

Investment in EV Charging Businesses

Considerations for investors in a complex
and rapidly growing landscape

July 2021



Introduction

The race for investment targets in electric mobility (eMobility) and electric vehicle (EV) charging services is now at a peak as the industry experiences fundamental transformation. For investors, it is increasingly difficult to identify eMobility businesses and charging services investments as companies continue to be acquired by eager buyers. While the charging market is experiencing intensive growth, few entities are now available for acquisition. Alternative methods to venture capital and private equity funding, such as special purpose acquisition companies (SPACs), are more prevalent despite the perceived investment risk. However, EV original equipment manufacturers (OEMs), data and service companies, charging networks or infrastructure companies continue to receive funding and go public by means of a SPAC on the basis of a strong outlook.

Demand for electric vehicles is expected to outpace internal combustion engine (ICE) vehicle sales by attracting mass-market adoption driven by environmental regulations and changing consumer views. As the retail cost of EVs declines due to improving battery technology, the increase in EV sales will correspondingly prompt growth for charging infrastructure, currently a pain point for consumers in some markets. This rapid growth has spurred innovative solutions to improve consumer experience and increasingly seamless solutions. Investors are looking to capitalise on this market for developing infrastructure to address consumer and commercial demand over the next decade.

This paper aims to evaluate the changing EV investment landscape, key players in the market, investment opportunities and overall market growth. Leveraging Hsubject Consulting's eMobility expertise and Charles River Associates' (CRA) energy expertise with our combined strategic positioning and extensive network in the market, we guide investors to make well-informed decisions and have developed a tailored approach for those ready to enter the market.

Our key findings bring light on how investments in EV charging could be approached:

- Investors are perceiving EV charging businesses as highly promising investment targets based on their long-term revenue projections, however the relevance of strategic investments in this area cannot be underestimated as has been displayed by the performance of recent SPACs
- Most EV charging businesses either underwent a public offering to access financing to innovate quicker or were acquired by major firms in order to access their established networks and financial backing
- EV charging businesses differentiate significantly by market approach and business model – each investment should be considered independently and without the right strategic due diligence, the risk for poor investment is high

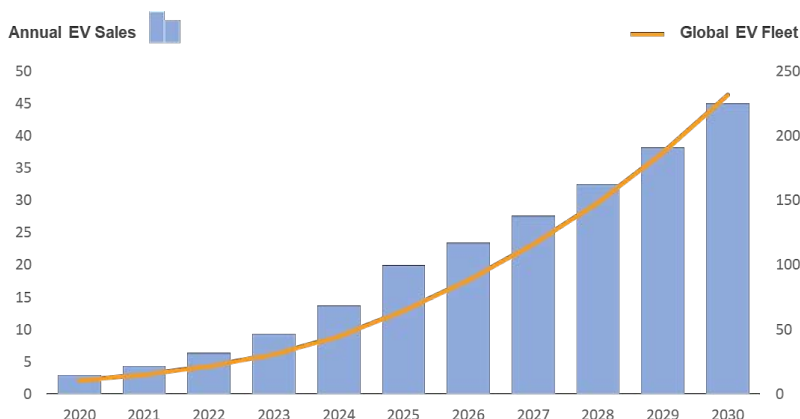
EV market growth

The EV is clearly becoming mainstream with more than 400 battery electric vehicle (BEV) models expected to be released in the next few years as automakers adapt to growing consumer demand. Despite an overall global auto market shrinkage in 2020 of 14% vs. the previous year precipitated by the pandemic, EV sales grew by 43% in the same

period¹. With emission targets and energy transition milestones drawing ever closer, the EV market is expected to grow even faster, and in turn, so will the demand for EV charging solutions. For example, the UK charging infrastructure market showed strong growth in 2020, with the number of public charging points increasing by 24%, displaying the continued need for investment in this segment.

Considering only the European growth of EVs, it is expected that in turn it will create a charging infrastructure opportunity of USD 43 billion by 2030². In recent years, this market has seen huge interest from start-ups, established utilities and oil and gas companies, all pursuing different segments of the value chain with various business models. EV growth scenarios are continually explored by analysts at many organisations with varying levels of expected positive growth. One noteworthy example is the International Energy Agency (IEA), which recently published their 2021 outlook for global EV sales, forecasting the global EV fleet to grow from 11 million in 2020 to 145 million (in its Stated Policy Scenario) or over 230 million (Sustainable Development Scenario – see Figure 1) in 2030.

Figure 1: Global EV sales and fleet outlook to 2030³



Since releasing its 2021 EV outlook, a more recent IEA⁴ report explores a more aggressive transition scenario with a route to net zero in 2050 that would require no new passenger ICE sales globally by 2035. It also highlights that light-duty vehicles are being electrified faster in advanced economies over the medium term and, in order to hit that net-zero target, light-duty vehicles will need to account for around 75% of global sales by 2030.

In summary, the growth of the eMobility market is highly dependent on five key factors as displayed in Figure 2 that will be further discussed in the subsequent section. These factors are generally interdependent and should be developed in an aligned fashion if we are to achieve stable and sustained growth.

¹ [EVvolumes.com](https://www.evolumes.com).

² Alexander Krug, et al., “Electric Vehicle Charging in Europe”, Arthur D. Little, January 2021.

³ IEA, “Global EV Outlook 2021” – Sustainable Development Scenario Outlook, p. 75.

⁴ IEA, “Net Zero by 2050 A Roadmap for the Global Energy Sector”.

Figure 2: eMobility industry – key market growth dynamics

Regulation and incentives	Competitive dynamics	Technology	Consumer demand	Charging infrastructure
<ul style="list-style-type: none"> Many US states are participating in the Zero Emission Vehicles (ZEV) programme In Europe, 24 countries levy taxes based on CO₂ emissions and/or fuel consumption In China, EV quotas and incentives and limits are present, linked to Corporate Average Fuel Consumption (CAFC) 	<ul style="list-style-type: none"> Utility companies acquiring start-ups Oil and gas companies using their network to develop segments, also through acquisition Start-ups having faster routes to raise capital via SPACs Partnerships being formed to link segments of the value chain e.g. PodPoint and supermarkets 	<ul style="list-style-type: none"> Battery technology improvements resulting in increased range possibilities (350 miles per charge), in turn enabling falling battery prices to reduce TCO Digital architecture enabling choice, transparency and access for consumers EV technology advancing to bring a refined offering to consumers 	<ul style="list-style-type: none"> EV model offerings estimated to rise to over 400 through 2025 Overall market penetration remains slow ~2.5% Unknown demand curve for EVs, dependant on supporting factors 	<ul style="list-style-type: none"> Infrastructure rollout accelerates to keep up with EV production Seamless charging experience has room for improvement Electricity generation and grid capabilities to be improved for long-term usage (not a short-term bottleneck)

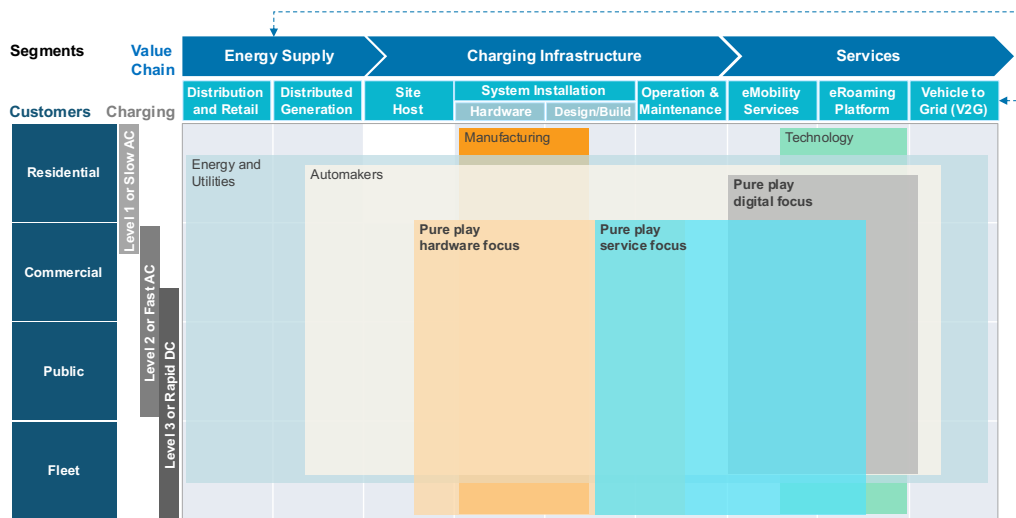
Market segments and emerging business models

The EV value chain has been well documented by industry watchers with numerous frameworks – largely based on the specific vantage point taken. However, EV charging is rapidly growing with evolving business models that do not neatly fit into static categories. For this analysis, we took a somewhat broader view of market segmentation to capture changing sector dynamics (see Figure 3).

Companies with different business models compete to serve a combination of customer and value chain segments, including energy supply, charging infrastructure and services. Companies across segment categories can be classified broadly as pure-play EV charging companies (i.e. EV charging focused start-ups) and expanding incumbents (i.e. larger players entering from external sectors including oil and gas, technology, equipment manufacturing, utilities and auto makers).

Pure plays, such as ones with a hardware, service or digital focus, tend to start from a single segment focus area and expand outward while incumbents, especially energy and utilities, favour acquisitive growth of pure plays as they expand across the value chain. Typically, charging offerings make up the core strategy of pure plays, whilst we see a variety of strategies employed by large incumbents. For example, in the UK, business models range from combining eMobility as part of holistic strategic or service bundles that integrate charging with storage, fleet management and other offers (e.g. SSE), operating charging as a semi stand-alone business similar to a pure play (e.g. BP Pulse), or including charging as a service that is part of a broader integrated offering (e.g. UK Power Networks).

Figure 3: EV Charging Competitive Landscape

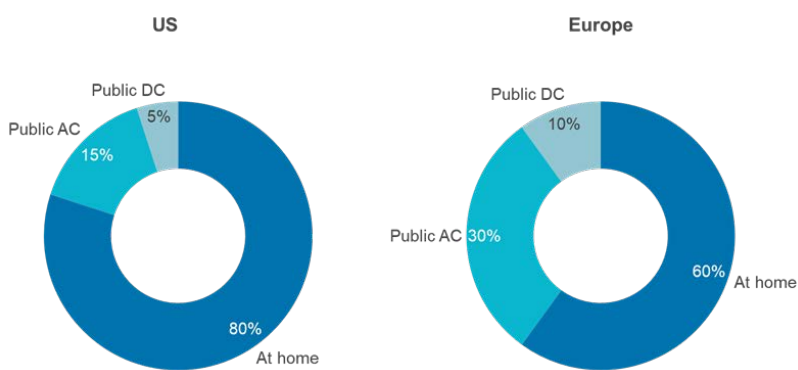


Note: Residential includes single and (small) multi-family housing; Commercial includes work/office, large multi-family, retail and destination charging

Broad passenger EV charging customer segments

Although many factors support rapid electric vehicle adoption globally, adequate charging remains a key challenge. For example, a recent study⁵ in California found that ~20% of EV owners revert back to ICEs for their next vehicle purchase, mostly due to lack of adequate public charging. The severity of this challenge varies by geography, given that the majority of EV charging today takes place at home^{6,7} (Figure 4), with the remainder of charging occurring at work on AC public chargers and fast DC public chargers.

Figure 4: Breakdown of where EV charging takes place



We have broadly categorised the passenger EV charging customers into four segments.

The residential segment is comprised of customers in single-family or small multi-family buildings. Typically, customers install and own level 1 (slow) AC chargers but are increasingly installing level 2 (fast) AC chargers with additional costs. Customers rarely

⁵ Scott Hardman and Gil Tal, “Understanding discontinuance among California’s electric vehicle owners”, *Nature Energy*, May 2021.
⁶ Mark Kane, “The average EV charging cost is \$0.15/kWh”, *INSIDEEVs*, 1 September 2020.
⁷ Transport and Environment, “Recharge EU: how many charge points will Europe and its Member States need in the 2020s”, January 2020.

install higher cost level 3 (rapid) DC chargers. Charging is usually included in utility bills with most charging taking place at home with limited opportunity for add-on services.

Although currently smaller in terms of units, the commercial segment represents a greater opportunity for charging companies given higher upfront investments (for levels 2-3 chargers) and need for additional services. This segment includes workplaces with chargers for employees, retail facilities for customers and businesses, such as hospitality and multi-family buildings, with destination chargers for longer charging periods. Segment revenues include equipment, installation and services to the businesses that own the charging stations who then set prices for public and semi-public EV drivers or provide it as a free service in some cases.

The public segment includes systems not associated with businesses and includes level 2-3 chargers for street parking or along highways. These systems can be owned by utilities, local governments or pure-play charging companies. Typically, revenues are generated from EV drivers through fees, energy charges and/or subscriptions. Lastly, the fleet segment serves the companies with fleets of EVs. These can include governments, car rental companies and taxi services that own chargers in their facilities and/or have a service access model for offsite charging stations. This is an attractive segment for charging companies given high vehicle usage rates and charging predictability.

Value chain segments

We split the EV value chain into three segments. The energy supply segment consists of utilities supplying electricity to chargers. As EV adoption grows, the incremental demand will become a major source of new revenues for utilities. This includes additional energy purchases for EV customers and incremental network capacity that will be paid for by all electric customers (e.g. new generation). Most utilities are now increasingly expanding their business models to include charging services in a more integrated way with the rest of their businesses. Utilities are also well positioned to compete based on existing customer relationships, a deep understanding of the grid systems and easy access to vast inexpensive capital. For example, some US utilities have started to combine forces to develop large EV charging coalitions. On the West Coast, 11 local utilities have joined forces to install a USD 850 million EV charging corridor spanning California, Oregon and Washington⁸. Although the needs differ, European utilities have begun to combine some efforts, for example the collaboration of France's EDF, Germany's E.ON and Italy's Enel on vehicle-to-grid (V2G) pilots in Europe with Nissan and Nuvve (V2G start-up)⁹. V2G is an emerging area which links the supply and service segments by enabling the two-way flow of electricity, allowing customers to sell stored energy to the grid during peak demand and charge during low demand hours. Customers can benefit from significant cost reductions whilst utilities reduce generation and grid upgrade costs. The unlocking of the V2G market could greatly support the demand response requirements of the grid. This opportunity, in turn, sees a forecasted V2G market valuation of USD 5 billion by 2024¹⁰.

⁸ [West Coast Clean Transit Corridor Initiative](#), June 2020.

⁹ Christoph Steitz, et al., "[European power firms aim to harness electric car batteries](#)", *Reuters*, 22 January 2019.

¹⁰ Virta, "[Vehicle-to-grid: everything you need to know](#)".

The charging infrastructure segment has emerged in the last decade. Initially, most entrants were smaller, EV charging focused pure-play start-ups with enthusiasm and the freedom to shape the physical consumer experience. In recent years, pure plays have grown significantly in scale and have been joined by large incumbents from other sectors (e.g. oil and gas, utilities, auto OEMs) that have grown through acquisition and direct investment to deploy large numbers of charging stations to expand their footprint. This growth has been supported by other ecosystem players improving the economics by scaling production (e.g. ABB, Schneider Electric, Siemens, etc.).

This segment focuses on the consumer interaction between charging their vehicle and choosing their site host, or where the charging takes place. Site host considerations can vary by customer segment, such as a public highway service station with multiple rapid charging points, or a fleet car park with overnight slow chargers. The key success factors for siting include strategic real estate selection, charger level selection and site sizing, or number of chargers, which are critical to optimise charge point utilisation and thus, returns on investment. The next component is the installation of the charging equipment; a one-time sale with additional revenues from maintenance and replacement parts. This segment can be further split into hardware components and the design and build phase, although many combine these into a single business.

Sustainable operation and maintenance of assets is crucial to the long-term profitability of segment players, by reducing equipment downtime and increasing revenue opportunity. From the asset owner perspective, carefully considered maintenance scheduling using high quality OEM parts improves asset lifespans. In parallel, a well-constructed site operating model that considers charging demand is important. The maintenance service is likely to be a revenue stream controlled by hardware manufacturers who own the intellectual property of the assets.

The third and final segment of the charging landscape is the services segment. Of the three segments, this is perhaps the most innovative in terms of developing customer offerings, not only in the context of passenger transportation, but also in broader energy services. The energy supply and charging infrastructure segments essentially substitute the fuel and re-fuelling services, respectively, that were associated with ICE transportation. In contrast, the services segment creates additional markets to fulfil new consumer needs inherent to EVs, such as how to help drivers plan their journeys based on battery range. Utilities are well suited to address these needs and integrate with broader offerings. For example, Centrica's Energy as a Service (EaaS) in the UK utilises energy optimisation services, EV site expansions, project management, financing and other services.

To charge an electric vehicle on a public network, the vehicle owner can typically choose between pay-as-you-go, with no fees or commitment but higher rates, or use a subscription or membership with an eMobility services provider (eMSP). The eMSP provides value to the vehicle owners within their membership by enabling access to their charging points and facilitating the charging transaction. There have been some issues when consumers have multiple subscriptions and applications for different regions, which has been resolved in part by eRoaming providers that offer consumers instant access to numerous eMSP networks, providing a single payment platform to solve geographical

limitations. Additionally, eRoaming broadens eMSPs' potential customer base, while also reducing the importance of customer subscriptions and loyalty.

Business models of industry participants

Large incumbents from other sectors such as energy utilities and global oil and gas companies are at the forefront of the global energy transition. They are tasked with finding new and innovative ways to reduce the overall climate impacts of energy generation, distribution and consumption. Electric mobility is a clear interface with their traditional business models and has led incumbents to incorporate fast-evolving EV technologies into their service offerings. The incumbents of the last decade were set to provide services only to the energy supply segment, such as distribution and retail, and distributed generation, and yet, roll the clock forward, and these players are now overhauling their strategies to ensure they can access the larger and emerging value pools within this market. Additionally, these large players can leverage existing customer relationships to accelerate growth and form new partnership models with non-energy sector companies with significant potential synergies – such as retailers with valuable EV charging sites, including Morrison's in the UK, ALDI in Europe and Walmart in the US.

There is a growing number of pure-play charging companies which tend to be focused on specific regional and country markets rather than larger global players that will operate across the charging infrastructure and services' value chain segments. Although there are a number of business models employed by pure-play companies, many will fall within two broad categories: one that can either take ownership of charging infrastructure assets or one that can provide services and solutions to charging asset owners.

Companies that own assets typically have an integrated model to develop, own and operate charging assets. Given the wide scope and financial requirements of this business model, these companies tend to focus on fewer customer segments. EVgo, for example, participates in the DC fast charging segments, such as public and fleets. Their customers are the EV owners and drivers, they need to support various OEM standards, and interact with different utilities and site hosts. Key capabilities to succeed in this sector include customer acquisition, site location, service support and having a strong balance sheet to support the needed investments. Service-focused companies, including Blink and EVBox, sell hardware, services and software solutions to EV infrastructure owners. Given the lower capital requirements, these firms can grow faster and participate directly in broader customer segments such as Residential, Commercial and Fleet (and indirectly in the public segments). Seamless platforms and ecosystems that can link hardware and software solutions are important success factors for these players as they have additional layers between end-use customers (e.g. building secure and reliable Internet of Things (IoT) solutions).

Growth of investment flows into the sector

In a changing and volatile market, investors take greater risks and often act with limited information. There is increasing demand to invest in companies developing EV charging infrastructure and charging services. While providing the “fuel of the future” and often having the direct client relationship, EV charging businesses are of major interest to private and public sectors, with different types of investors poised to engage in different areas of the market. Specifically, the more physical infrastructure aspects (e.g. charging

stations, etc.) will be more appealing to the long-term investors due to the predictability of technology lifecycles and the proven capability in similar industries, whereas charging services businesses could be of interest to investors seeking higher risk, short-term growth associated with this nascent market segment. As Figure 5 shows, investment activity has recently surged for both EV charging services and infrastructure, especially by major oil and gas and energy utilities highlighted below, with a chain of recent acquisitions paving the way for continued investment flows.

Figure 5: Growing attention in EVs attracts recent investments

EV Services Provider	2020 – Q4	2021 – Q1		
	Oct - Dec	Jan	Feb	Mar
EVBOX	SPAC IPO at \$1bn			
WiTricity		VC Funding at \$18M		
Ubitricity		Shell acquisition		
EVgo		\$4.2bn SPAC merger		
Volta			\$2bn SPAC merger	
Chargepoint				\$2.4bn SPAC merger and IPO
Pod Point				EDF acquired majority stake
Rimac				€70M stake by Porsche
Freewire				Venture funds raise \$25M
Digital Charging Solutions				BP takes 33% stake

Global investors are directing their attention to regions, such as Germany, UK, China, Japan and the US, with large expected investment planned to pave the way for an electrified future. Automakers plan to spend approximately USD 300 billion globally in EVs by 2030, driven by government net-zero policies and ICE phase-outs, technological advances, along with improved EV costs, range and charging times. As the industry continues to expand and mass-market adoption of EVs approaches, the infrastructure for charging and charging services must see even faster growth to support the coming demand. Public investments in the charging services space need to be made to support the consumer experience and acceptance of EVs in general. As an example, approximately 72% of UK drivers have access to off-street parking¹¹, in turn a majority of EV owners will have the option for residential charging solutions and would not regularly rely on public charging, however the slow rollout of public charging services is becoming a hinderance to mass EV adoption, especially in cities. This is further highlighted with a focus on urban areas in a recent IEA report¹². The report states that by 2025, the large-scale deployment of EV public charging infrastructure in urban areas needs to be sufficiently advanced to allow households without access to private chargers to opt for EVs. Linked to the growing deficit between EVs and chargers, the report also estimates the need for 40 million EV public chargers globally by 2030; more than a 30-fold increase from today. Currently, in the US, only a handful of bigger charging networks exist, whereas Europe is experiencing a flood of players spanning the charging market.

¹¹ PWC, “Charging ahead - the need to upscale UK electric vehicle charging infrastructure”, April 2018.

¹² IEA, “Net Zero by 2050 A Roadmap for the Global Energy Sector”.

Growth of the charging sector is inevitable, yet speed of growth will be the question. Leading economies have started to address the challenge of speed through ambitions, pledges and policy support to bolster the efforts of the EV sector to innovate more rapidly. Namely, in April 2021 the Biden administration introduced a USD 2.3 trillion bill that details an infrastructure plan, The American Jobs Plan, with a USD 175 billion pledged investment to “win the EV market”¹³. Some of the highlights include:

- Upgraded network transmission lines to support 2030 target of 500k chargers
- Electrification of 20% of the school bus fleet and portions of the USPS fleet
- Investments in US manufacturing, specifically in batteries and vehicles
- Extended tax credits to manufacturers and incentives for consumers

President Biden has since visited automakers, including Ford, to show further commitment to the bill, and if the bill makes it through Congress intact, it is likely that the uptake of plug-in vehicles could jump considerably. Policy support has been further evidenced in the UK. In December 2020, the UK’s Department for Business, Energy & Industrial Strategy (BEIS) published the Energy white paper¹⁴ which outlined measures that would support the growth of the eMobility market. Namely, there would be USD 1.85 billion to accelerate the rollout of charge points for EVs, USD 820 million in grants for those buying zero- or ultra-low emission vehicles and USD 700 million to be spent in the next four years for the development and scale production of EV batteries.

Beyond government intervention, the current climate has sparked a paradigm shift for the general public. During the COVID-19 pandemic, most countries have exhibited an overall decline in the use of public transport and ridesharing services. The general public are travelling more by personal vehicle and in some cases, moving away from cities and urban areas as rural areas become more attractive with remote working being more acceptable; in turn, this increases the demand for public EV charging sites outside of cities. It is currently difficult to anticipate whether behavioral changes are permanent.

SPACs financing context for the EV charging market

SPACs use a business model which has been around since the 1980s but has emerged again to capture profitability from the market. SPACs have become increasingly popular in the eMobility world; they act as a public shell company that can acquire a private company. They face high competition amongst each other as well as traditional financing. With investor funds secured, SPACs will set out on a search for a target company to merge with or acquire.

SPACs seek companies able to differentiate from the pack and pitch a viable business which can thrive in the public market. Target companies must be able to succeed once public and provide attractive returns to stakeholders. Unlike the traditional routes, SPACs present a quicker path to going public and streamline the fundraising process. Traditional funding can occur across multiple rounds before a company decides to go public whilst venture capital (VC) funding can be quicker but still requires input from many sources as

¹³ Katie Fehrenbacher, “The key things to know about Biden’s EV infrastructure plan”, *GreenBiz*, 7 April 2021.

¹⁴ BEIS, “Energy white Paper: Powering our net zero future”, December 2020.

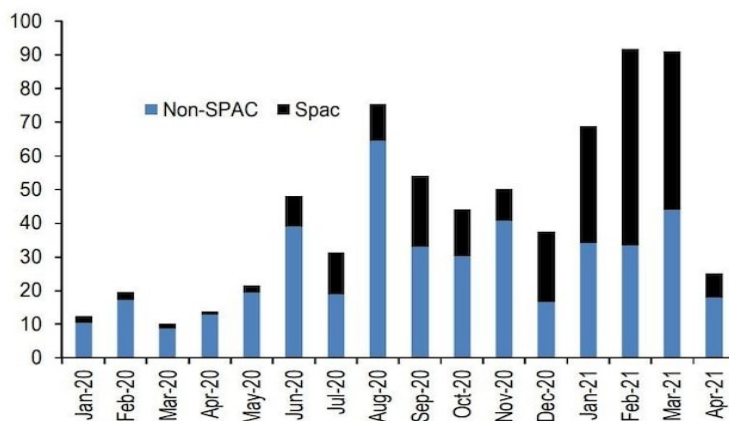
VCs typically invest in smaller, riskier, earlier stage companies. By focusing on future projections and growth rather than current profitability, the EV market, in particular, has seen the rise of SPACs among players such as Volta, EVgo and ChargePoint.

EV charging infrastructure is capital intensive, and companies require large investments to grow in the market. This is where traditional financing rounds and acquisitions through SPACs benefit the sector. That said, initial public offerings (IPOs) can be lengthy processes that are susceptible to press and public opinions as they require heavy due diligence, market and regulatory readiness to receive the best enterprise valuation. Conversely, SPACs change the way capital-intensive business can be evaluated, since most EV companies do not generate revenue upon inception. While SPACs consider projected revenues during enterprise valuations, IPOs are not permitted to. Additionally, SPACs are more likely to provide better terms in the acquisition or merger to avoid dilution of existing company stakeholders or extreme compromise of equity.

The large SPAC activity in early 2021 should be looked at with caution as some notable SPACs saw initial enthusiasm at announcement which was followed by plummeting share price to pre-merger levels. The large investments can be huge risks as the example of EVBox¹⁵ shows “significant uncertainty” with the announced \$1.9B offer now in doubt. SPACs have helped bring a number of private companies public. Nearly 30 EV-related SPACs have been enacted since July 2020, 14 of these in the first quarter of 2021¹⁶. However, as shown in Figure 6, April of 2021 saw fewer SPACs globally than the previous months which may represent a potential hesitancy to use SPACs as aggressively.

Figure 6: Global announced IPOs including SPACs¹⁷

In \$bn per annum, MTD for April'21.



Investment activity by market participants

Several oil and gas majors, including BP, Shell and Chevron are notable incumbents with major investments in eMobility. These companies have made significant acquisitions in the space. For example, in June 2018 BP acquired Chargemaster, the UK’s largest EV

¹⁵ “TPG Pace Says \$1.9B EVBox Merger Now in Doubt”, *DealFlow’s SPAC Newsletter*, 18 May 2021.

¹⁶ Ines Ferre, “The electric vehicle gold rush: A look at EV startups going public”, *Yahoo Finance*, 5 March 2021.

¹⁷ Matthew Fox, “JPMorgan is calling the top for SPACs - and says declining day-trader interest is to blame”, *Markets Insider*, 28 April 2021.

charging network at the time¹⁸, and invested in FreeWire (rapid charging solutions), NIO Capital (Chinese EV manufacturer), Castrol (e-fluids range) and StoreDot (ultra-fast-charging battery manufacturer)¹⁹. BP also partnered with OEM manufacturer, the VW Group with the goal to deliver value to VW owners through integrating BP's network of retail sites to provide consumers with transparent access to ultra-fast charging points²⁰. Similarly, Shell acquired NewMotion in 2017 (Europe's largest EV charging network player); partnered with Ionity (EV charging technology partner with several major automakers); and acquired Greenlots (US-based charging and software).

Utilities have also expanded their offerings beyond the energy supply segment. In February 2020 EDF acquired a majority stake of Pod Point, an infrastructure provider partnering with European supermarkets including Tesco and Lidl²¹. This transaction will improve conversions to EDF's low-carbon EV tariff by offering this tariff to Pod Point users. In 2021, UK-based Octopus Energy launched an EV leasing offering for companies to extend as an employee benefit. The scheme provides a fully insured EV for a monthly salary pre-tax payment and links with Octopus's additional consumer benefits such as free home charge points for early sign ups and free energy to drive 8,000 miles for Octopus customers.²² Octopus is also active in the V2G space with their Powerloop offering, and pilots underway with UK Power Networks to test the potential of the EV as a grid resource.²³

Charging services like EVgo and Volta are receiving private and public sector support to fund their mission in the EV marketplace. EVgo, one of the largest fast charging networks in the US, is tapping into public markets by means of a merger with the Climate Change Crisis Real Impact (CLII) SPAC in 2021. As part of the merger, EVgo will receive USD 575 million in net cash proceeds to fund growth initiatives as part of PIPE (Private Investment in Public Equity). With a pro forma enterprise valuation of USD 4.2 billion, EVgo has a forecasted 2027 EV to sales multiple of 3.3x²⁴, indicating a greater long-term value in the investment. Having deployed 800 fast-charging stations across 34 states, EVgo will continue to grow and multiply sales through 2025 with additional support from investors including BlackRock, Van Eck Associates and Wellington Management.

Likewise, Volta, the leading charging station provider in the US, attracted a merger opportunity from the Tortoise Acquisition Corp. II SPAC to propel the build-out of its charging network. As a prominent leader and operator of public electric vehicle charging, Volta will continue to expand charging stations located in strategic places including residential, workplace and retail hubs. With an enterprise valuation of USD 1.4 billion²⁵ and estimated net cash proceeds of USD 600 million, Volta is expected to exceed a pro-forma equity value of USD 2 billion. This merger bolsters Volta's position in the

¹⁸ Good News Network, "Giant Oil Companies Providing EV Chargers Next to Their Gas Pumps", 12 September 2020.

¹⁹ BP, "The road ahead: BP and the mobility future", 28 June 2018.

²⁰ BP, "BP joins forces with Volkswagen Group", 15 March 2021.

²¹ EDF, "EDF acquires Pod Point, one of the UK's largest EV charging companies", press release, 13 February 2020.

²² Roger Brown, "Octopus Electric Vehicles launches EV leasing service", *The Energyst*, 7 April 2021.

²³ Octopus Electric Vehicles, Powerloop.

²⁴ See EVgo, at <https://www.evgo.com/investors/>.

²⁵ Amber Deter, "Volta IPO: Stock Coming in 2021 - SPAC Tortoise Acquisition II", *InvestmentU*, 19 February 2021.

charging services market, with greater penetration and opportunity for additional EV ecosystem services. With a differentiated business model, Volta, along with support from their stakeholders, can continue to become a leader in the EV marketplace and encourage other market players to complement their offerings. As the market allows more niche charging companies to enter, public and private investors will have many opportunities to capitalise on the industry’s growth. As SPACs, VCs and other investment vehicles continue to hunt for cash cows, increases in market capitalisation will foster greater development in charging services, interoperability and a better connected EV ecosystem, ultimately enhancing the customer experience.

Strategic risks and opportunities

Based on our analysis, the record-breaking public listings and the multiple incumbent-led acquisitions show that the EV charging market has been top of mind for many CEOs to ensure their businesses compete in less saturated segments. The pure plays have created some exciting and innovative approaches to segments that did not exist in the last decade, however, as we have seen in recent years, pure-play segments are receiving immense pressure from incumbents to either sell up or accept the competition. Incumbents are also under pressure to grow as a result of macro trends such as the long-term decline of fossil fuels facing oil and gas companies, and utilities with declining revenues from energy efficiency gains, making EV charging an obvious adjacency to pursue. These large integrated energy firms can leverage not only their deep customer relationships (i.e. loyalty schemes), but also various parts of the traditional value chain they own (e.g. fuel stations). They can also scale advantages from bundling services with an integrated offer in both B2C (e.g. tariffs, home energy management, and prosumer models) and B2B (e.g. EaaS), commercial tariffs, asset management, fleet management, microgrids, etc.). Figure 7 identifies some of the key risks and opportunities for both pure plays and incumbents.

Figure 7: Strategic risks and opportunities of the different participant business models

	Risks	Opportunities
Pure plays	<ul style="list-style-type: none"> • Growing number of new entrants • Lack of industry standards • Customer acquisition costs • Ability to scale and expand • Price competition • Balance sheet to absorb early losses 	<ul style="list-style-type: none"> • Strategic focus and segment expertise • Market adoption and growth upside • High relative valuations and investor demand to support growth capex • Government incentives • Local market knowledge
Incumbents	<ul style="list-style-type: none"> • Lack of focus (small relative to parent) • Internal competition of resources • Lack of coherent strategy • Overpaying for acquisitions • Lack of local knowledge (O&G) • Geographic expansion (utilities) 	<ul style="list-style-type: none"> • Cost of capital/balance sheet strength • Operational scale • Cost competitiveness • Ability to expand globally (oil and gas) • Customer relationships (utilities) • Technical capabilities

Strategic EV charging investment due diligence done right

Navigating the EV charging market is undoubtedly a challenge when considering the number of market players and segments. Climate change goals and regulations continue

to pressure the sector to deliver ahead of schedule, in turn there is a need for the segments to innovate quickly and in a coordinated manner. This innovation will inherently require strategic investment, with adequate guidance of the landscape and segment growth potential, investors can:

- Understand the value of investments and the strategic positioning of firms in the ecosystem
- Find the right investment area and target with the most promising ROIs
- Evaluate growth potential and market outlook of investment targets

Investments in EV and sustainable transportation supported by a strategic partnership and industry experience leads to a more connected and seamless ecosystem and promising ROIs. CRA and Hsubject have developed an alliance to help clients navigate market entry, evolving business models and the abundance of EV ecosystem service options in the eMobility sector. As experts in the energy sector and eMobility, both CRA and Hsubject, respectively, are equipped to provide strategic, technical, economic, regulatory and financial analysis on the future of eMobility leveraging evidence-based research, rigorous analyses and proven experience.

Through strategic partnerships with key eMobility players such as Volkswagen Group, BMW Group, Bosch, Siemens and more, Hsubject has the eMobility industry insight to transform the consumer's EV experience. Along with the proprietary Intercharge platform, Hsubject is able to leverage millions of data points from charge point operators (CPOs) and eMSPs to help clients make data-driven decisions.

Similarly, CRA delivers upon proven experience across all issues that the energy industry poses. With CRA's deep understanding of decarbonisation and energy transition across the value chain, we can tackle current energy issues such as grid modernisation, accommodating growth of distributed energy resources and overall grid challenges across markets in North America, UK and Europe.

By devising successful strategies, creating meaningful opportunities and navigating the unknown, both CRA and Hsubject are able to guide clients, including national governments, utility providers and automotive OEMs, toward a sustainable future.

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