

Webinar

Charging forward

A look at trends, developments and challenges on the European EV charging market



MOBILITY 46



Agenda

- Introductions
- Context for the Automotive industry and inflection points linked to autos and EV-charging
- Current state of the global market
- A look at the EV-charging value chain
- Current trends and developments in the market
- A look at Sweden vs. Norway vs. Germany
- Utilization of charging infrastructure
- General take-aways and summation



Steven Van Arsdale

Steven is Autofacts Lead Analyst at PwC in Frankfurt am Main, Germany, leading the German Autofacts team. He possesses more than 5 years of work experience in analysis, consulting and directly at an OEM.

Steven holds a Bachelor of Business Administration in Automotive Marketing and Management from Northwood University in Midland, Michigan USA. He also holds a Master of Arts in Automotive Management from Nürtingen-Geislingen University in Geislingen an der Steige, Germany.



Milos Lørup Bartosek

Milos is Director at Strategy& in Norway, PwC's strategy consulting arm, and has more than 10 years of strategy and transaction advisory experience advising corporate as well as financial investor clients across the EMEA region. He is one of the co-authors of the annual Strategy& E-readiness study and Digital Auto Reports.

Milos is an expert on energy transformation with focus on new energy solutions combining renewable generation, storage, and offtake sources (EVs / smart mobility) both in-front and behind the meter powered by smart services and technology. Milos holds MA in Economics and Finance from Heriot-Watt University in Edinburgh, United Kingdom and is a Chartered Financial Analyst (CFA).



Johannes Asp

Johannes is CEO and co-founder of Swedish SaaS company Mobility46, a leading tech company in business systems for digitizing parking, EV charging and mobility.

With his +10 years experience in business development in parking, EV charging and mobility, Johannes is a highly valued speaker and industry advisor. He was keynote speaker at The European EV Charging Summit in Rotterdam and has participated in several industry conferences and podcasts over the years.

Johannes holds a Master of Laws (LL.M.) from University of Stockholm and is a Chartered Alternative Investment Analyst (CAIA).

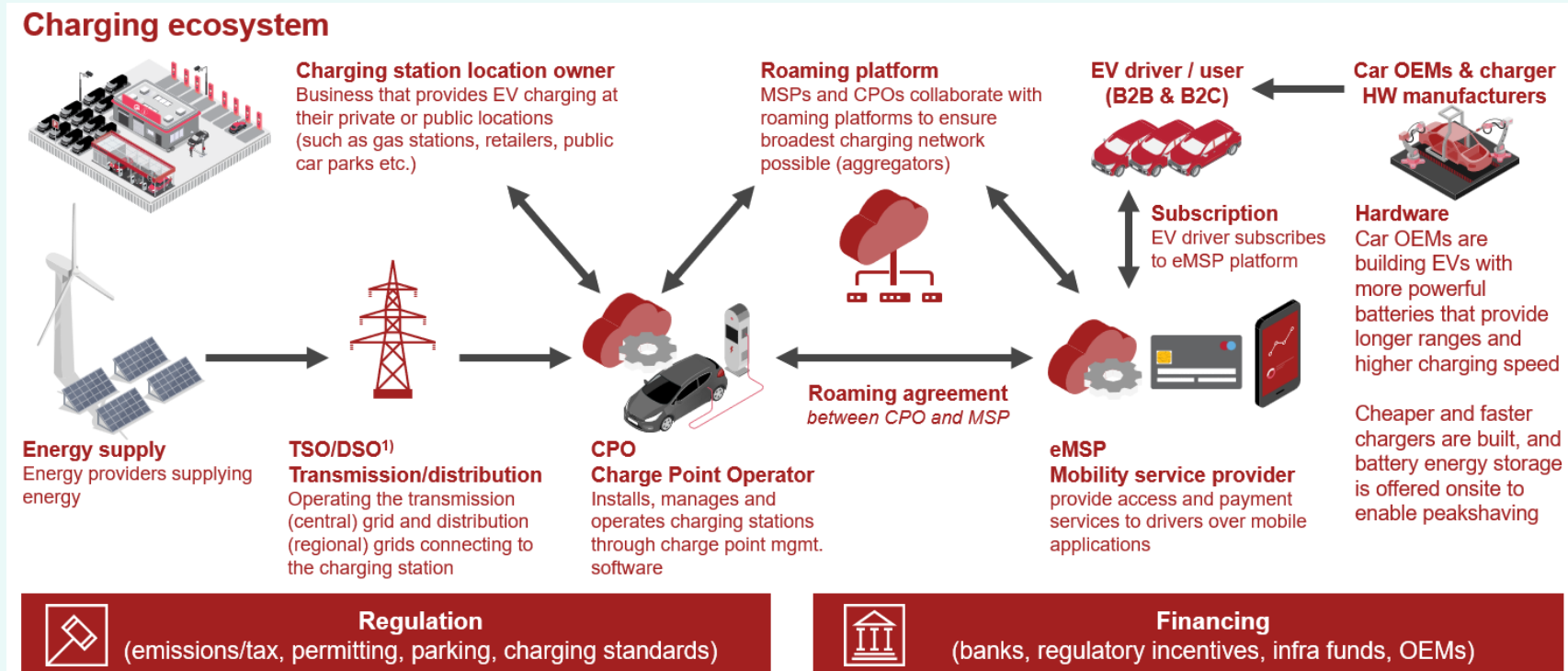


Terminology

- **AC** = Alternating Current, a type of electrical current, in which the direction of the flow of electrons switches back and forth at regular intervals or cycles
- **BOP** = Balance of Plant, a power engineering term which refers to the various supporting and auxiliary components of a power plant system required to produce energy. BoP systems provide the support needed to keep the plant running stably and efficiently.
- **CAPEX** = a capital expenditure, sometimes called a capital expense, which is money a company uses to purchase, maintain, or expand fixed assets
- **CPO** = Charge Point Operator
- **CSO** = Charging Station Owner
- **DC** = Direct current, an electric current that is uni-directional, so the flow of charge is always in the same direction.
- **eMSP** = eMobility Service Provider, a company or organization that provides electric vehicle (EV) charging roaming services.

Context for the Automotive industry and EV-charging

- Regulatory push is meeting commercial commitments & business viability
- Multi party interdependent EV charging ecosystem (OEMs cannot develop alone)
- Technological uncertainty and grid availability



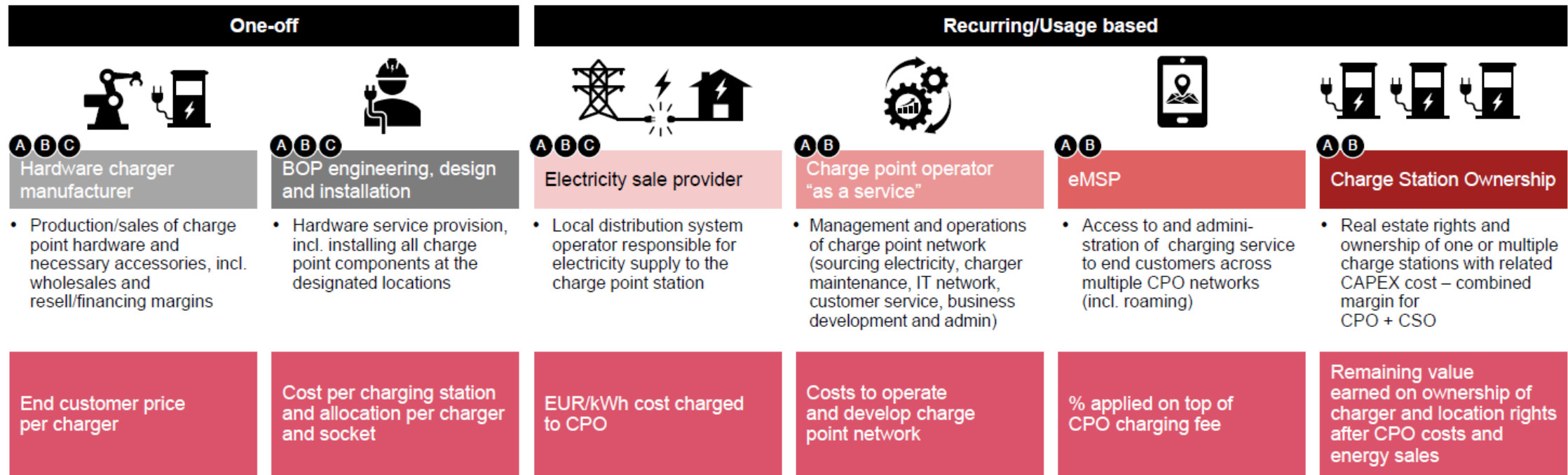
Current State of the EV Market

- H1 2023 and Q3 2023 EV sales
 - Powertrains (Sunsetting of plug-in technology in EU/ full shift to BEV)
 - Across Europe BEVs reached 21% of the overall market in August (+118%). The BEV powertrain was also more popular than diesel.
 - At the same time PHEVs decreased from 8.5% to 7.4%
 - Both results are significantly impacted by Germany with BEVs up over 170% and PHEVs down by 41%
 - August was a unique month for Germany with incentive changes. For the month of September BEVs were down nearly 29% to a 14.1% share and PHEVs down by 45% for a 6.9% share of the market.
 - Trigger point of 16% share of new sales (BEV sales update)
 - August YTD, 15 of 31 European countries have surpassed this inflection point
 - Norway has the highest share at 83%
 - Romania with 10.6% is ahead of two top 5 countries (Spain and Italy)


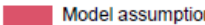
There are six main value pools in the EV-charging value chain, from infrastructure build-up to pure-play software positions

Main value pools and model parameters

Analyzed charging market components for private and public charging segments



Additional value pools out of scope: Demand from PHEV, Smart energy (vehicle to grid and behind the meter solutions), location and owner specific Value Added-Services

Strategy&
 DC = Direct current AC = Alternating current BOP = Balance of plant CPO = Charging point operator eMSP = Electric mobility service provider CSO = Charging station owner
 Output  Model assumption **A** Public fast charging **B** Public slow charging **C** Private charging

Sweden vs. Norway vs. Germany

- Where are we now?
 - TCO BEV vs. ICE. Pace of BEV rollout
 - Charging behaviour
 - Private vs. public
 - Fast Charging vs. Slow Charging in private access Car parks
 - Real Estate owners role in EV charging infrastructure
- What trends are emerging? Where are we going?
 - What infrastructure and when to build
 - Dwell time very important to establish EV charging needs (levels of power output)
 - What revenue models do we see
 - CPO's role and operating margins (equilibrium) and CSO's role and CapEx appetite
- Which touchpoints/issues are top of mind/most frequently discussed?
 - Regulatory questions, building permits, subsidies for BEVs and Infrastructure
- What are the main challenges that we face?



Utilization of Charging Infrastructure

- What is the estimated long term ratio/split of charged kWh between public fast charging and private slow charging?
 - Starting point is to charge slow <11kW at places of longest dwell time (home, work)
 - As market adoption grows, less opportunity to charge slow, move towards public
 - Charging speed drives the kWh -> observed shift towards faster 150kW+ public chargers while private
 - Shift from 75–80% “private slow” in ‘21/’22 towards 40–45% of kWh by ‘35 in Europe (in Sweden, >90% charging is “private slow”)
- What is the estimated long term price/kWh at public fast charging vs. private slow charging?
 - A range of prices observed today within public (highway, destination)
 - Cross-subsidy models
 - Food & other retail to drive footfall / dwell time
 - Players with energy market assets/ exposure to drive arbitrage
 - Integrated play
 - Tesla as a price leader with dynamic and competitive price
 - Most integrated players from HW to SW and operations

Want to know more? Read PwC/ Strategy&'s latest on the Auto / charging space



[eReadiness](#)



[Electric Vehicle Sales Review](#)



[Digital Auto Report](#)



[EV Charging Market Outlook](#)

Thank you!



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