

Electric vehicle charging in Europe

What will be the winning business models in a rising multibillion Euro market?

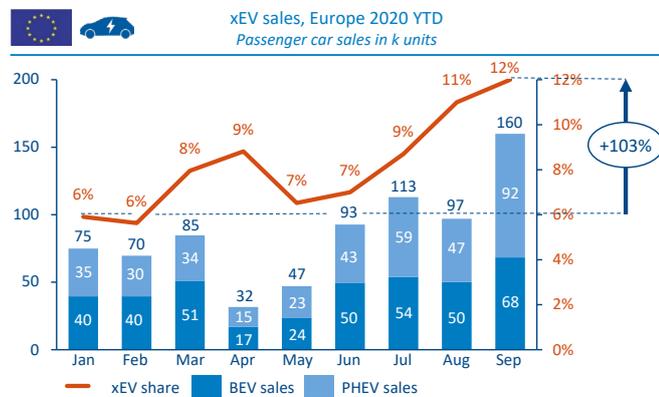


Look at any urban environment in Europe and one thing is very apparent: electric vehicles (EVs) have arrived! EVs have evolved from a niche technology into a serious alternative to combustion engines. Exploring major manufacturers’ future model plans makes this realization even more striking – EVs are about to become mainstream. They are the auto industry’s best bet on combatting air pollution and reducing dependence on oil. The market for EVs is expected to grow massively over the next decade – and with it the demand for EV charging solutions. Europe is expected to have 40 million passenger EVs on its roads by 2030, generating an immense market opportunity of 36bn EUR for EV charging solutions. Tiny startups from the charging sphere – often backed by key utility and oil & gas players – have already professionalized and grown into serious companies. The whole industry has been undergoing a consolidation phase since 2017 and now the big question: Which players and business models will come out on top?

COVID-19 and automotive sector

COVID-19 has hit the European economy hard. The auto industry is among those sectors most severely affected. While overall sales are expected to drop by 20% or more in 2020, xEV (BEV + PHEV) sales are growing against the trend (see figure below). In September, xEV sales in Europe hit a new record of 160k units – more than double pre-COVID levels. And by August, xEVs market share reached over 10% and considering long delivery times, growth is expected to continue.

xEV sales Europe, 2020

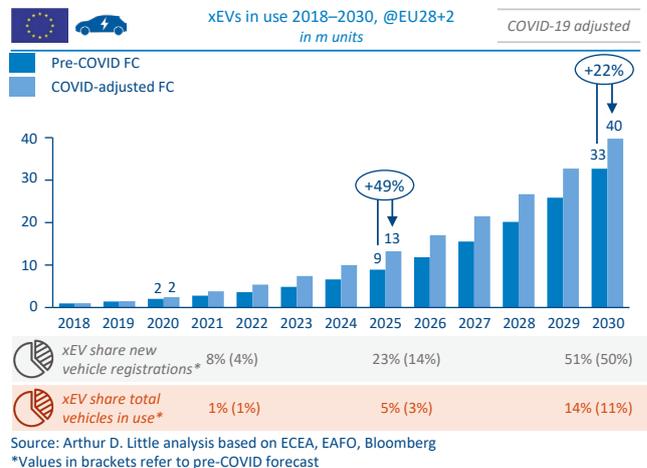


Source: Arthur D. Little, EVSales.com

Although the market success of EVs is partially driven by governmental subsidies and tax advantages, this strong upwards trend is expected to continue with multiple high-profile EV product launches. Volkswagen just unveiled the ID.3 compact EV, while SUV models like Volkswagen’s ID.4 and Tesla’s Model Y will start selling in 2021. This electrification trend is being “fueled” from two sides:

- 1. Demand side.** Studies show an ever-increasing demand for “greener” vehicles, while purchasing barriers, like high price, range anxiety and poor charging infrastructure, are gradually vanishing.
- 2. Supply side.** OEMs need to reduce their CO₂ emission drastically to reach their emission targets and plan to launch around 400 new BEVs by 2025. Development could accelerate due to recent discussions by the European Commission to further tighten CO₂ emission-reduction targets from 40% to 55% by 2030.

Covid-19 effect on xEVs in use



As the figure above shows, we expect 40 million xEVs on Europe’s roads in 2030. This reflects an increase of 22% (or 7 million vehicles) compared to pre-COVID forecasts and represents 14% of the passenger car fleet in Europe. By 2030, **every second new car sold will be electrified.** This is not

particularly good news for all OEMs that must transform their business even faster but is certainly delighting prospects for utilities and charging service providers. Recharging these 40 million xEVs will require an additional electricity supply of ca. 79 TWh in 2030 as well as massive investments in charging infrastructure across Europe, providing the foundation of a multibillion EUR market opportunity.

EV charging will become 36bn EUR market

After many years, the patience of early EV charging investors will soon pay off. With more EVs coming to the market, revenues from EV charging will surge and likely hit 36bn EUR in 2030. This is a sevenfold increase from 2021 and implies a massive growth rate of ~25% per year. Given that our analysis focuses on passenger vehicles, total market value will be even bigger. EV charging opens up enormous opportunities for business models. Based on our in-depth analysis, we can subdivide the EV charging market into the following revenue pools (see figure below):

Hardware includes all revenues generated from manufacturing and selling charging hardware. It also contains fulfillment services required to set the infrastructure in place. Fulfillment refers to all services associated with planning, installing and commissioning hardware on end-customer premises.

Asset ownership (i.e., commercial operation) accounts for all revenues generated via the sale of charging services by owners of (semi-) public charging infrastructure. In our analysis, we have deducted total electricity and technical operation costs to only display the residual revenue generated in this value chain step.

Technical operation incorporates all revenues generated via operating private and public charging infrastructure. It usually involves provision of charge point management software, technical service hotline, hardware maintenance and field service for ad hoc repairs.

The **e-MSP (electric mobility service provider)** revenue pool contains all revenues created by giving EV drivers access to public charging infrastructure. This includes transaction fees of customers as well as roaming fees of CPOs and MSPs. To highlight the value-add of this service, we only included the mark-up revenue of the e-MSP in the revenue pool analysis.

Energy management refers to smart charging services (i.e., optimizing charging behavior of consumers on power connection level – peak load shaving, PV integration, time-based tariffs) and the provision of balancing power to the electricity grid by pooling EVs connected to the grid.

Electricity & grid includes the sale of electric power and grid usage fees – used for charging the vehicles – to end customers. These customers can be private households, companies or operators of public charging infrastructure.

The figure below shows our forecast for EV charging revenues in Europe by 2030, grouped by business models and charging use cases. It is important to distinguish between **one-time revenue pools** from infrastructure deployment and **recurring revenues** from operation/usage of the charge points.

Increasing importance of recurring revenues

The EV charging sector is currently in a ramp-up phase. While the current number of newly deployed charging points per year is almost as high as the existing charging infrastructure, these numbers will significantly diverge each year going forward.

Recurring revenues will increase from a **20% share today to more than 50% in 2030**. But what does this mean for the market? Certainly, recurring revenues will outgrow one-time revenues in the long run – but even by 2030, **hardware and related fulfilment services** will still account for **almost 50%** of the market potential. Ten years from now, the hardware business will still play a massive role despite its slowly degrading market share.

EV charging revenue pools, 2030

| Value chain | | EV charging revenue pools, EU 28+2 | | | | | | PASSENGER CARS ONLY | | |
|---------------|---------------------------------|---|-----------------------|-----------|---------------------|----------------------|-------------------|---------------------|--|--|
| | | Total market potential in bn EUR per business model and charging use case | | | | | | | | |
| | | Hardware ¹ | Asset ownership | Operation | Platform | Mobility service | Energy management | Electricity & grid | | |
| Home | 6.3 | 0 | 0.4 | 0 | | | | 4.6 | | |
| Work | 6.1 | 0 | 1.4 | 0.2 | | | | 1.8 | | |
| Destination | 2.1 | 0.1 | 1.3 | 0.4 | | | | 1.3 | | |
| Public | 1.4 | 2.8 | 0.4 | 0.6 | | | | 1.2 | | |
| Revenue pools | €15.7 bn Σ One-time revenues | Σ Comm. operation | Σ Technical operation | Σ e-MSP | Σ Energy management | Σ Electricity & grid | | | | |
| | | €2.9 bn | €3.5 bn | €1.2 bn | €3.8+ bn | €8.9 bn | | | | |
| | | €20.3 bn | | | | | | | | |
| | | Σ Recurring revenues | | | | | | | | |

NB: Analysis covers passenger vehicles only, considering revenue value pools based on bottom-up forecasts (excl. taxes)
 Source: Arthur D. Little analysis 1) includes fulfilment services (planning + installation) 2) Potential estimation is limited to services with the car battery only (no additional stationary batteries)
 – only home and workplace charging use cases in scope for analysis, destination and public charging use cases represent additional upside

Electricity & grid only accounts for 25% of total revenues

Taking a more detailed look at the numbers, we see that **electricity & grid** fees only accounts for **~25% of total net revenues** in 2030. Most value is simply created elsewhere. EV charging will surely represent a “natural” market opportunity for energy utilities but will still not be a home run. Utilities eager to surf the EV charging growth wave will likely have to expand their offering across the EV charging value chain.

In total numbers, **hardware** will be the biggest business segments in 2030. While hardware, electricity, and energy management create most value in the private charging use cases, asset ownership and e-MSP create most value via public charging solutions.

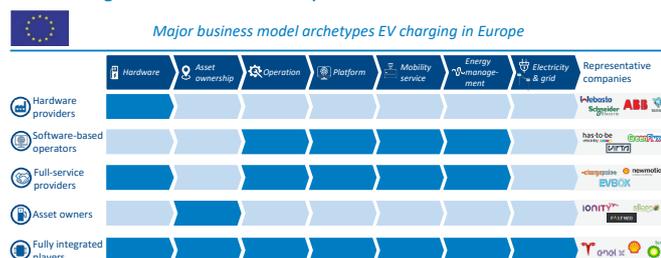
Highest margins in software-driven activities today

The average profitability of business models in each value pool is almost as important as the market size. Following statements regarding profitability are based on the total revenue per value chain step. This must be considered when referencing margin levels of revenue pools that are displayed as residual values in our analysis (asset ownership & e-MSP). We currently observe a **very mixed picture of margin levels** in the market. While technical operation, energy management and asset ownership can often generate high margins of more than 40%, average margin levels in electricity delivery and mobility services are on a significantly lower level. The hardware business currently sits between these two poles and hardware players are facing pressure to constantly innovate their products and reduce COGS to maintain their margin levels.

Industry leaders are moving towards integrated business models – “charging as a service”

So what will be the **winning business models of tomorrow**? Looking at current market participants and trends, we identify very different approaches. The figure below illustrates the dominating business models in the market. Comparing these business model archetypes shows that each type comes with various advantages and drawbacks:

Dominating business models today



Source: Arthur D. Little

From a **scalability** point of view, the **software-based operators** business model's strong suit is its asset lightness and limited investment requirements compared to other business models. Margin levels in this space tend to be pretty high, but it remains a classic scale game with only a few players surviving.

Adopting a **total revenue** perspective, hardware and asset ownership appear to be the best bets until 2030. The downside clearly lies in high investment requirements and a potential risk of market price regulations. **Hardware providers** will also likely face tight margin pressure if they can't keep up with innovation speeds. The **asset ownership** model could be a potential entry point for financial investors as increasing utilization levels of public charging infrastructure allows for profitable operation. We estimate a **total investment volume of ~30bn EUR** to set up the complete public and destination charging infrastructure through 2030. Taking into account that utilities, oil & gas companies and retailers have multiple priorities to transform their business for the next decades, we could see a similar trend as in the telco industry where infrastructure funds are stepping in to finance the expansion of towercos and fiber assets that will allow predictable, healthy margins in the future.

A **full-service provider** positioning is well suited for participating in market growth today (hardware) and tomorrow (operation + platform). It also covers several high margin businesses – bundling multiple products and services together into a “one-stop shop” offer even increases the margin potential. Right now, only **a few players** in the market can master the whole value chain, and these companies will have to fight an uphill battle in keeping up with the innovation pace of niche players.

It is too early to definitively determine which business model archetype will be the most successful. Yet, we can observe a clear trend among current market leaders in Europe (e.g., Shell, EVBox, Enel X) that are building their charging activities into **integrated business models**. These models are significantly tailored to the needs of corporate fleet customers as they are currently the most attractive market segment due to demand for TCO-focused turnkey solutions. **Charging as a service** perfectly meets their needs and relieves customers from high initial investment costs, thus making a strong claim as a future-proof model if one brings the breadth of capabilities to deploy it

Conclusion

EV charging will become a multibillion EUR business

Electric mobility is taking off, even COVID-19 can't stop it. Indeed, EV sales are shifting up a gear – partly due to generous subsidies in many EU countries – and EV adoption will likely proceed even faster than predicted. As a result, EV charging will evolve from a niche sector into a multibillion EUR market

by 2030. Passenger EVs alone will generate a market volume of roughly 36bn EUR. This represents a massive opportunity for utilities, big oil, automotive OEMs and financial investors.

Value pools are big enough for niche players and local “top dogs”

Although EV charging is an embryonic market today, we already see a highly fragmented market with a complex value chain and many small market participants. The sector is currently undergoing a consolidation wave with many participants trying to expand their value share and geographic coverage. However, the total market potential is likely big enough for both niche players and regional top dogs to operate “next to each other.” While niche players like software platform providers need to scale their business on a European or even global level to reach a critical mass, regional top dogs like national utilities can build a successful business by covering multiple value pools and offering integrated solutions.

Set your ambition right; scale is key to succeed!

Market growth alone does not build a successful business. Many substantial players with deep financial pockets have entered the market and play the game very aggressively. Consolidation has already started a few years ago and is expected to intensify over the next years. Some EV charging business models employ classical scale games, and many players will go out of business in the midterm. Leaving the consolidation phase as a winner requires development of the right strategy and laser-focused implementation – while still remaining as flexible and agile as possible to react to change in a fast-moving industry.

Whoever loses time now will have to pay for it many times over in a few years

The window of opportunity is open now and time is money. Many large players have already built a strong standing and put themselves in a good starting position to surf the growth wave. Market share gains after 2025 will likely become extremely expensive and latecomers will lose more than a few “financial feathers” fighting their way into an occupied market.

ADL continues publication series on EV charging

ADL is currently conducting a broad series of interviews with industry leaders from utilities, oil & gas, automotive OEMs, dedicated charging service providers and investors. We aim to collect and discuss the opinions of EV charging insiders on the sector’s most important business and technology questions for the future. We will publish key insights of this study by the end of 2020. If you are interested in participating, [register here](#).

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