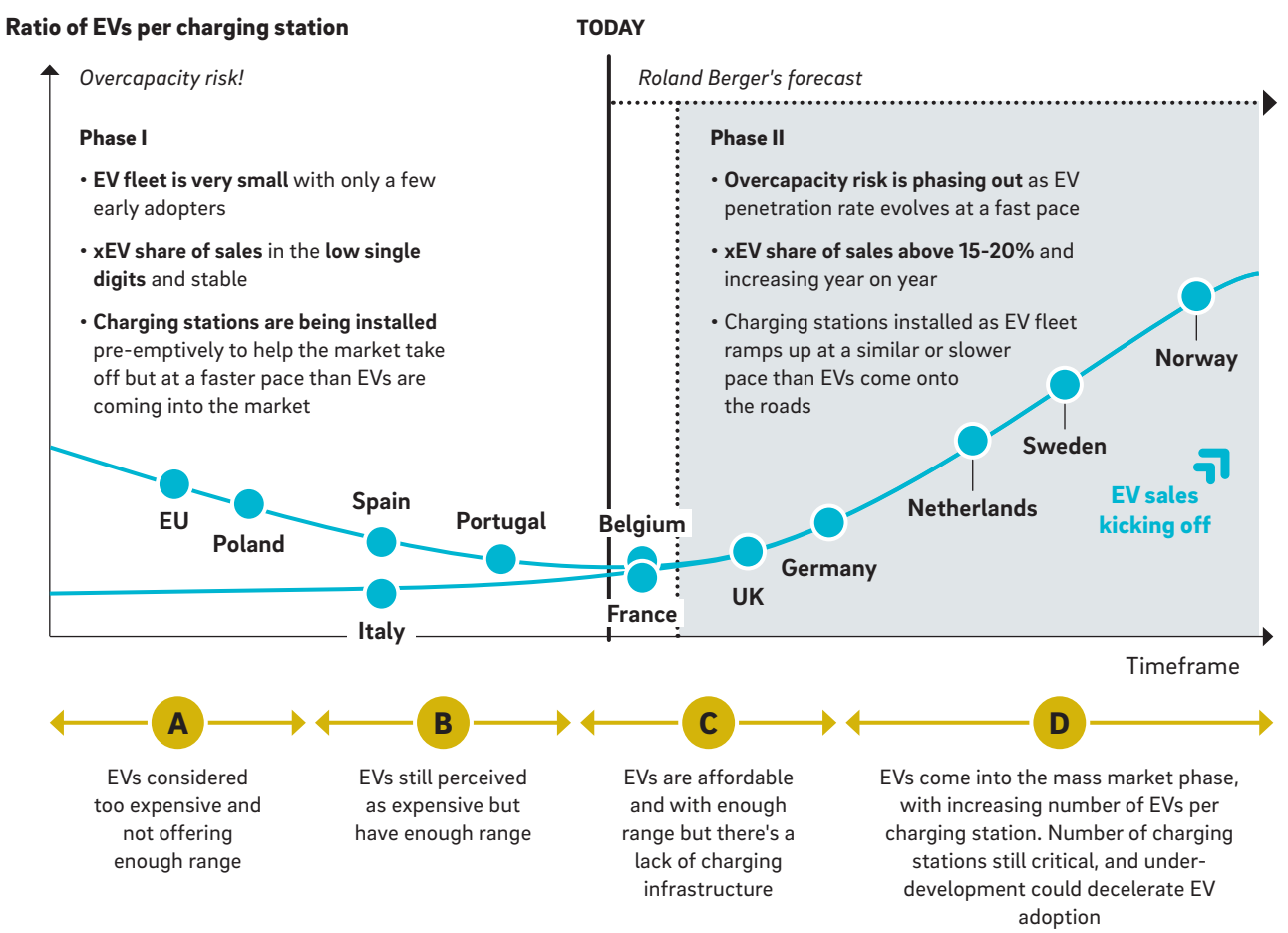
Partnership opportunities: These are threefold. First, collaborations to develop business and charging revenue generate for example, partnerships with retailers for players specializing in destination charging, or with rent/leasing and VTC players for CPOs targeting the workplace segment. Second, service partnerships to secure necessary hardware and software from OEMs and IT firms, locations from real estate developers and energy supplies from utilities, as well as good installation and maintenance contracts. Third, targeted geographical partnerships. Two categories of CPO have emerged here – local champions (EnBW and Eneco in the Netherlands, Osprey in the UK, Freshmile in France, etc.) and pan-European scale-ups (Allego, Fastned, etc.)

In such conditions, it's no surprise that both public and private investors view the market as ripe for the picking. EV charging players have recently raised huge capital amounts, whether in equity or debt, to ramp up their network. In addition to the IONITY deal, other notable capital injections include EVgo (USD 575 million, 2021), NW Groupe (EUR 300 million, 2022), Allego (USD 160

million, 2022), Electra (EUR 160 million, 2022), Fastned (EUR 150 million, 2021) and PowerDot (EUR 150 million, 2022). NW Groupe and Allego have even achieved unicorn status, with valuations of more than USD 1 billion. More big fundraising announcements are expected in the next few months, according to EV market insiders.

D: Turning point

The ratio of EVs per charging station is now moving away from the overcapacity risk phase as penetration increases in most countries



Source: Roland Berger

3 / **Winning models**

THE FOUR MARKET SEGMENTS – AND THE FOUR WAYS TO SUCCEED

As the EV charging market grows, we see four segments emerging. These can be plotted along two different axes: CAPEX risk levels (asset light and asset heavy) and charging speed (slow charging and rapid charging).

CAPEX RISK LEVELS

Capital costs are high in EV charging. The installation of an HPC, for example, costs between EUR 50,000 and EUR 100,000. So, who will bear the risk and inject the high amounts of capital needed to roll out an EV charging network? There are two distinct profiles from a CPO perspective:

Asset light: Players following this model provide charging-related services, for example permitting, EPC, sourcing, location selection, maintenance and operation. They need to have a large enough backlog to avoid having unoccupied FTEs, while ensuring a big enough workforce to guarantee client-acceptable lead times. Additionally, they need to find an alternative business when charger installations slow down.

Asset heavy: Under this model, players invest CAPEX directly and equipment remains at least partially proprietary. They assume the high risk of empty stations while supporting the CAPEX, but once installed, annuity-like revenues and very limited fixed costs generate high margins.

CHARGING SPEED

Charging speeds are most often associated with the targeted use case:

AC charging – Slow (3-11 kW) or fast (22 kW): This is mostly used for residential and workplace charging. Typically, EV drivers use it to charge their car over a period of several hours in the evening at their home, or during the day at work.

Four races are taking place at the same time. Winners will emerge in each of the four market segments obtained by combining combining two dimensions: CAPEX risk level and charging speed.

DC charging – Rapid (50-100 kW) and HPC (>150 kW): Destination charging is the most common use case for rapid and HPC chargers, along with enroute charging, for example at service stations.

BUSINESS MODELS

Mixing and matching the axis enables us to define four market segments and the winning criteria for each. Understanding what it takes to win in each position is critical, whether you are an investor looking for the perfect target or a CPO looking to raise funds to support rapid development.

1 Asset heavy/rapid and HPC charging

- **Location quality:** Choosing the right locations for rapid chargers can drive utilization rates strongly. Installations therefore need to be either close to highly utilized roads/highways or at sites where customers tend to stay for only 15-20 minutes. All players seem to have developed internal tools to select locations based on potential IRR – early market movers can benefit by securing the most attractive locations
- **Access to capital:** A CPO's ability to scale in this market position is driven by its ability to raise CAPEX, for example, because of the high cost of installing an HPC charger
- **High-quality hardware:** Long-term returns depend on the quality of infrastructure. EV charging players therefore need to have high-quality hardware, developed either internally or sourced from trustworthy OEM partners

2 Asset light/rapid and HPC charging (>50 kW)

- **Partnerships and commercial reach**: CPOs need to establish strong commercial relationships to install and operate chargers at the most attractive locations, namely highly frequented destinations like malls, restaurants and service stations. This is particularly crucial at luxury destinations, for example hotels, resorts and wellness centers, that may be willing to install chargers in their car parks
- **High-quality services**: Asset-light firms generate a significant part of their revenues from operations and maintenance. As such, they need to provide high-quality services, whether internally or through reliable partners
- **High customization**: Technological flexibility and customization are key to adapt to end customer needs

3 Asset heavy/AC slow or fast charging (<22 kW)

- **Niche market:** This is a limited market position, so players need to identify the right niche
- **Commercial forces adapted to targeted customer base:** In a relatively small and niche market, it is crucial to be able to target shared ownership and commercial partners such as hotels, etc.
- **Access to capital to deploy chargers at scale**
- **Highly customized offer, adapted to the targeted niche**
- **Ability to fuel growth with long-term revenues** (beyond charging): Traffic, advertising, smart city offering, etc.
- **Costs under control to last** until the company achieves scale

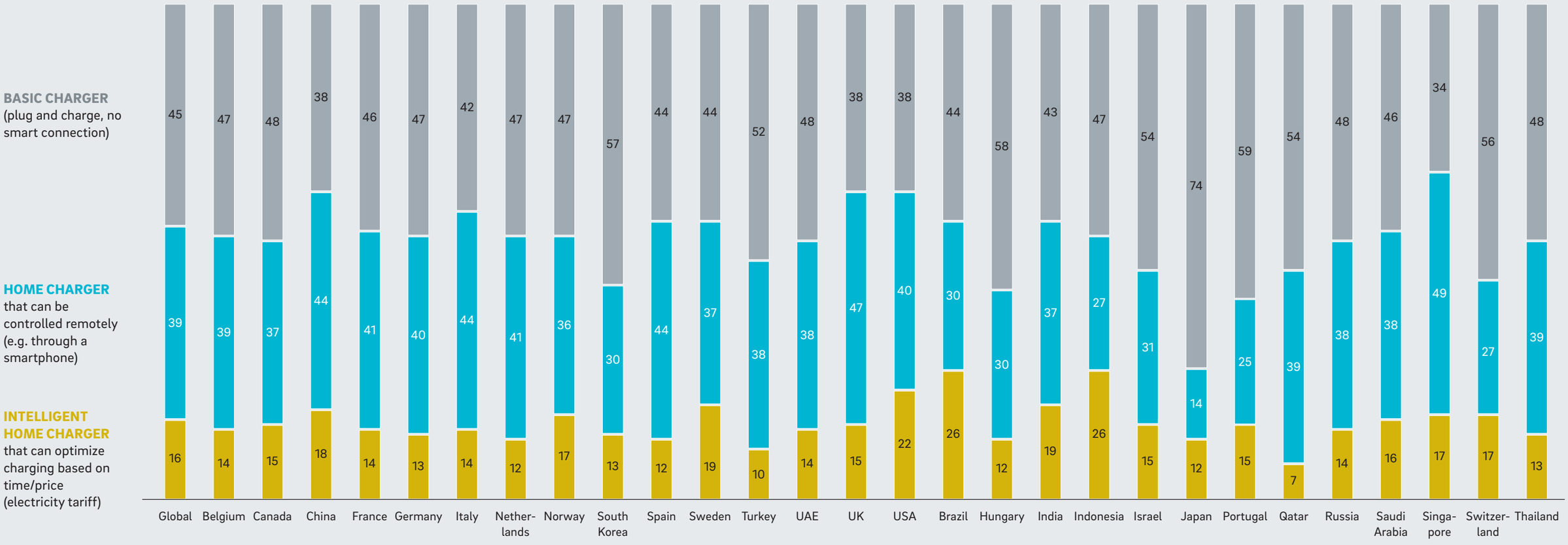
4 Asset light/AC slow or fast charging (<22 kW)

- **Low cost of operation and maintenance:** Enabled through high equipment rate of buildings and standardization to scale at minimal costs
- **Established installation capabilities**
- **Commercial reach towards property managers**
- **Financing option for EV owners:** Offering financing (through outsourced partner) reduces CAPEX for EV owners
- **Highly responsive** and **efficient maintenance teams,** accessible 24/7
- **Smart services:** Additional services, based on smart meters, to generate additional revenue stream → E

E: Not so smart

Around half of current home chargers in our surveyed countries are basic chargers, with far fewer intelligent chargers

HOW INTELLIGENT IS YOUR HOME CHARGER?



Source: Roland Berger online survey 2022

4 / **Power profiles**

WHAT THE FUTURE EV CHARGING MARKET AND ITS WINNING PLAYERS WILL LOOK LIKE

With the market position criteria set, the question now is what will happen in the future. How will the market develop and who will the winners be?

We expect a raft of players to remain in the market over the next few years, until around 2025. Each will continue to develop their chosen business model and market position.

But the time to scale is now. Winners will be those who make the right moves in the next two to three years and raise the necessary CAPEX to deploy their network fast and smart – that is, in the best locations. They will also need to follow a well-defined roadmap to conquer their target market.

By the end of this period, the early winners will emerge, and we will enter a phase of survival of the fittest and consolidation. Smaller players will be acquired by the larger ones in their continuous quest for scale.

At this point, we expect that three types of players will begin to dominate as they will have acquired the assets to succeed:

PURE PLAYERS

- They have exploited their first mover advantage and secured key charging locations
- Pure players have the most advanced technologies to select and operate charging locations
- They are solely focused on EV charging and can dedicate all their financial and human resources to EV charging

PLAYERS OWNED BY LARGE UTILITIES/ENERGY DISTRIBUTORS

- Strong financial resources enable them to buy smaller players
- They have privileged power supply partnerships and contracts
- They benefit from a strong knowledge and partnership network across the electricity market

AUTOMOBILE OEMS

- They capitalize on a close connection to the key product, with the ability to sell products in bundles
- Most EV makers are large international companies, giving them large financial resources

What happens beyond this timescale is likely in the hands of EV drivers. We believe that all use cases will remain relevant as long as they meet the needs of EV owners. How these requirements will develop is almost impossible to predict. But one thing is for sure, a failure to scale up and adapt to evolving needs could see some CPOs running out of battery themselves.

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AUTHORS

BAPTISTE MAISONNIER
Partner
+33 1 53670-945
baptiste.maisonnier@rolandberger.com

TIM LONGSTAFF
Partner
+44 20 3075-1116
tim.longstaff@rolandberger.com

JUAN LUIS VILCHEZ
Partner
+34 91 5900-250
juan-luis.vilchez@rolandberger.com

ERWAN GAUDEMER
Project Manager
erwan.gaudemer@rolandberger.com

TAREK ABDALLAH
Consultant
tarek.abdallah@rolandberger.com

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comments and suggestions

WWW.ROLANDBERGER.COM

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PUBLISHER:
ROLAND BERGER GMBH
Sederanger 1
80538 Munich
Germany
+49 89 9230-0

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