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EV charging market outlook 2025

Roadmap to profitable growth in a mass-adoption era

Volume 1 – Europe (EU27+UK+EFTA)

June 2025

Focus of this year's EV charging market outlook

BEV adoption regains some momentum but with a wider outlook to '35 across Europe

- After '24 slowdown in growth, BEV adoption is picking up again, expected to reach 18-22% of total sales and 3% of the total parc in '25
- Given the continuous market uncertainty related to the emission regulations, growing trade barriers and technological advancements, we foresee a broader corridor of adoptions and likely not in a straight-line growth
- By '35, BEVs expected to account for 70-96% of total sales and 23% to 34% of the total LV parc

Improving BEV fundamentals with more affordable & available models

- BEV adoption is far from linear across Europe, with Norway at 90+% share of new sales vs. 5% in Italy in Q1'25 => pan-European average at 17% - starting to approach the early majority
- To accelerate on the steepest part of the S-curve, BEVs need to cater to majority users with more affordable and sufficient models that are also profit making for the OEMs. We clearly see positive signs of this already and expect it to accelerate

Improving infrastructure roll out & user experience, charging demand to reach 200TWh by '35

- Public fast-charger deployment has outpaced BEV growth recently —helping to curb range anxiety—but users still highlight cost, wait times, availability and site convenience as priorities for further improvement for public charging
- Charging demand is projected to reach 200 TWh by '35, supported by an estimated 55m installed charge points with 50+m being private AC chargepoints. A shift in TWh demand from mainly private (75%+ in '25) to rapid growth of public charging to (c.38% both slow and fast in '35)

Contested market with challenging profitability and need for scale driving first market shake-out

- EV charging has attracted many companies over the past few years – we categorise them in 7 ways to play from HW, SW specialists to integrated solutions, owners & operators
- Profitability continues to be a challenge across the industry as players focus on scale yet face market headwinds - resulting in growth ambition tapering, first defaults and market exits - yet an emerging group of players has reached profitability already

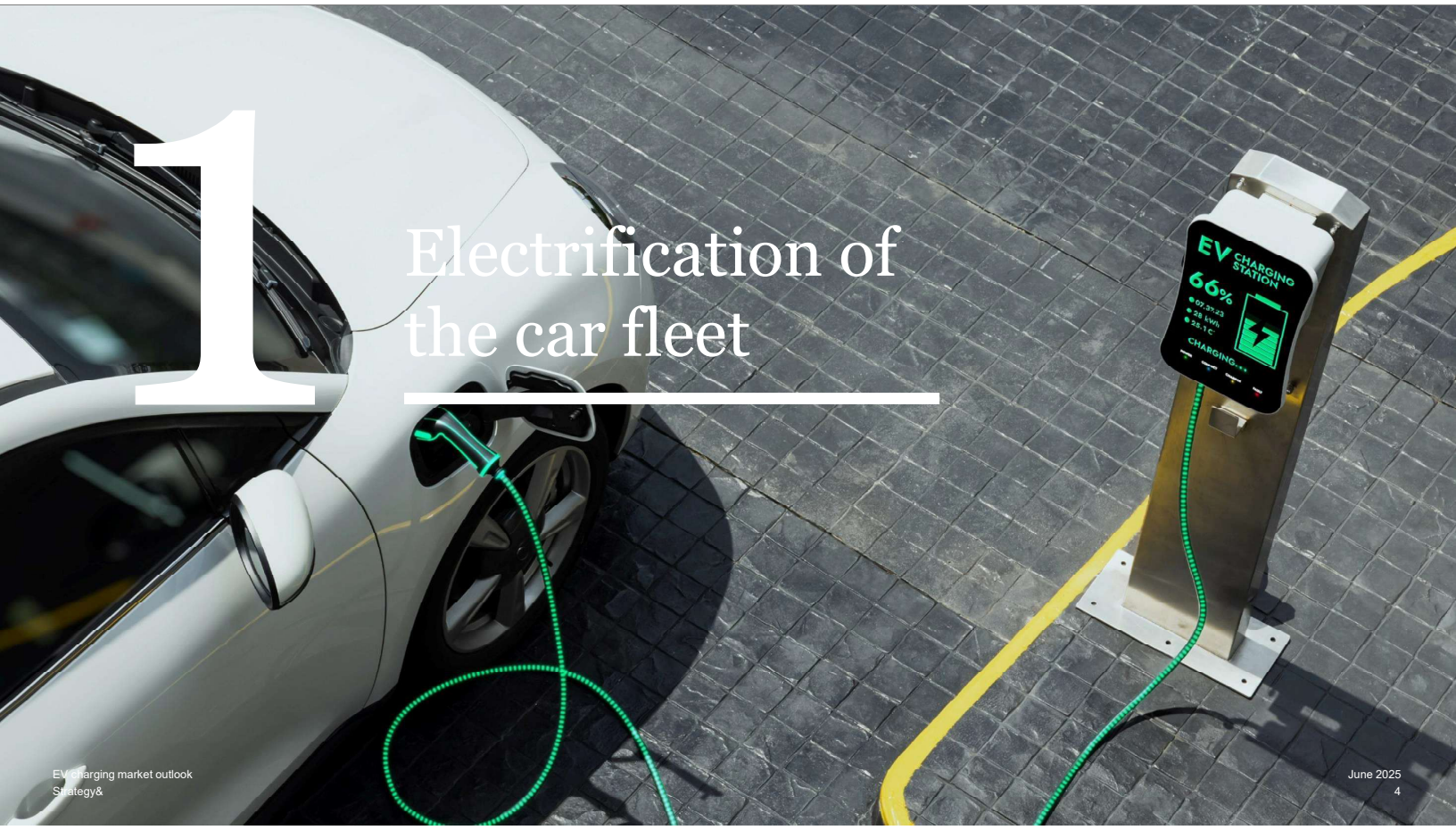
Long-term potential of the segment recognised by both equity and debt investors

- While stock-prices of listed players continue to be impacted by the less bullish EV outlook, leading companies are able to raise funding to support their scaling going forward, including:
  - Continued equity & debt raising in the CPO segment for platforms with proven bankable concept and roll-out strategy
  - Notable series B funding in the software segment (CPMS) to support platform building

Cross industry JVs & partnerships are forming to unlock new recurring value pools

- Adoption of BEVs increases energy consumption, requires greater grid stability yet can be paired up with smart energy management and distributed generation & storage (incl V2G) for optimisation and aggregation across devices and locations
- To unlock the opportunities, traditional industries increasingly overlap and new JVs and partnerships emerge to control recurring value from the new kWh, monetise grid stability & energy optimisation across assets and users

1) Other technologies such as wireless addressed in the sections
BEV: Battery electric vehicles (including <6 tons), excluding PHEVs and other hybridisation

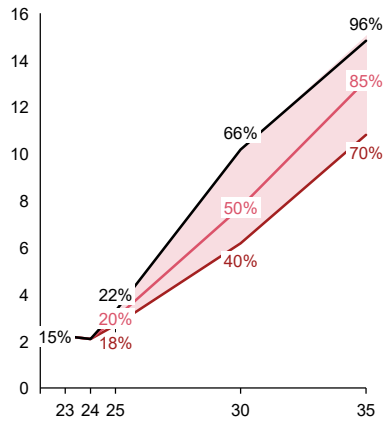


1 Electrification of the car fleet

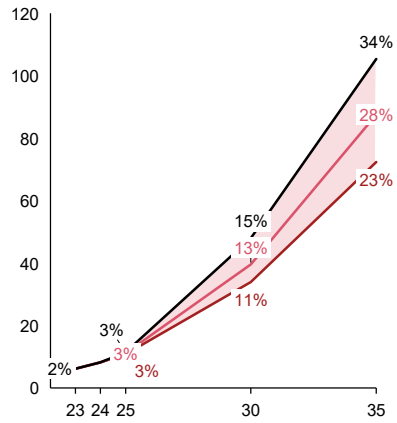
After 2024 slowdown in growth, BEV adoption is picking up again. Given the continuous market uncertainty, we foresee a broader corridor of adoptions to '35

Diffusion scenarios of light-duty BEV sales & stock in Europe[1] (%, millions)

BEV Vehicle sales



BEV Vehicle stock



EU Regulatory consistency & tech advancements — Base case — Stagnant growth & diluted regulation

Despite the broader adoption corridor, the EV transition continues to present a large opportunity for EV charging companies - driven by **~13 million new EV sales in 2035** and an expected stock of **~88 million EVs on the road by 2035** in the base case

Key uncertainties

EU's flagship CO2 emission reduction scheme

- The EU has relaxed compliance of stricter 2025 pipe emission regulation from a single year 2025 to a 3-year average **– likely dampening partially 2025 adoption**
- EU is expected in late 2025 to review the 2030 emission reduction level regulation and 2035 0g CO2 target. **Relaxation will dampen adoption**, **sticking to the regulation will reassure investors**

Growing Trade barriers

- Impact of growing trade tariffs with the US on EU's **OEMs financial position & general lower economic growth**, **potentially to be offset by reintroduction of national incentives particularly in Germany**
- EU's stand towards Chinese technology and tariffs on BEVs built in China **reducing # of affordable BEVs and adoption before EU OEMs catch up**

Technological advancement

- Battery costs (largest cost component of BEV) continue to decline, with Chinese OEMs gaining from cost advantages. EU OEMs must catch up to boost **BEV's profitability and drive more accelerated adoption towards 2035**
- **OEMs are increasingly betting on long-range PHEVs** as a transitional solution, especially in light of regulatory leniency and consumer range concerns

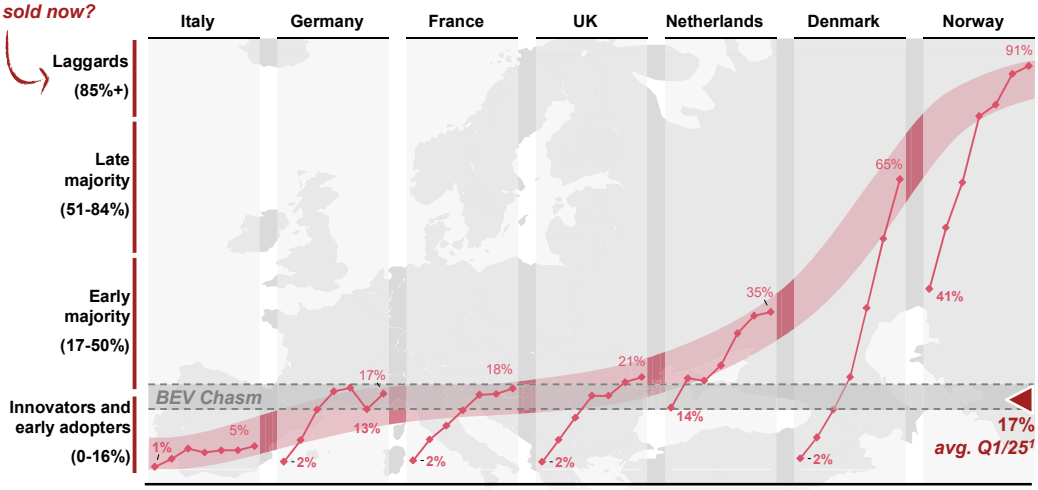
Notes: 1) Below 6t for EU27+ EFTA+ UK
Source: PwC Autofacts ®, Strategy& analysis

To enable mass-adoption beyond a handful of smaller, higher-income countries, focus is needed on BEV choice & affordability, infra build-up and user experience

S-curve path to mass adoption in BEV sales in Europe

Who buys the EV sold now?

BEV sales from 2019 to Q1/2025 in selected countries *(in % of total registrations)*



The adoption of any new technology typically follows an S-Curve pattern. Chasm refers to the point of transition to mass market where there is a divide in popular opinion about the technology and targeted commercial and regulatory push is needed

Path to mass adoption

Affordable, sufficient & profitable BEVs

- **Improve consistency in** BEV **incentives**
- Introduce more **attractive and affordable** models in mass market **B & C segments**
- Focus on path to BEV model profitability parity with ICE models for OEMs with greater scale & battery costs decline
- Establish more predictable residual value

Charging accessibility

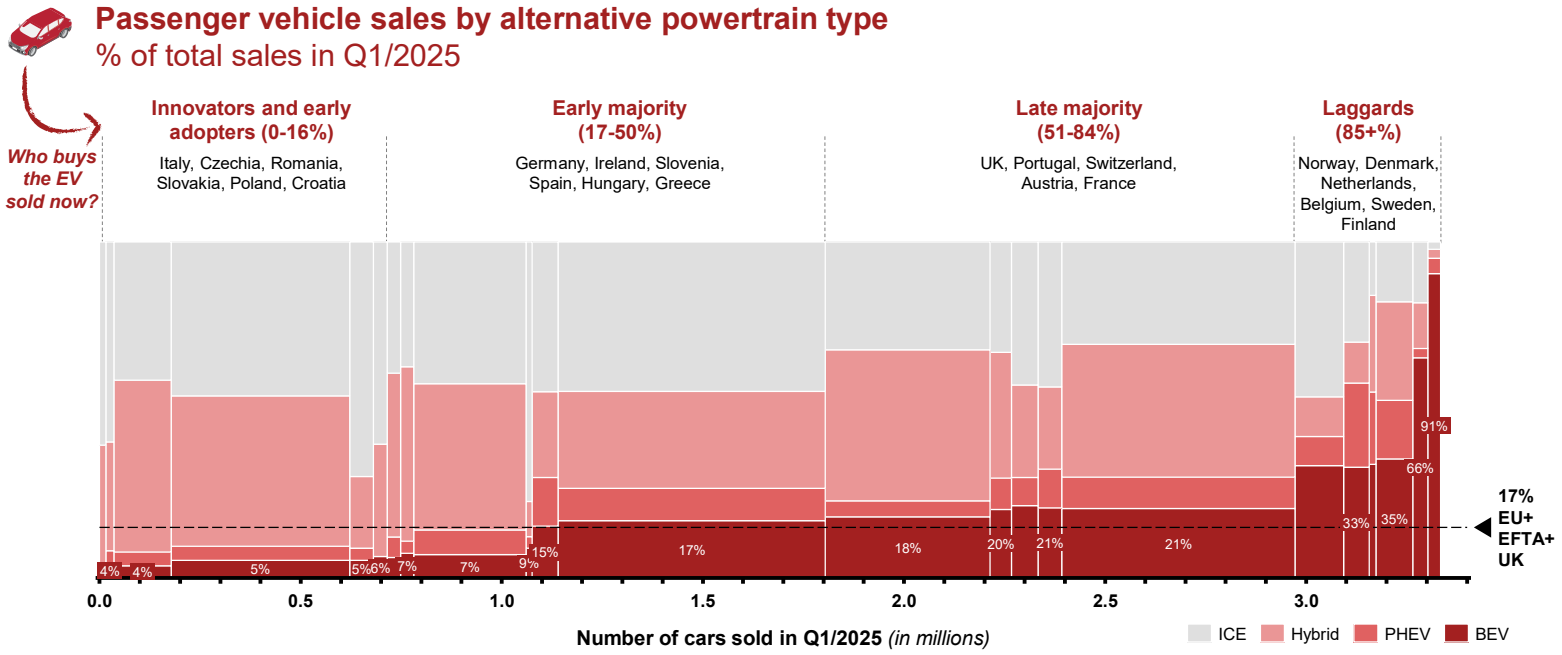
- Public networks built up faster than BEV sales in '24, need for a clearer car fleet adoption to calibrate roll out investments
- **Need for more partnerships** and integrated **energy & mobility models to overcome grid limits** and building **regulations** imposing limitations on charging **build up at scale** for private and public charging

Charging user-experience

- Need for a **mass-market friendly** experience with **high uptime, session start success & attractive retail concepts at stations**
- Increased **price transparency** for public charging

Notes: 1) EU27+EFTA+UK
Source: European Fuels Observatory, Strategy& analysis

Adoption of BEVs across Europe is moving into “early majority” adoption of 17%, Germany lags behind UK & France

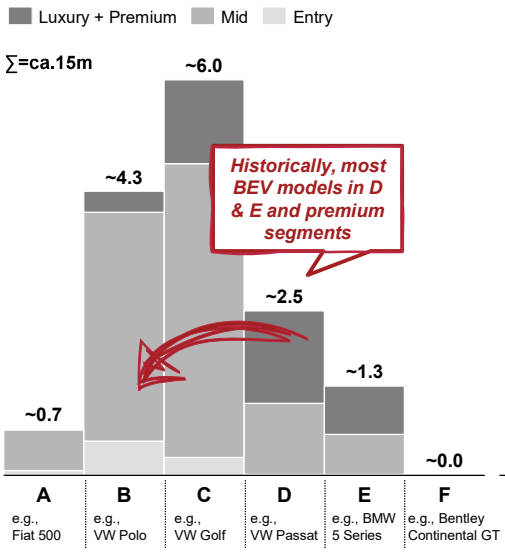


Note: 1) Bulgaria, Cyprus, Latvia, Lithuania, Luxembourg, Malta and Iceland removed due to size (<50000 vehicles sold in 2024) to improve readibility
Source: ACEA, Strategy& analysis

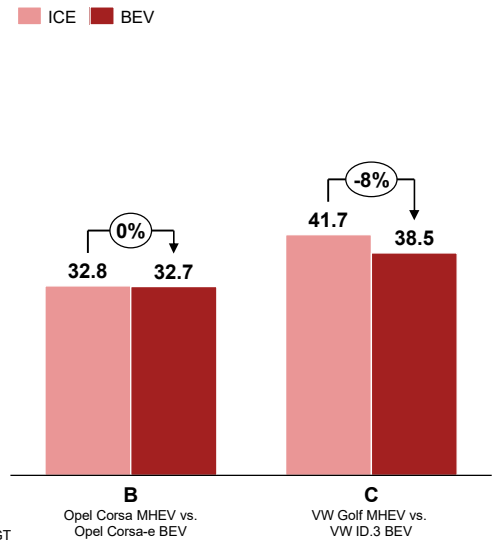
Segment B & C are critical to unlock mass-adoption, upfront costs are now at parity with ICE or lower and expected to further improve with more models being revealed

Passenger vehicle sales distribution in Europe

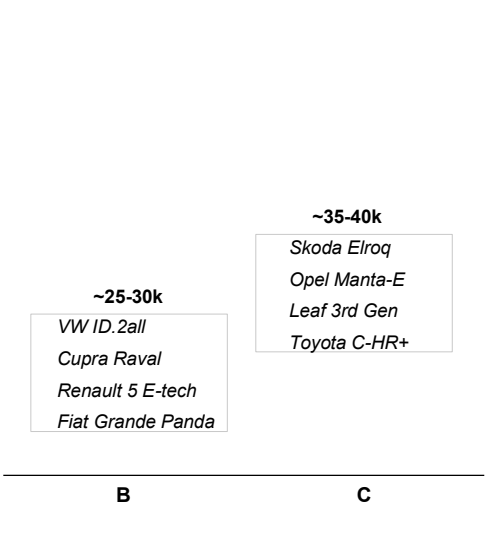
Sales distribution by segment (millions)



Purchase price comparison[1] (EURk)



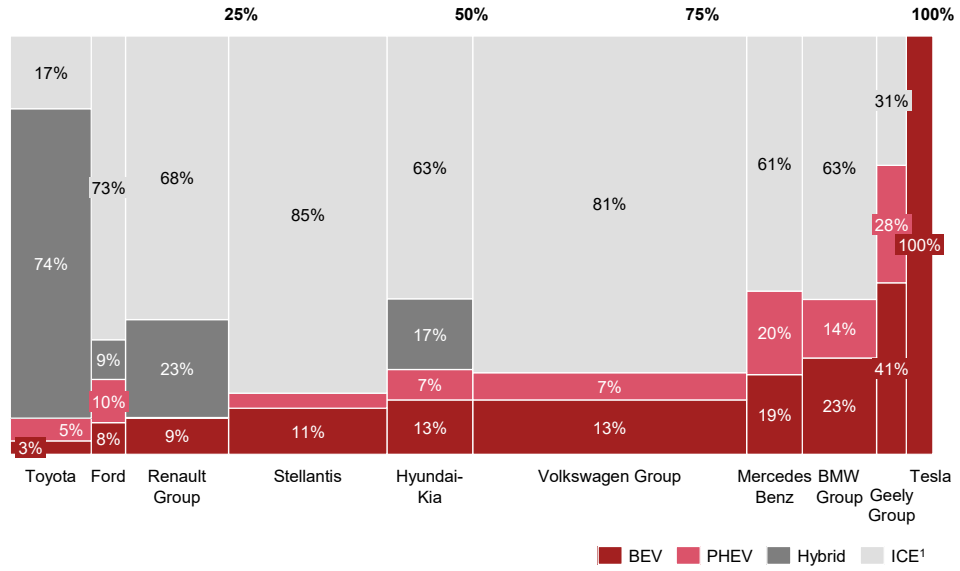
Selected upcoming BEV models in '25-26



Note: 1) Comparison of models at comparable power output and specifications across France, Germany, Netherlands and the UK in March 2025, price includes VAT+ applicable subsidies, bonus-malus and ownership tax; **Source:** PwC Autofacts ®, OEM public releases, Strategy& Analysis

Given the volume sold, VW, Stellantis and Renault are most crucial to EV growth, this has historically come with a profit challenge and parity to take a few more years

European 2024 sales by top 10 manufacturer by powertrain



BEV/ICE profitability parity challenge

"The new Elroq is **priced on a par** with the comparable Karoq, but **generates a significantly lower margin**."- *Skoda's Chief Executive Officer (CEO)* ***Klaus Zellmer***

Stellantis puts ICE/BEV profitability parity roughly around **2026–2027**. This timeline aligns with Stellantis' **"Dare Forward 2030"**

BMW's plan to have **25% EV sales in 2025** and **50% by 2030** is aligned with EU CO_2 reduction trajectories

By **2026+,** as Neue Klasse ramps up, **BMW** expects EV margin parity with, or even superiority to, ICE in some cases. The company aims for a long-term **8–10% operating margin** even when **more than 50% of sales are EVs by 2030**

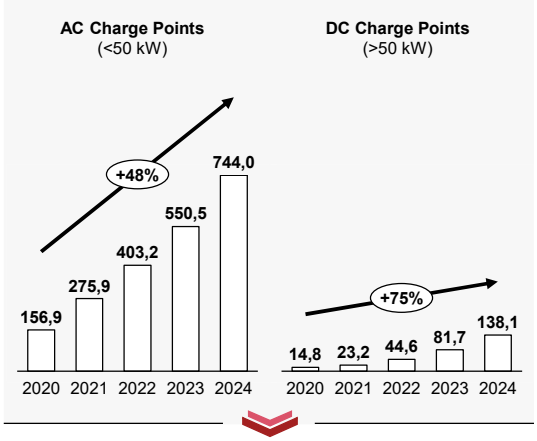
Note: 1) includes Mild hybrids

Source: ACEA, JATO, Strategy& Analysis

On European level, the “range-anxiety” is being addressed by roll out of public fast chargers that is faster than BEV adoption, but more needs to be built going forward

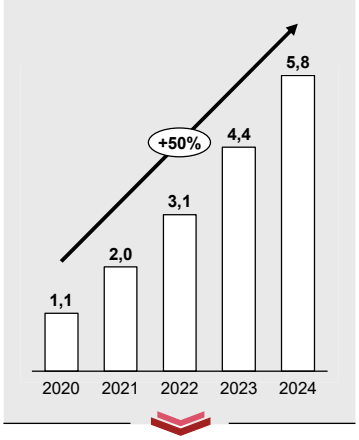
Public fast charger roll out vs. M1 (passenger vehicle) BEV

Public chargers, in thousands



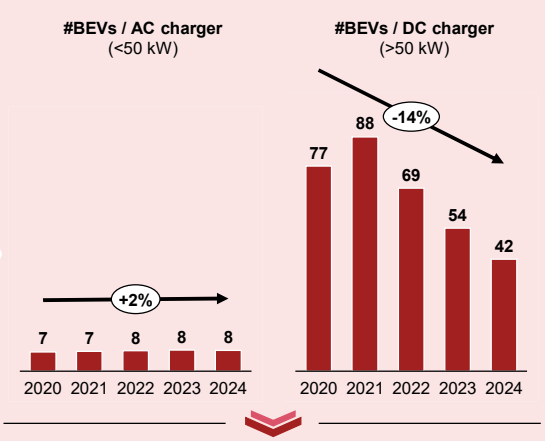
The rollout of public fast chargers is accelerating significantly, growing by 75% from 2022 to 2024, ensuring better coverage and reducing charging bottlenecks across Europe. Similarly, slower AC chargers also saw substantial growth of 48% during the same period

BEVs in Europe, in million



While BEV adoption continues to rise, increasing by 50% from 2022 to 2024, the faster expansion of charging infrastructure helps mitigate concerns about charging availability and range anxiety

#BEVs per charger



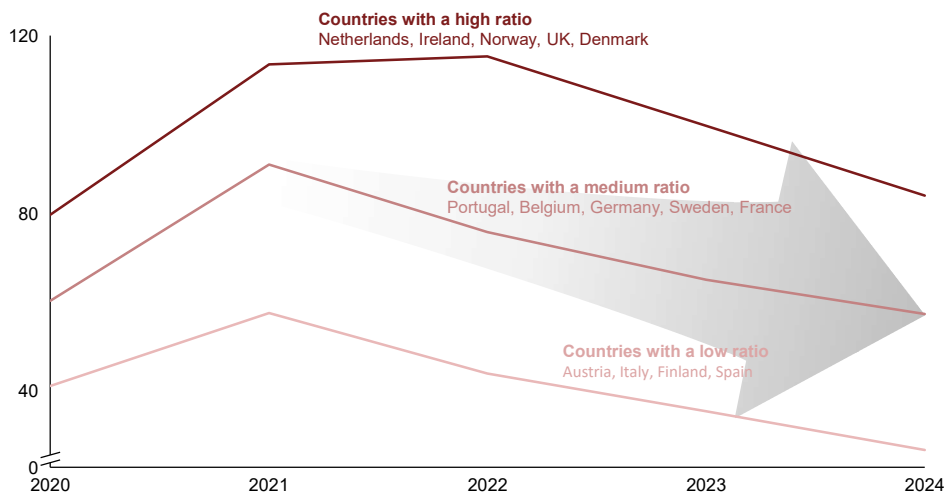
With more chargers being installed at a faster pace than BEV growth, the ratio of BEVs per fast charger is improving, making public charging more accessible, especially for DC charging. **However, this shift pressures CPOs to improve profitability, utilization rates, and network efficiency**

Source: European Alternative Fuels Observatory (Data includes EU27 only); Vehicles only include M1 class passenger vehicles; Strategy& Analysis

CP network growth outpaced BEV adoption in recent years, resulting in declining number of BEVs per DC CP across the board

M1 BEV fleet to Charge Point ratio

Ratio[1] BEV:CP (50kW +) ratio 2020-2024



Comments

High Ratio (Many BEVs per Charging Point)

- **Grid Limitations**: Congested grid infrastructure makes it difficult to scale further charging networks
- **Strong Private Charging Adoption**: High percentage of homeowners reduces demand for public CPs
- **Policy & Investment Gap**: Lack of gov. incentives or slow permitting processes delay CP expansion

Middle Field (Balanced BEV-to-CP Ratio)

- **Urban vs. Rural Spread**: Charging infrastructure keeps pace with BEV adoption in urban areas, but rural expansion is slower
- **Standardized & Coordinated Rollout**: Clear policies and cooperation between grid operators, municipalities, and private CP providers ensure stable development

Low Ratio (Few BEVs per Charging Point)

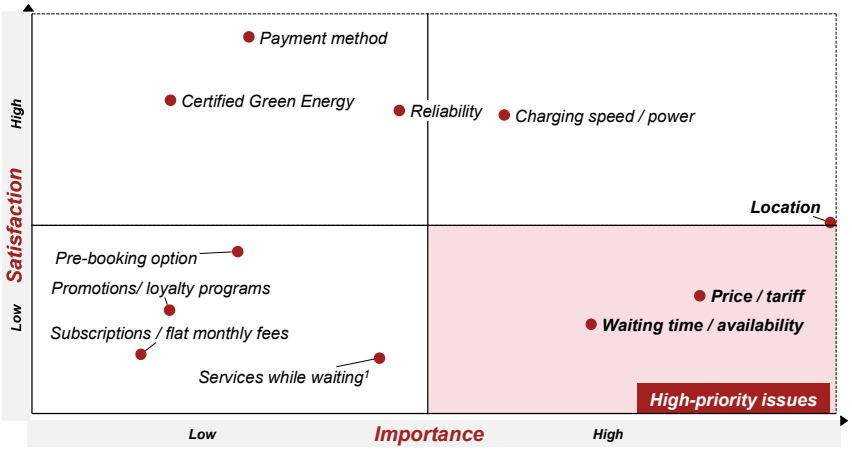
- **Aggressive Charging Rollout to support early stages of uptake**: Countries with early CP expansion at key location (e.g., government-subsidized ultra-fast chargers)
- **Low BEV Penetration**: Public CPs were built ahead of demand, leading to a temporarily low ratio

Notes: 1) Averaged ratios of the included countries
Source: European Alternative Fuels Observatory; Only M1 passenger vehicles included; Strategy& Analysis

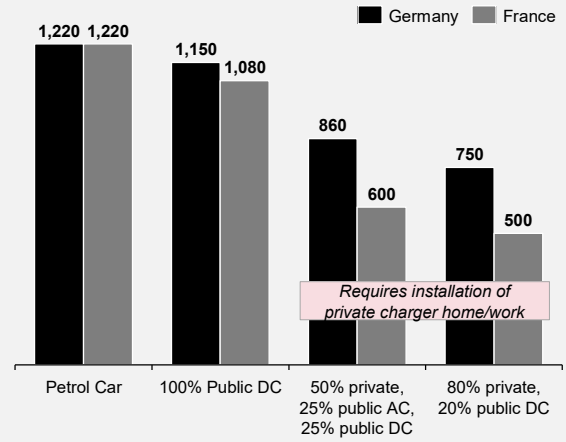
BEV charging cheaper than ICE regardless of type, but for public fast charging price, waiting time /availability and location identified by users as areas to improve

Charging user experience

User ranking of satisfaction with public fast charging attributes



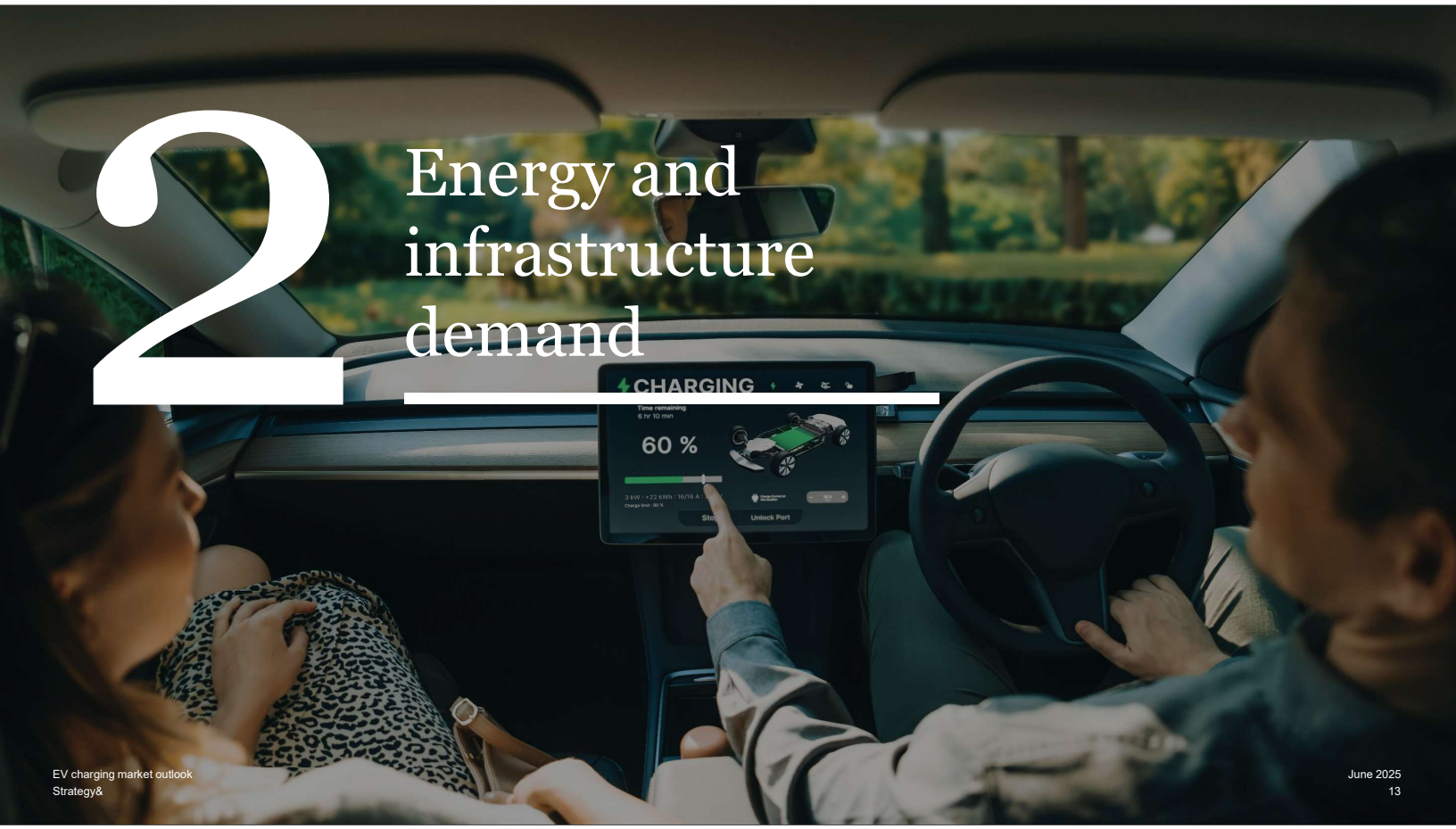
Annual fuelling cost ICE vs. BEV – March 2025[2,3]



Current ranking reflects higher adoption of BEV amongst early adopters with access to private charging, with growing adoption we foresee a shift to more use of public fast charging driven by lack of access, convenience and other services at a stations. Charging price likely to be competed lower and or bundled with other energy or retail promotions and subscriptions

Notes: 1) Services such as restaurants, shops, vending machines and other services located nearby the charging station; 2) Assumptions: Annual mileage ~12,000 km; petrol car: 5.5–6.0 L/100 km; BEV: ~15 kWh/100 km; 3) Energy prices (Germany/France): Petrol €1.69/L; Household elec. €0.36/€0.20 per kWh; Public AC €0.54/€0.35; Public DC €0.64/€0.59; **Sources:** Strategy& E-readiness survey 2024, Strategy& analysis

2 Energy and infrastructure demand



Cable charging is expected to continue as main BEV tech; battery swapping pushed mainly in China, induction still in pilot stage, and overhead only in niche applications

Charging technology overview

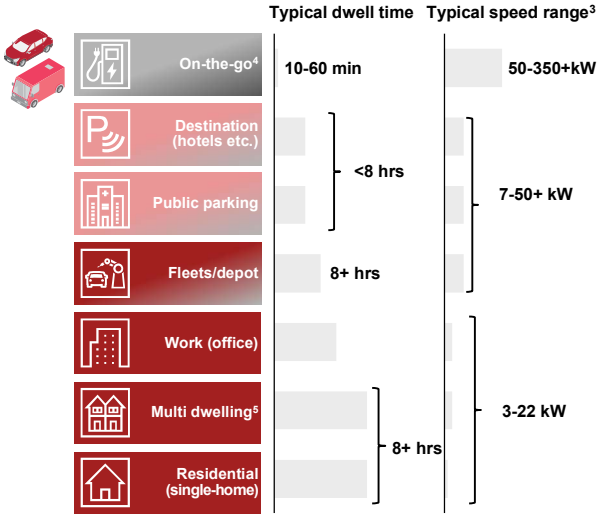
		 Cable charging	 Battery swapping	 Induction	 Overhead
		Focus of this study	Deployment primarily in China with use-cases in the EU	On watchlist for OEM adoption	Niche only
Vehicle suitability	Light <6t	✓	✓	✓	✗
	Med/Heavy >6t	✓	✓	✓	✓
Charging speed	AC <22kW	✓	Competes with recharging sessions <10mins typically DC	✓	✗
	DC >50kW	✓		✓	(✓)
	DC >150kW	✓	✓	?	✓
	DC >500kW	✓	✓	?	✓
Standardization		CCS/Tesla (USA)	OEM-specific	Not established so far	Not established so far
Deployment		●	◔	Pilots, OEM deployment prob. >2026	Niche applications only
Pros (+) / cons (-) relative to cable charging			+ Reliance on (high) power supply + Charging time – Battery efficiency – Physical space	+ Reduced physical environment needs + Time to initiate charging process – Charging speed (currently)	+ High charging speed – High infrastructure costs
Key trends to watch		• **BESS integration/ buffering** • Integration into HEMS • Energy efficiency for high-speed charging	• Roll-out of network/ financing • OEM adoption • Common standard across OEMs	• Energy efficiency • OEM adoption to avoid retrofit • Cost curve development	• OEM/industry adoption

Source: Strategy& analysis

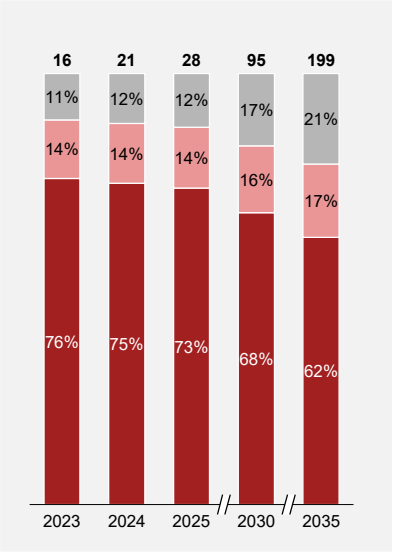
~200 TWh charging demand in and approx. 55 million installed charge points by 2035 in Europe[1]

Charging use cases and electricity demand and chargers installed for LDVs[2] *(Base Case Scenario)*

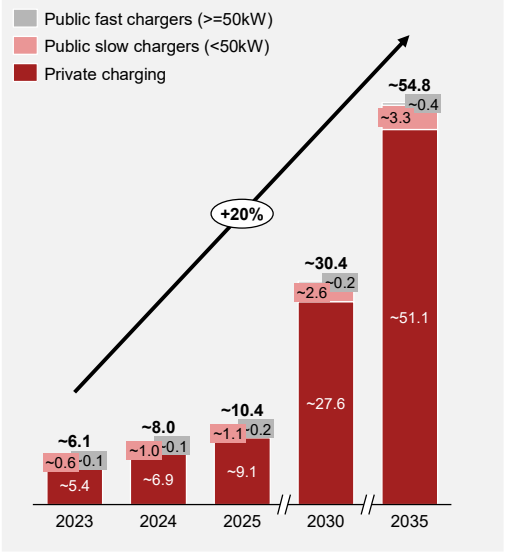
Charging locations and use cases



Electricity demand, TWh



Installed charge points, millions

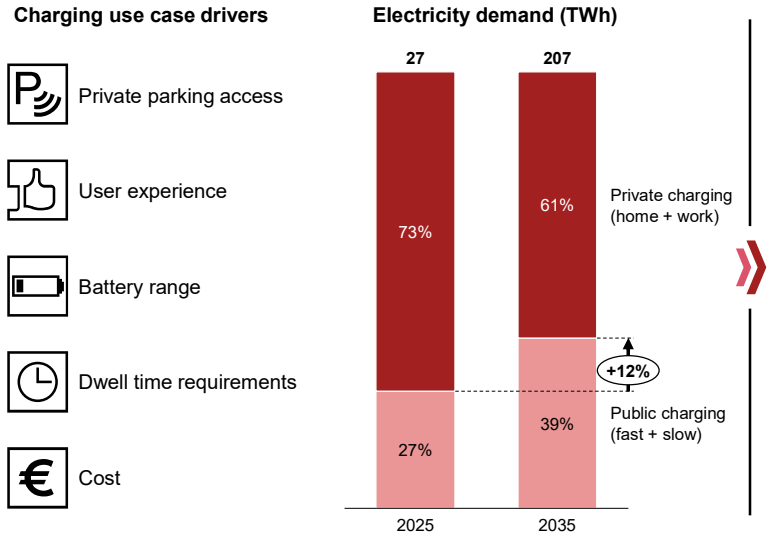


Notes: 1) includes EU27+UK+EFTA; 2) LDV – Light Duty Vehicles; 3) Varies by region and within segment, actual charging power dependent on grid availability and vehicle take rate; 4) On-the-go refers to highway rest stops, gas stations, fast food restaurants etc.; 5) Multi dwelling includes community owned charge points in living compounds, with access card management and separate billing; **Source:** Strategy& analysis

Early BEV owners favour private charging, however as the mass market buys a BEV, public charging use cases will increase in importance

Private vs public charging

Drivers for public and private charging demand



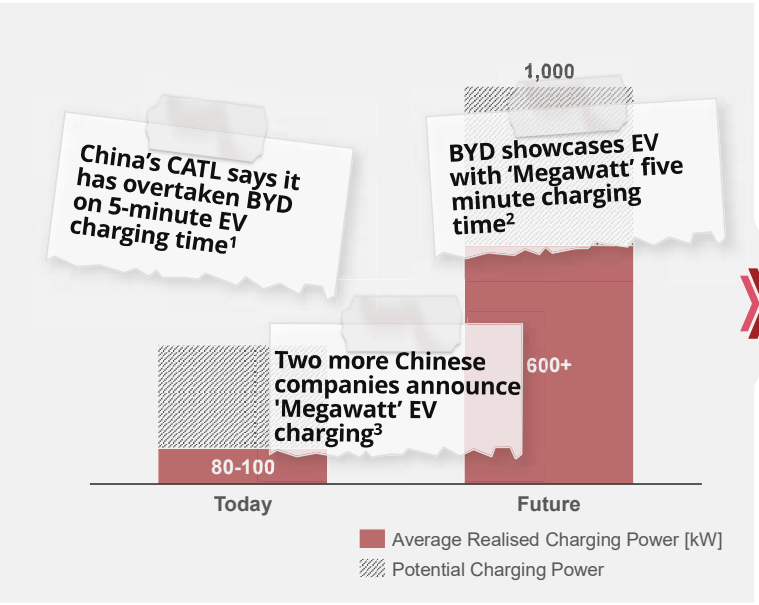
Comments

- **Currently, in Europe, private charging is the dominant use case, in particular home charging**
  - Consumers prefer private charging use cases as it is convenient, guarantees fast access, and is cheaper than public charging
  - More than 50% of the EU population live in detached or semi-detached house, most of which with access to private parking
  - In many geographies, current BEV drivers belong to the "early adopter" segment (higher income with access to private parking)
- **As the BEV fleet grows, public charging will increase in importance**
  - Drivers without access to parking will adopt BEVs and rely on public charging use cases
  - BEVs will increasingly be used for long distance travel as ICE vehicles are phased out (as opposed to drivers using BEVs for short distance and ICE for long-distance today)
  - Battery ranges will increase, however more affordable BEV models with lower range will also be offered to meet requirements of mass market

Source: Strategy& analysis

Various players set charging speed potential records – now focus turns to grid and infrastructure readiness

Impact of fast chargers



Change in charging experience and key challenges behind

Faster charging enables shorter sessions and fewer required charging stations – but this comes with new challenges such as increased per-site energy demand, greater grid complexity, and regulatory hurdles

Grid capacity requirements:
Charging at 1+ MW per vehicle creates extreme peak loads at local sites
Grid capacity upgrades are essential *to handle high loads and maintain charging stability*

Grid stress and flexibility:
Sudden, high-power demand can destabilize local grid and limit scalability
Battery-buffered charging hubs *can reduce strain on the grid and provide operational flexibility*

Deployment bottlenecks:
Slow permitting processes and lack of high-voltage access delay rollout
High-voltage connections and fast permitting *are needed to enable timely infrastructure deployment*

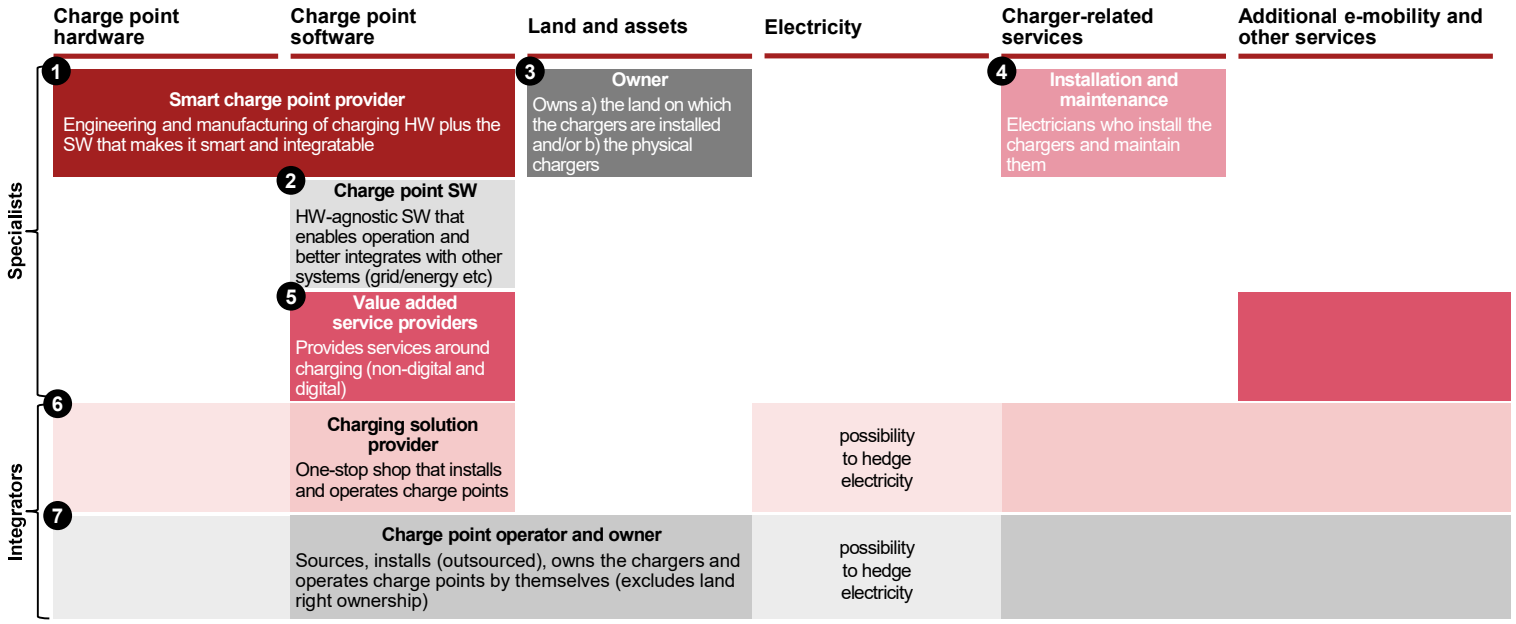
Site-level energy management:
High energy throughput raises complexity in CP operations and load balancing
Smart load balancing and energy management systems *ensure efficient charger utilization and stable operations*

Source: Strategy& analysis

3 Ways to play and financial performance

Existing competition can be grouped into a broad set of 7 ways to play – tapping into one or more of the revenue pools

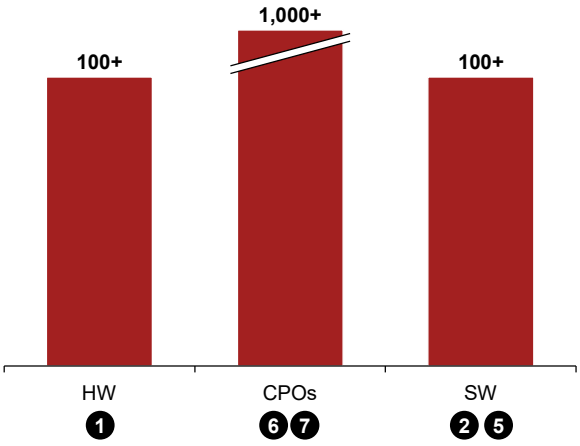
Ways to play across the revenue pools



Source: Strategy& analysis

EV charging has attracted a large number of companies over the past few years, more challenging growth prospects are resulting in first defaults and market exits

# of players

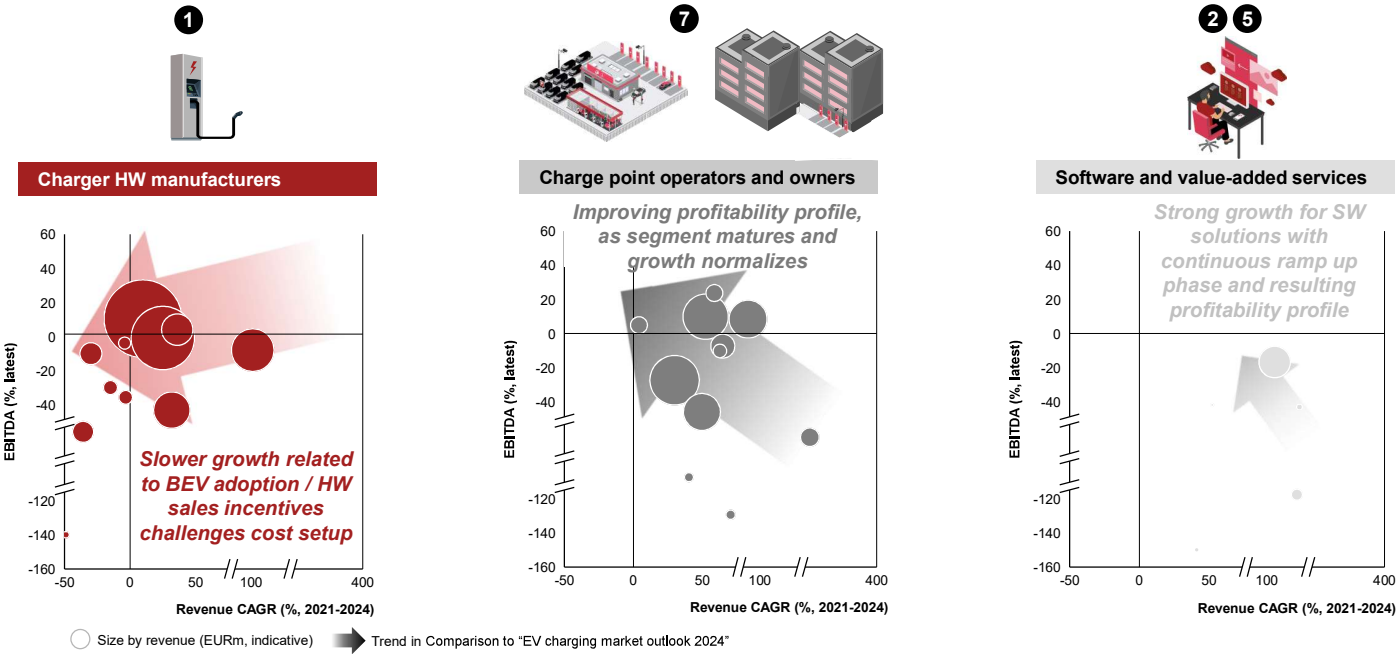


Selected defaults and exits (2022-2025)

- **7** Shell Recharge sells its AC home and workplace EV charging business to 50five to focus on public fast
- **1** Landis+Gyr discontinues its EV charging HW & SW business
- **7** BP Pulse ceases its direct-to-customer home charge sales to focus on public fast and fleet charging
- **5** EVA Global customer service & SW for CPOs files for bankruptcy
- **1** Tritium DC charger manufacturer files for bankruptcy
- **6** Eways (HW, SW and solution provider) went bankrupt in late 2024 with the bankruptcy estate acquired shortly after
- **1** Engie discontinues its EV Box (AC / DC and SW) charging unit
- **6** Compleo (HW, SW and solution provider) files for insolvency and is taken over by Kostal

Note: Ways-to-play #3 (owner) and #4 (installer) not assessed
Source: Strategy& analysis

Profitability continues to be a challenge in the industry as players focus on scale yet face market headwinds

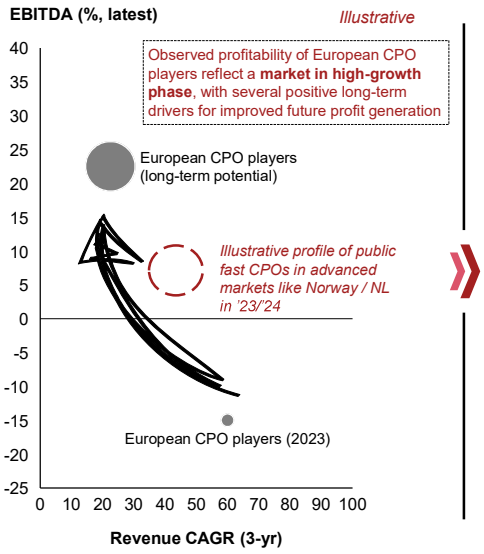


Note: Deviating financial periods were adjusted to match calendar years; 1) If 2024 financials not published, EBITDA % '23, CAGR '21-'23 and revenue '23 are used; 2) EBITDA % '22, CAGR '20-'22 and revenue '22;
Source: CapitalIQ, Valu8, Eikon, Orbis, Company reports

Despite profitability being an industry challenge, EV charging is likely to be attractive for investors in the long-run

Profitability outlook

CPOs are struggling to make profits…



… however, a positive profitability outlook is supported by long-term market trends

Increasing BEV adoption
- After 2024 slowdown in growth, BEV adoption is expected to accelerate again
- With a move to mass-market, public charging is expected to increase in popularity due to private parking access constraints
- More BEVs lead to increased demand for charging, improving station utilization and revenue

Market consolidation
- There are currently too many sub-scale players in Europe, especially in emerging EV markets
- Consolidation allows for scaling operations, reducing per-unit costs and increasing profitability
- Price is likely to be pressured with greater transparency & volume benefiting larger players

Maturing tech and value chain
- Asset downtime, poor UX and excessive support requirements are current industry struggles
- Technological advancements will lower equipment and operational costs, as well as reducing downtime and maintenance costs, which will contribute to better margins
- Legacy in-house tech stacks likely to be replaced by best-of-breed software for CPMS / eMSP

More service and market segment focus
- Service and segment focus to improve operational efficiency and enable customized services tailored to specific end-markets with potential for premium pricing
- Specialization enhance brand identity, leading to customer loyalty and repeat business

Emergence of additional value-added services
- A more integrated ecosystem will enable companies to offer value-added services (smart charging, flexibility services etc.) through partnerships, increasing ARPU and profitability
- Successful smart-meter rollout enables companies to track consumer's load over time and provide dynamic pricing models based on real-time energy prices

Source: Strategy& analysis

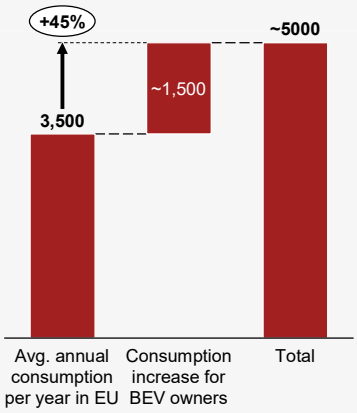
4 EV charging in wider ecosystem

BEV adoption unlocks new opportunities to monitise optimisation of the increased power consumption with unfolding grid management and power production

EV charging as a piece of a wider e-mobility ecosystem[1]

Household electricity consumption

(kWh/year)



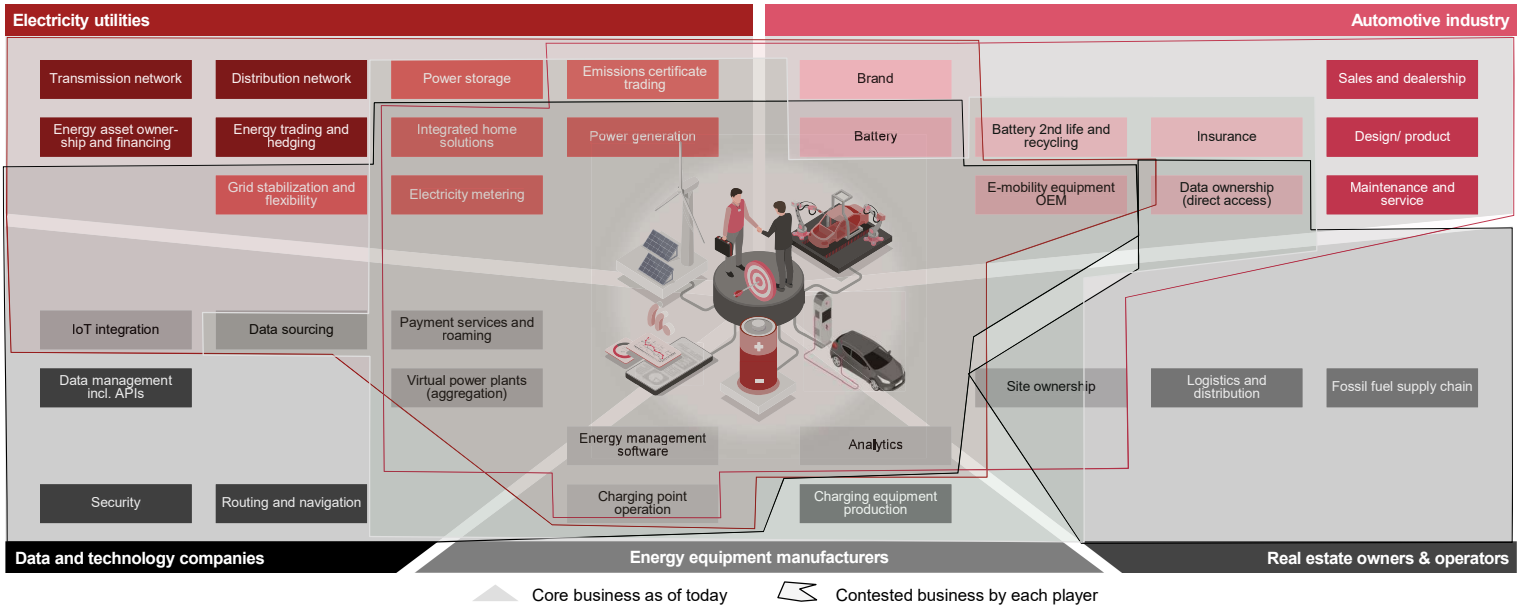
In the EU, **BEV ownership typically raises household electricity usage by ~45% on average**. Enabling this at scale requires greater grid stability, yet can be paired up with smart energy management and distributed generation & storage (incl V2G) for optimisation and aggregation across devices and locations

Control of assets together with strong customer relationships through intuitive and hassle-free user engagement, increasingly key to monitise usage optimisation, and grid flexibility

1) year range indicates "scaled market product" with mass market adoption across Europe
Source: Eurostat, Strategy& analysis

To enable the e-mobility ecosystem traditional industries increasingly overlap and are contested – JVs and partnership are key to prove and scale opportunities

E-mobility ecosystem overview – selected value pools



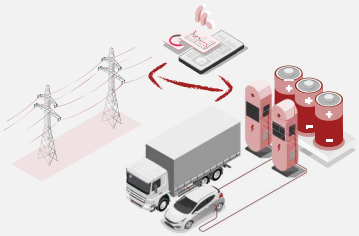
Source: Jacobides, M.G. (2022) "How to compete when industries digitize and collide: an ecosystem development framework" ; Strategy& analysis

Existing partnership illustrate how different players come together to try and test tapping into the evolving value pools

Selected partnerships 2024-25

Sparkion / Recharge

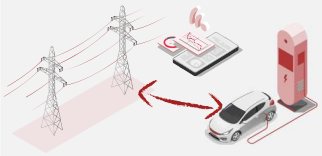
Sparkion will provide energy management services needed to utilize energy from batteries installed at Recharge's own charging stations in locations where the grid operator is unable to provide the necessary power for high power charge points.



Sparkion helps CPO to operate sites earlier, reducing cost of transmission, & optimising potential capacity for placement in flex markets

Tibber's Grid Rewards

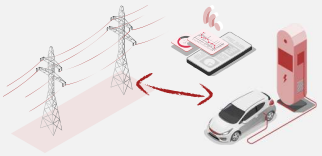
Tibber has launched Grid Rewards, a program where users can earn money by allowing their electric vehicles and other smart devices to help balance the electricity grid. This involves connecting devices like EVs and Homevolt batteries to Tibber's Virtual Power Plant (VPP) technology



EV gets financial rewards by allowing Tibber to pause charging in periods with high grid demand, which in turn earns on aggregating volume for flex markets

Octopus / Zaptec / BYD V2G bundle

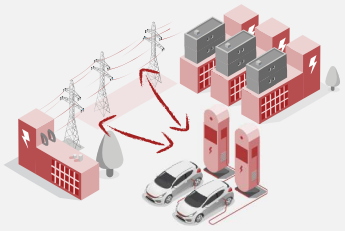
UK's first vehicle-to-grid (V2G) bundle - BYD Dolphin, bi-directional charger from Zaptec and smart tariff from Octopus Energy– offering drivers completely free home charging and turning EVs into flexible energy assets.



Octopus provides charging for free for end-user in exchange for using the EV as an energy asset in the flexibility market while

Utrecht's V2G ecosystem

First fully operational V2G ecosystem in a European city, designed to stabilise the grid while giving Utrecht residents an affordable, sustainable mobility solution.



Utrecht facilitates the city's shared EVs fleet to both benefit and participate in the larger energy ecosystem

Source: Desktop research, Strategy& analysis

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Thank you

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