

Energizing the Future: Strategies for Scaling Europe's EV Charging Infrastructures

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Introduction

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PTR Inc. Capability Statement



Enabling Proactive Decision Making by Empowering Businesses with Tools and Information Based on Transparent Methodologies.

PTR Inc. is committed to being your **Strategic Growth Partner** in the Electrical Infrastructure Manufacturing Sector. Leveraging our unparalleled expertise and diverse capabilities, we deliver tailored solutions and strategic insights to empower your growth and business development efforts. Through collaborative service offerings, we drive sustainable growth and ensure long-term success for our valued clients.

Market Research

- Bespoke and syndicated market intelligence reports
- Extensive datasets and reports covering over 40 countries worldwide.
- In-depth research methodology backed by data accuracy & transparency.

Marketing Support Services

- Content Creation, syndication, and marketing advisory services aimed at promoting cutting-edge technologies, products, and services for our clients across the energy value chain via content collaborations on:
- Whitepapers
 - Webinars
 - and more..

Advisory

- Strategic growth partners for businesses, governments, and investors, specializing in,
- Commercial advisory
 - Go-to-Market Strategy
 - Opportunity Assessment
 - New Market Entry
 - Market Access and Policy
 - Pricing Strategy
 - And more.

Cognito

- PTR Expert Network offers its clients a diverse panel of industry experts spanning multiple sectors across the energy value chain, delivering
- Broad Industry Coverage
 - Expertise Across Hierarchies
 - Global Reach

Matos AI

- Industry Agnostic data automation tool
- Data acquisition and AI-powered market research
 - Bulk download options
 - Real-time data streams
 - Data outputs in several forms

PTR's Electrical Assets & Infrastructure Topic Coverage

PTR's Coverage in terms of Be-spoke, Syndicated, and Advisory Services for Power Grid and New Energy Topics



Transformers
(Distribution, Power)



Switchgear
(HV, MV)



Flexible AC Trans. Systems
(SVCs, STATCOMs)



HVDC Market Analysis
(VSC, LCC, Cables)



AI in Power Grid
(DERM, DR, VPP, & EVs)



Grid Investment Tracker
(TSOs & DSOs)



**Grid Modernization & Flexibility
Technology Leaderboard**



Substation Automation
(Dist. vs Cent.)



Port Electrification
(Shore-to-Ship, Microgrid)



Smart Meters
(Power Quality, AMI)



Power Factor Correction
(Active, Passive)



Grid Communication
(Private LTE, 5G)



Industrial Motors & Drives
(MV/LV - Custom)



EVCI (EV Charging Infrastructure)
(Public, Private, Passenger/Comm.)



Energy Storage Value Chain
(Utility Scale, C&I)



Commercial & Off-highway Vehicles
(BEVs, PHEVs, FCEVs, ICEs)



Hydrogen
(Tech., Demand, Value Chain)



Impact of EVs on Power Grid
(Quantitative, Trafos, Switchgr.)



Financial Trackers
(Grid Investments,
Company Financial Breakdowns)

Current EV Market Landscape

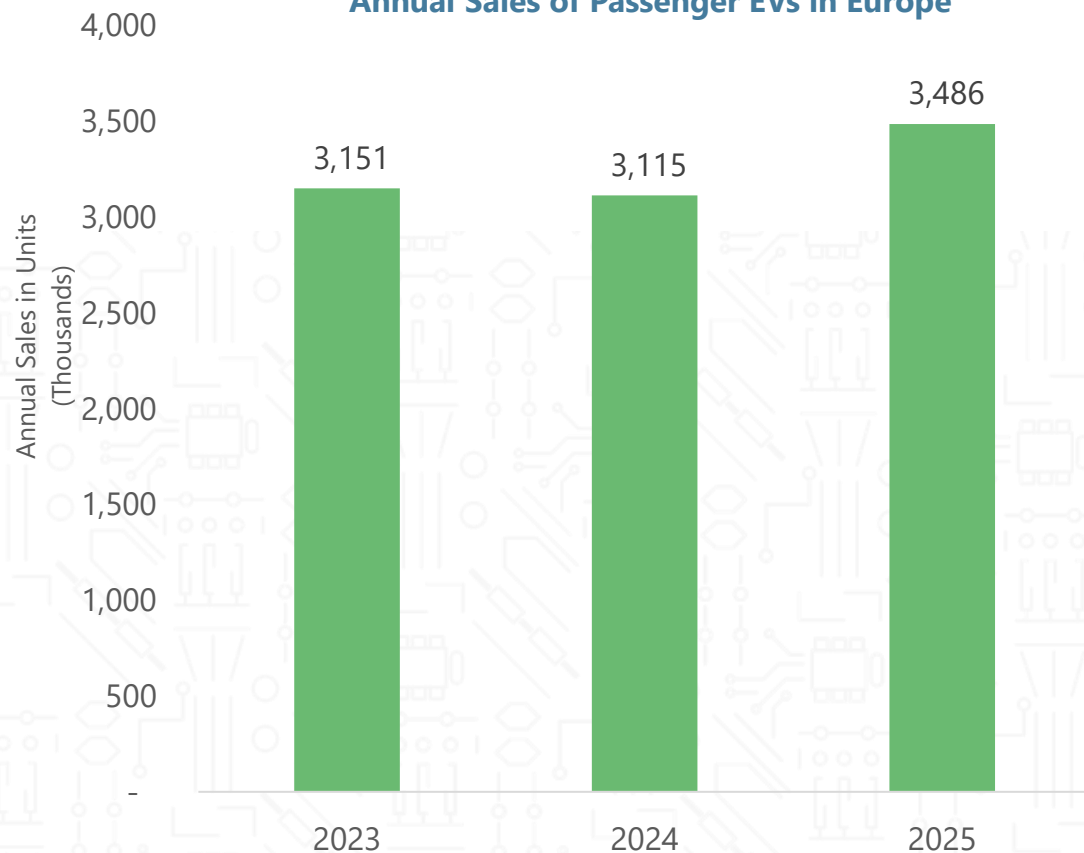
02

EV Market Rebounds, Setting Stage for Infrastructure Scale-Up



Market resurgence and policy tailwinds reignite Europe's EV growth trajectory

Annual Sales of Passenger EVs in Europe



- **Strong Market Recovery:**

- EU BEV sales up **25%** YTD (to September 2025) vs. 2024; PHEV sales up **32%**, signaling renewed consumer demand.
- Strong national recoveries: UK (+29%), Germany (+38%), Austria (41%), Spain (+89%), and Poland (+106%) in BEV sales.
- Germany, Spain and Poland have already **surpassed** their full-year 2024 BEV volumes within the first nine months of 2025.

European EV Market Drivers: Targets and Incentives

Despite EV slowdown last year, the region's market will expand driven by ambitious policies and incentives in the long run

Targets & Incentives in Major European Markets

United Kingdom:

- **300,000 CPs** by 2030
- **£650 million** Electric Car Grant offering up to **£3,750**
- ZEV Mandate:
 - **80%** by 2030
 - **100%** by 2035
- Financial incentives for EVs and EVCI

France:

- France 2030 Investment Plan:
 - **€370 million** subsidy for EVs
 - Tax exemptions and financial incentives for EVs only
- ADVENIR Program 2027:
 - **520 million EUR**
 - **250,000 CPs** target

Italy:

- **€597M** funding through mid-2026 aimed at replacing ~39,000 ICE vehicles.
- Incentives: up to **€11K** for private BEV buyers (with scrappage) and **€20K** or **30%** for micro-enterprises purchasing electric LCVs

Nordics:

- Norway:
 - **89%** new vehicles sold were electric in 2024
 - All new trucks to be electric by 2030
- Denmark: **775,000** electric or hybrid cars by 2030
- Tax exemptions and financial incentives for EVs and EVCI

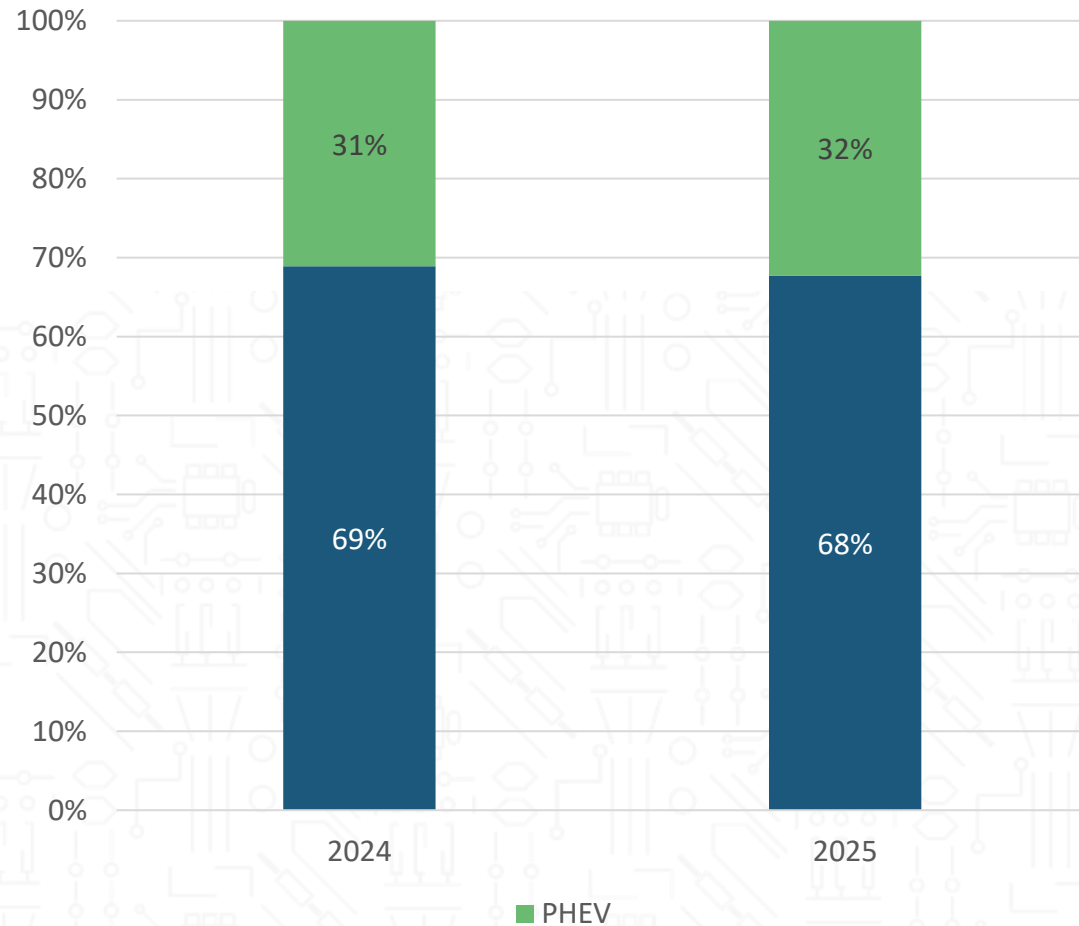
Germany:

- **15 million EVs** on roads in 2030
- **1 million CPs** in 2030
- Germany to reintroduce consumer aid, with a **€3 billion** package announced in October 2025 to assist low- and middle-income households.
- Germany also launched supply-side incentives, featuring accelerated depreciation, tax relief, and infrastructure support to drive fleet electrification.

Tariffs and Market Uncertainty Reinforce Europe's Broader PHEV Transition



Shifting trade dynamics and cost pressures reignite momentum for plug-in hybrids



- **Chinese OEMs pivoting to PHEVs:**

- EU imposed anti-subsidy tariffs of 17%–35.3% (plus 10% base duty) on Chinese OEMs from July 2024, citing unfair state support that enables Chinese OEMs to undercut European competitors.
- EU–China trade talks progress toward a minimum pricing agreement to replace tariffs; technical terms largely finalized by July 2025, pending political approval from the EU side.
- Chinese manufacturers are adapting strategically, with BYD and MG pivoting to plug-in hybrids that face lower duties.

- **Broader PHEV transition:**

- PHEV sales grew 32% YoY, outpacing BEV growth as inflation and economic uncertainty weaken full-electric demand.
- Automakers are turning to PHEVs as a lower-risk compliance tool, balancing affordability pressures with regulatory mandates.
- Major OEMs are revising electrification timelines:
- Volkswagen is expanding its PHEV lineup and considering German factory closures to streamline costs; Volvo, Audi, and Mercedes-Benz have delayed full-EV targets or model rollouts; Jaguar Land Rover and Bentley have postponed upcoming BEV launches amid stronger PHEV demand.

Current EVCI Market Landscape

03

EU and National Funding Underpin Sustained Charger Network Growth



Funding Initiatives and Policy Support Reinforce Europe's Charging Network Expansion



PEVs on roads (EOY '25)

18 Million



Installed Public EVCI (EOY '25)

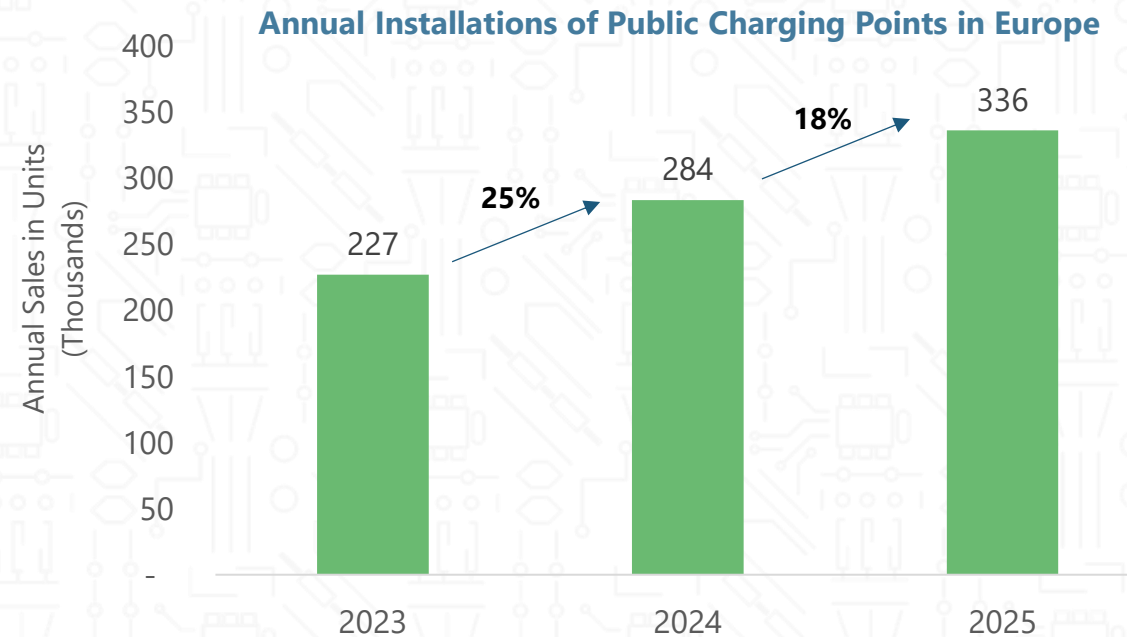
1.4 Million



Annual share of top 5 markets (EOY '24)

60%

- Charger installations rose 18% YoY, supported by strong EU and national funding.
- Charger revenues increased 19% YoY, with high-power DC chargers' revenue expanding faster at 23%.
- In parallel to AFIF and other EU funds, France, Germany, and other major economies are deploying domestic funding programs to complement EU-level initiatives.
- The Netherlands leads Europe in charger density, with more than 190,000 public charging stations installed as of 2024.
- Norway hosts over 34,000 public chargers, maintaining the world's highest per capita coverage.



Regional disparities across Europe

Despite Uneven Rollout, Europe's Charging Network Holds Significant Room for Growth

1. Concentration of Chargers

- The Netherlands, France, and Germany host ~48% of installed chargers but cover only 10% of their land area.
- London alone has more chargers than several EU nations like Romania.

2. Regional Disparities:

- The Netherlands has 31× more chargers than Romania, despite being 6× smaller.
- Only ~15% of England's chargers are in rural areas, exposing an urban–rural access gap.

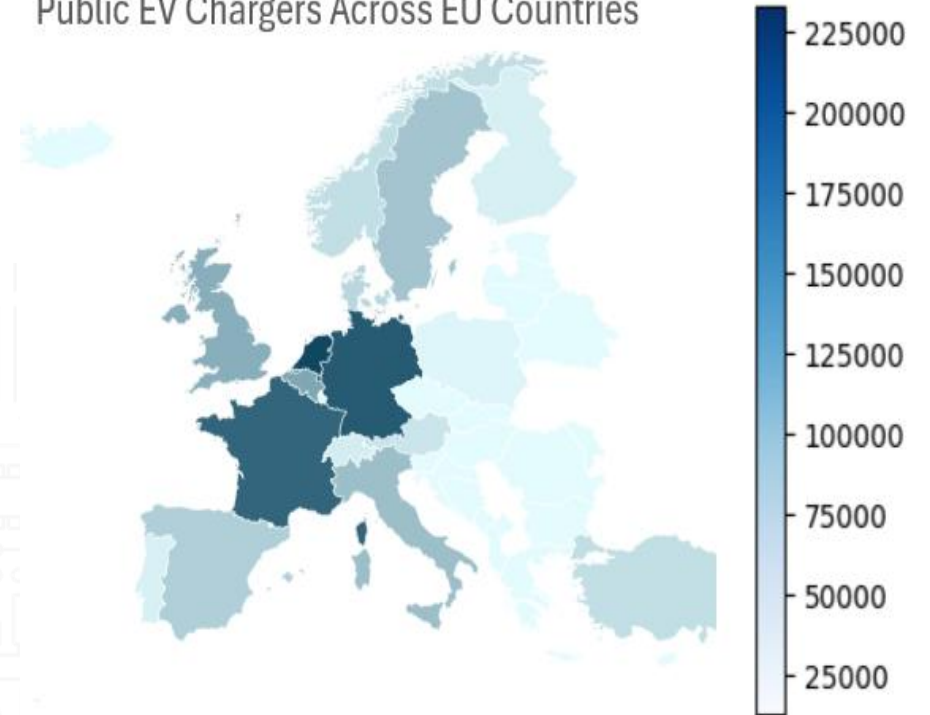
3. Technical and Market Trends:

- Western Europe: High charger density, mix of low/high-power units.
- Eastern Europe: Fewer stations but higher average power (Croatia 43 kW, Turkey 44 kW, Czech 39 kW).
- Southern Europe: Spain, Italy, Greece, gaining momentum; Ireland, Malta, Cyprus remain underdeveloped — untapped growth potential.

4. Uneven Growth vs. Vehicle Demand:

- As BEV fleets grow, many regions' charger-to-vehicle ratios exceed the EU's 1:10 benchmark, signaling huge investment and innovation opportunities.

Public EV Chargers Across EU Countries



AFIF and AFIR: Key Instruments Shaping EVCI Development Across Europe



Deployment of AFIF/AFIR is a crucial component in shaping the EVCI development across Europe

Alternative Fuels Infrastructure Regulation: Solution to Uneven Development of EVCI in the EU



The 60 km Rule Along the TEN-T Network

- For LDVs, **150 kW** charging station every **60 km**
- Charging capacity of at least **1.3 kW** per registered BEV
- For HDVs, **350 kW** charging station every **60 km**



Pricing Transparency

- At charging points above **50 kW**, pricing should be **energy-based**, i.e., per kWh
- Ad hoc card payments to be available at all charging stations above **50 kW**



Smart Charging

- All public charging stations should have the ability to **charge smartly**



Open Data

- Unrestricted access to the **availability, location, waiting time, operational status, and price** at charging stations



AFIF Infrastructure Funding

- The AFIF programs have granted €1.7 billion since 2021.
- Funding distribution: public charging ≈ 60% (€1.1 billion); hydrogen refueling ≈ 23% (€0.4 billion); and airports, shipping, rail, and rest ≈ 17%.

Existing Challenges for EVCI in Europe

Structural bottlenecks and grid constraints threaten Europe's charging ambitions



Uneven Charger
Deployment and
Fragmented
Incentives



Prolonged
Approval and
Permitting Delays



Investment
Challenges and
Capital Pressure



Grid Constraints
and Supply
Bottlenecks

Implications:

- The EU will fall well short of its 2030 charging target; current structural constraints make sustaining installations at the required ~412,000 units per year highly unlikely.
- The EU's Fit for 55 package and 2035 ICE ban hinge on rapid EV adoption, but slow charger deployment risks derailing these targets and prolonging transport emissions, which represent about a quarter of the EU's total.

Strategies to Scale the Market

04

Strategies for Scaling Charging Infrastructure Across Europe



Recent developments in the EV & EVCI market in Europe: EV OEMs realigning their strategies

1

Identify priority EV charging areas

Uneven charger distribution - High concentration in urban hubs and shortages along interurban/rural corridors create range anxiety and limit long-distance travel.

Imbalanced demand-supply - Oversupply in low-demand zones leads to underutilization, while shortages in high-demand areas cause queuing, grid stress, and lost revenue.



Targeted funding and planning: Programs like AFIF and Deutschlandnetz direct investment to high-value corridors, while cities increasingly use data-driven site selection, integrating demand, grid, and land-readiness factors.

Planning-oriented models: Cities such as Stockholm pre-select high-potential locations to ensure efficient deployment.

Fastned's H1 2025 results show the payoff - revenue up 44% YoY to €54.3M, with a pipeline of 606 secured sites driven by strategic location capture.

2

Integrate long-term grid expansion and renewable energy into EVCI strategies

Grid & renewables integration: Align long-term grid expansion with clean energy sourcing to future-proof charging networks.



Next-gen approach: Networks like IONITY power stations with renewables (wind, solar, hydro) or use green energy contracts, cutting lifecycle CO₂ emissions.

Proactive planning: Embedding renewable integration early reduces retrofit costs and mitigates grid strain as demand scales.

Strategies for Scaling Charging Infrastructure Across Europe



Streamlined Permitting and Coordination Shorten Deployment Timelines

3

Streamlined Permitting and Coordination Shorten Deployment Timelines

Deployment Delays for High-Power Chargers (150+ kW):

- Typical deployment timeline: 12–18 months
- Planning approvals alone take ~8 months on average

Grid Connection Lag

- DSO assessments add minimum of 1–3 months
- Final site approval takes an additional 2–3 months post-assessment

Complex Multi-Agency Coordination

- Sequential involvement of city planning, highways, energy, and environmental authorities
- Lack of unified permitting leads to cascading administrative delays



Early Coordination & Planning

- Align municipal planners, DSOs, and CPOs early to ensure grid capacity readiness before construction.
- Stockholm model: City-curated site maps pre-clear feasibility and local approvals, cutting early-stage delays.

Streamlined Approvals

- Enforce permitting deadlines and create single-window approval systems for charger deployment.
- Use pre-approved templates for site and design submissions to reduce administrative cycles.

Standards & Interoperability

- Implement standardized technical and interoperability codes under AFIR to minimize OEM–CPO friction and ensure network compatibility.

Strategies for Scaling Charging Infrastructure Across Europe



Collaborative Investment Frameworks Unlock Scale and Sustain Private-Sector Momentum

4

Structured Public-Private Models to Accelerate Deployment

Germany – Deutschlandnetz

- €1.8B in subsidies to attract private capital for 9,000 high-speed chargers.
- Addresses “white-spot” regions → ensures equitable national access with private-sector efficiency.

Public R&D and Municipal Pilots

- V2G & advanced tech funding reduces first-mover risk and accelerates market entry.
- Utrecht’s V2G pilot (Renault, We Drive Solar, MyWheels, City of Utrecht) shows how municipal-corporate partnerships scale renewable integration.

5

Leveraging Finance to Scale Infrastructure

Capital Markets & Green Finance

- EIB & CEF programs: Offer concessional loans & guarantees → de-risk large-scale corridor projects.
- Fastned: €71M retail bond issues → 44% H1 2025 revenue growth, enabling corridor expansion.
- GRIDSERVE: £526M sustainability-linked loan → Europe’s largest private EV charging financing, reducing cost of capital.

Strategies for Scaling Charging Infrastructure Across Europe



Shift to Modular and Smart-Charging Architectures Enables Scalable, Grid-Integrated Growth

6

Shift to Distributed Architecture Enables Scalability, Improved Utilization and Efficiency

Transition to Modular, Distributed Hubs

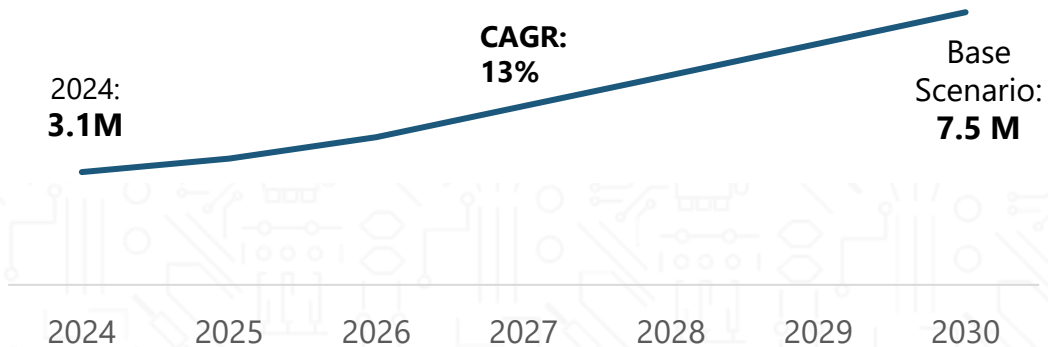
- Europe is shifting from standalone chargers to distributed, modular hubs to manage grid constraints and improve utilization efficiency.
- Modular hubs support dynamic power allocation and load balancing across multiple EVs, from trucks to passenger cars.

Key Takeaways: Navigating the Future

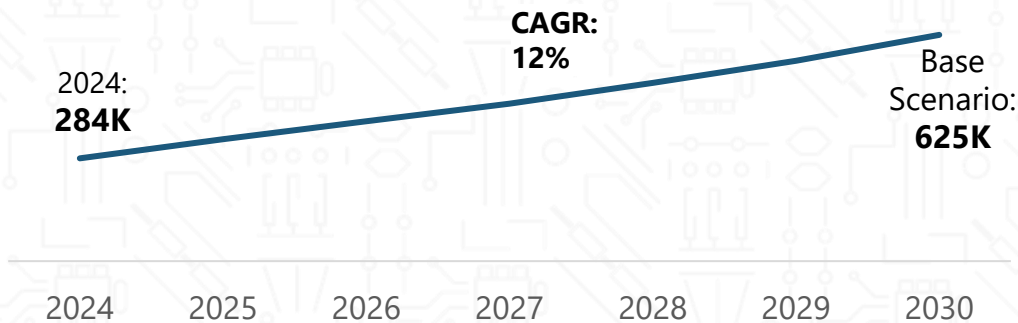


Building an Equitable, Resilient, and Renewable-Integrated Charging Network

Europe – Number of EVs (units)



Europe – Number of Public EV Charging Points (units)



- **Prioritize affordability and access:** Expand subsidies and cost-effective EV options to sustain momentum amid inflation and consumer uncertainty.
- **Correct regional imbalances:** 48% of chargers concentrated in NL, FR, and DE; rural and interurban gaps persist, limiting mass adoption potential.
- **Accelerate infrastructure expansion:** Leverage European, national programs, and blended green finance to close charger gaps to achieve equitable EU-wide coverage.
- **Integrate grid and renewables early:** Pair charging rollout with clean energy sourcing, digital load management, and V2G pilots to reduce future retrofit costs and grid strain.

PTR's EVCI Market Research



Analysis of the EV & EVCI Market Around the Globe



EV and EVCI Hardware Market

- Installed and Annual Market forecast in Capacity, Application, and Owner's views from 2022-2035 (Units, Revenue)
- Public Policies and Plans
- Charger Pricing
- Market Shares, Top Suppliers
- Presentation of data in the PowerBI platform



EVCI Ancillary Service Market Sizing

- Installed and Annual Market forecast from 2022-2035 (Units, Revenue)



EVCI Market Competitive Analysis Report

- Mergers & Acquisitions (M&A)
- Company Profiles of 20 leading EVCI OEMs



PTR Sonar EVCI

- Weekly updates on key market happenings
- Proprietary desktop/mobile app

