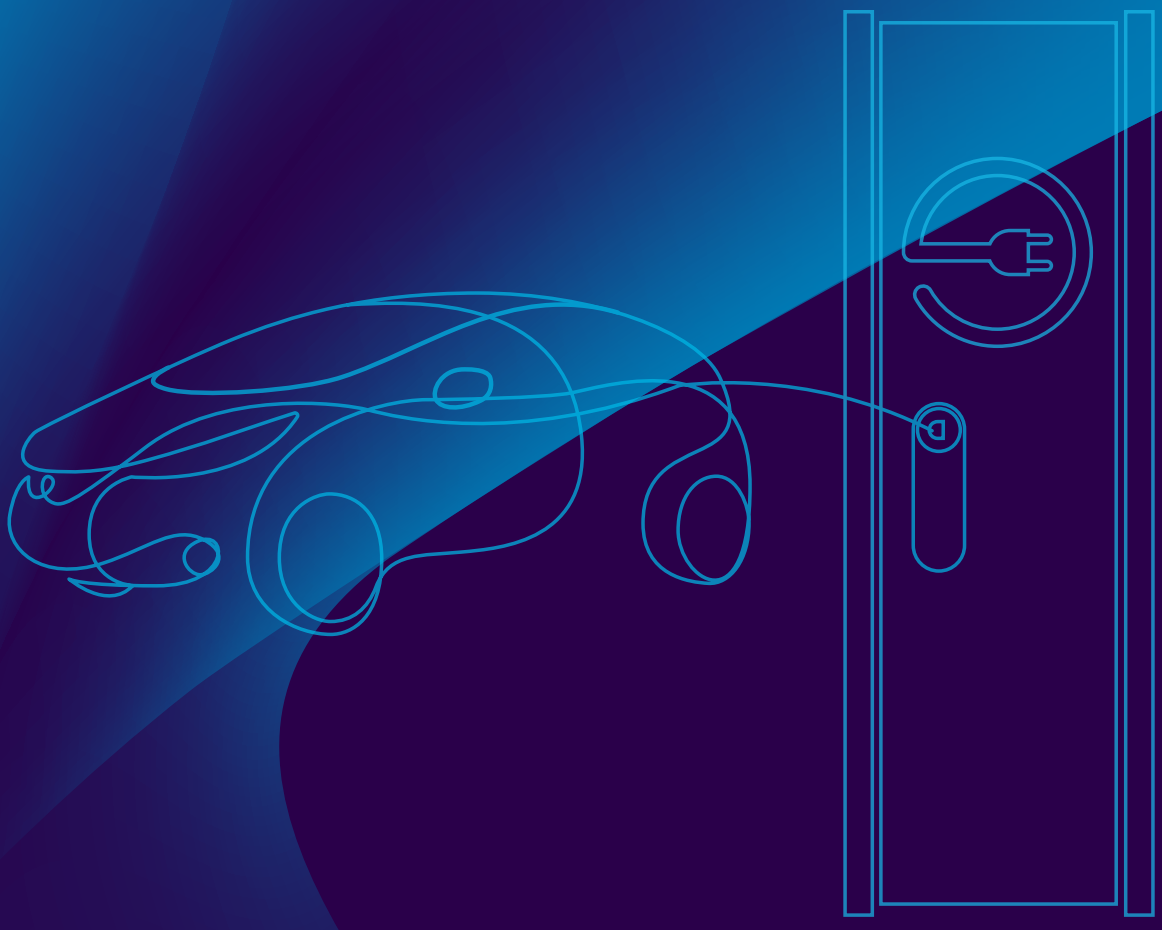
KEY FACTORS DEFINING THE E-MOBILITY OF TOMORROW

A focus on the EV charging infrastructure ecosystem and emerging business models



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FOREWORD

Smart mobility and electrification are reshaping the future of mobility and accelerating the transition to e-mobility. Electric vehicle (EV) sales keep increasing, now more than 1 million units globally , one of the fastest growing segment of the automotive market.[1] While geographic discrepancies are high, the trend is accelerating further, and sales are likely to rise in coming years.

The roll out of EV charging infrastructures is critical for EVs to be adopted on a large scale. New infrastructure development, especially charging points, is essential to keep addressing customers' range-anxiety and further bolster the uptake of EVs. Consequently, the deployment of charging infrastructure coupled to EV penetration are creating new market opportunities and attracting new players.
Assessing who can capture new value generated by this market is critical. Indeed, business models and development scenarios are constantly reshaped, making it uneasy to forecast financial returns and economic benefits for market players.

Despite uncertainties, business opportunities offered by EV charging infrastructure are real, and numerous players like car manufacturers, power companies or facility management companies are currently building their capabilities and have the potential to play a crucial role. In fact, the complexity of the EV charging infrastructure ecosystem incentivizes all players to create new business models and to develop innovative solutions. As EV penetration increases and EV infrastructure expands, two key questions become salient for companies active in the field:

- **When to invest:** what is "the tipping point" for EVs sales which will make the EV charging market more attractive and enable full industrialization
- **Where to invest:** which part of the value chain will concentrate most value and enable the highest margins

The current mobility shift pushes players to move along the electrification value chain, to review their investment strategies and to transform their business models through mergers and acquisitions or internal developments. The transformation imperative becomes even stronger as the ecosystem's complexity increases. Capgemini Invent has combined its Energy & Utilities and Automotive expertise in this research paper to shed some light on the EV charging infrastructure's evolving value chain, the opportunities for value-creation and the development pathways. Therefore, we aim to provide keys to navigate the burgeoning EV charging infrastructure market and to help market players chart the e-mobility ecosystem of the future.

THIS VERSION IS AN EXTRACT OF THE FULL STUDY WHICH CONTAINS A DETAILED MARKET REVIEW AND DETAILED BUSINESS MODELS ANALYSIS. PLEASE CONTACT US TO GET ACCESS TO THE FULL STUDY

THIS STUDY IS A COMPLEMENTARY TO THE LATEST CARS ONLINE TREND STUDY OF CAPGEMINI AUTOMOTIVE SECTOR: "ELECTRIC CARS: AT THE TIPPING POINT?".

1 - IEA, 2018 - Global EV Outlook 2018 - towards cross modal electrification

EXECUTIVE SUMMARY

The EV charging ecosystem has the potential to reshape the mobility of tomorrow

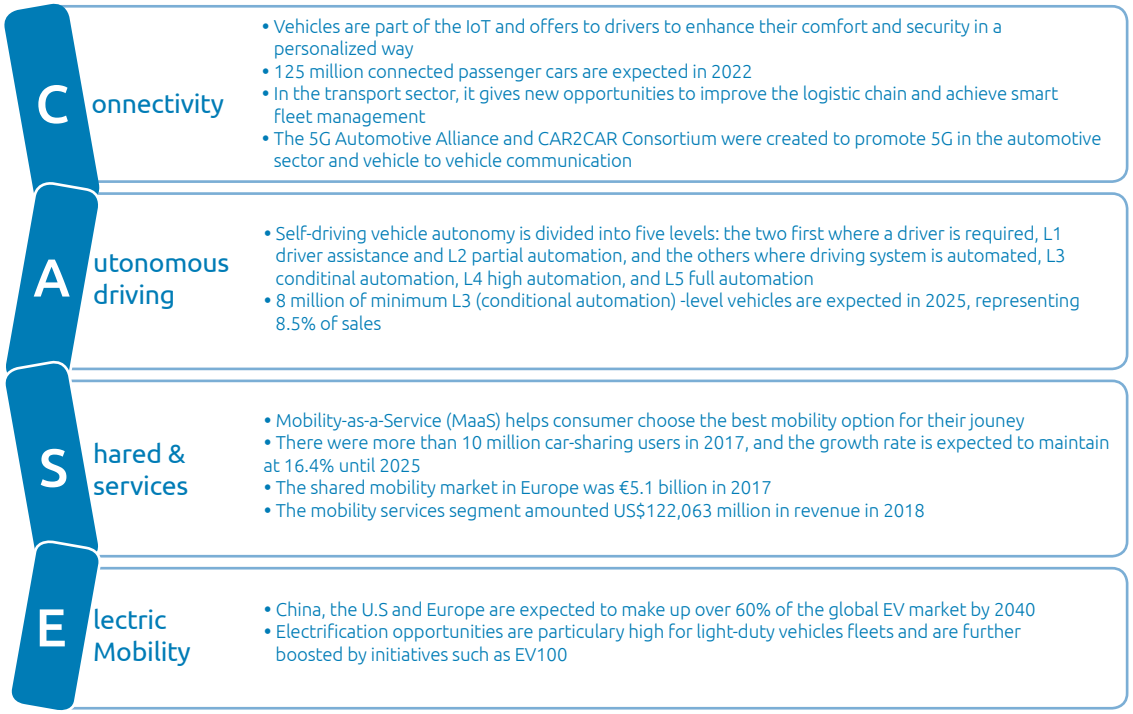
The development of e-mobility represents a billion-euro opportunity that companies should seize by preparing the future from today. The key is to adopt viable business models that enable them to differentiate themselves from competitors in an increasingly crowded market. As the Achilles heel of the electric vehicules (EVs) market lies in the charging infrastructure, this is a crucial avenue to explore in order to gain a competitive advantage.

Capgemini Invent's point of view aims to bring new perspectives to the EV charging market for light-duty vehicles. We conducted interviews with industry executives from energy companies to automakers, academics and representative samples of customers to provide the most encompassing study on the charging infrastructure market to date.

Key findings:

1 - Electrification is one of the four megatrends reshaping the future of mobility

Four major trends are changing mobility, i.e., Connectivity, Autonomous driving, Shared & Services and Electric mobility, often summarized in the acronym CASE



2 - E-mobility has recently gained widespread attention and is experiencing a momentum; despite high geographic discrepancies, the trend is accelerating.

Global EV sales reached one million in 2017 and are expected to continue to increase[2].

3 - Access to EV charging infrastructure will soon be the only barrier remaining, to unlock the potential of e-mobility

Growing interest from automakers, like Toyota, Volvo or Renault, coupled to falling battery prices are close to bringing price-competitive EVs to all major light-duty vehicle segments, even though they still remain significantly more expensive than internal combustion engine (ICE) vehicles without government subsidies.
Based on our interviews, consumers rank 'charging anxiety' as the fourth most important barrier to EV purchase, behind driving range (range anxiety), diversity of EV models and price. With declining EV prices, increasing EV models and expanding driving ranges, access to charging infrastructure will soon be the only barrier remaining. The charging experience is another key issue as the lack of standardisation, unclear pricing schemes and insufficient interoperability between charger providers further complicate customer journeys.

4 - Based on scenarios developed by Capgemini Invent, incremental progress is the most likely scenario

The future of the EV charging ecosystem depends on changes along four dimensions: EV charging and autonomous vehicle technologies; changing regulatory environments; and customer expectations. An intermediary scenario, with incremental progress, could lead to a decrease in car ownership as new generations favor new mobility modes and use a limited stock of ICE vehicles to accommodate specific mobility needs. Like 80% of the experts we interviewed, we think that this scenario is the most likely.

5 - The EV charging value chain is genuinely new and is likely to evolve further as the market expands and the number of active companies in the field increases

As technologies, policies and customer preferences are likely to shift according to the incremental progress scenario, the EV charging ecosystem and value chain will change.
The EV charging infrastructure is the product of a new value chain made of both conventional players and new entrants which comprises three main parts: energy supply, charging infrastructure and add-on services.
Most players are increasing their presence by moving along the value chain, developing new business models through mergers and acquisitions or internal developments.

6 - Seven Business Models were identified in the current EV charging mobility market, each with their strengths and potential for further growth

The rapid evolution of the EV charging ecosystem has led to the multiplication of business models, each results from a combination of specific roles within the market and dedicated activities on the EV charging value chain. In fact, some business models are better suited to answer the demands of certain customer segments. Coupling this segmentation with persona enables us to provide a dynamic picture of the ideal positioning of each business model *(Details of persona analysis are available upon request)*.

7 - No clear leader stands out yet in this complex EV charging ecosystem, but Oil & Gas players are directly threatened and should react fast

While it is clear that e-mobility business models require to manage a complex ecosystem, no leader stands out yet among automakers, utilities, oil & gas or EV charging pure players. Automakers & some pure players are better placed to endorse specific business models, thus to serve some customer segments better than others thanks to their ability to access users data. Utilities could become the one-stop shop for energy and mobility provision – or be relegated to mere commodity suppliers. Oil & gas are definitely the most threatened players and should transform fast to capture a major share of the EV charging market in order not to disappear. Even though GAFA are not part of the picture yet, they could enter it in a matter of years.

8 - Understanding customer preferences – their current and future mobility and charging habits - will be the real game changer for market players

Overall, data management plays a crucial role to understand the needs of customers and their links with service providers. This trend is only likely to be reinforced in the future. The company who will create a strong connection with its customers will be the real game changer.

9 - Digital and data mastery are critical to win in the EV charging market

Digital brings opportunities to companies to adapt their business model. For backend systems, own operation enables specific customization, high flexibility and the possibility to add marketing of IT solutions. On the other hand, using as a service / partnering provides fast setting up with high professionalism and low implementation costs.

2 - IEA, 2018 - Global EV Outlook 2018 – towards cross modal electrification

DEVELOPMENT SCENARIOS FOR THE EV CHARGING ECOSYSTEM

The accelerating pace of change in the EV ecosystem and its relative fragility make it challenging to foresee how EV charging infrastructure could grow over time. Nonetheless, drawing scenarios is important to understand which forces can contribute to sustain, or break, the growth observed since the 2010s.

In fact, the future of the EV charging ecosystem depends on **potential changes along 4 main dimensions: technology,** that we chose to split into between the **EV charging** and **autonomous vehicles; regulatory environments;** and **customer expectations.** We consider that a change in one dimension will create proportionate changes across all other dimensions, a kind of **domino effect**.

For instance, if governments cut investments in EV-related technologies, private companies are likely to lose interest and to start shifting to other technologies. This move will eventually slow down the development of the entire market. In this case, customer activism would be insufficient to generate a new dynamic as EV growth relies on the creation of a complex ecosystem. That is the reason why developing countries have so far been lagging behind in terms of EV development, although commitments from some governments like India could change the picture[3].

However, as soon as an **e-mobility ecosystem is created, customers will take the driving seat of the mobility revolution.** They will reshape the ecosystem based on their EV model preferences,

their economic situation and their charging habits. At that point, we should underline that forecasting the pace of progress becomes challenging, as it is difficult to rigorously predict customers' behaviour.
Therefore, we foresee 3 ideal-typical scenarios for the development of EV-charging infrastructure: unachieved dreams, incremental progress, and electric push. According to most experts we interviewed, **incremental progress** is **the most likely scenario.**

	EV Charging Technology	Autonomous vehicle technology	Regulatory Environments	Customer Expectations
ELECTRIC PUSH	• Innovation boosted due to high investment • Battery autonomy increased	• Roll-out boosted due to strong demand for new mobility	• Strong uptake from local governments • Massive national subsidy schemes • Harmonization at supranational level	• Steep increase in environmental awareness • New mobility demands, electric, autonomous • High willingness to pay
INCREMENTAL PROGRESS	• Incremental innovation, sustained investment	• Progressive roll out, test, and trial phases	• Uptake from cities • National subsidy schemes • Supranational standards progressively enacted	• Shift towards more environment-friendly mobility, TCO remains a concern • Sustained willingness to own a car
UNACHIEVED DREAMS	• Lack of innovation • Rising resource constraints	• Depressed growth • No maturity	• Low subsidies • Crises fuelled by looming trade wars • Strong lobbying from ICE world	• Environmental awareness slowed by constrained middle class • Resistance from developing world

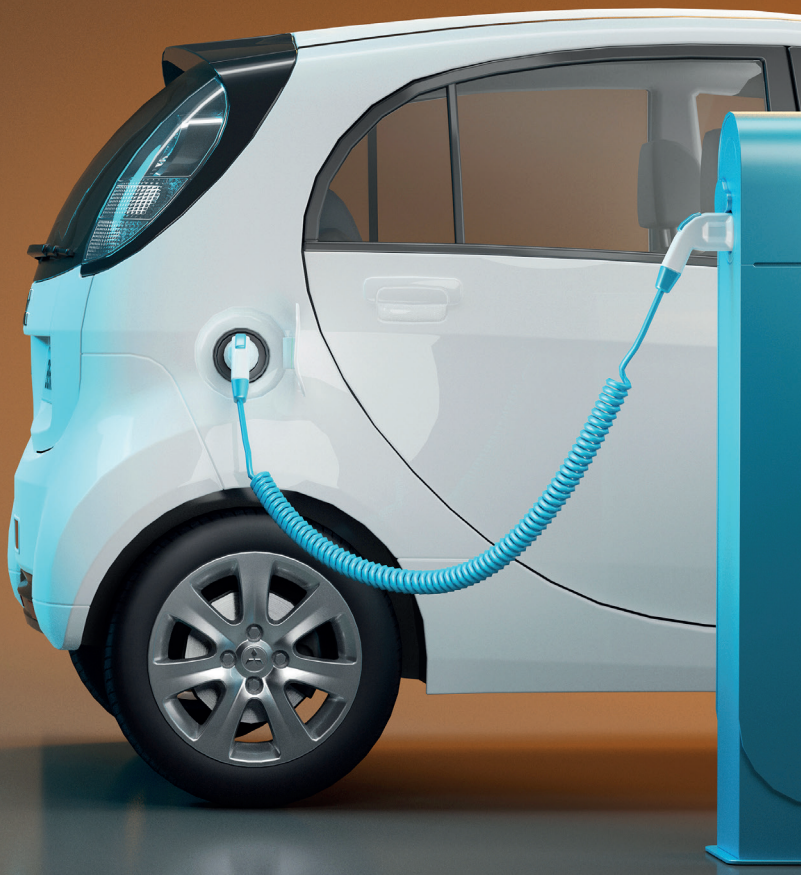
3 - "Modi government's e-car dream could soon come up against a challenge it can't overcome", *The Economic Times*, 04/01/2018

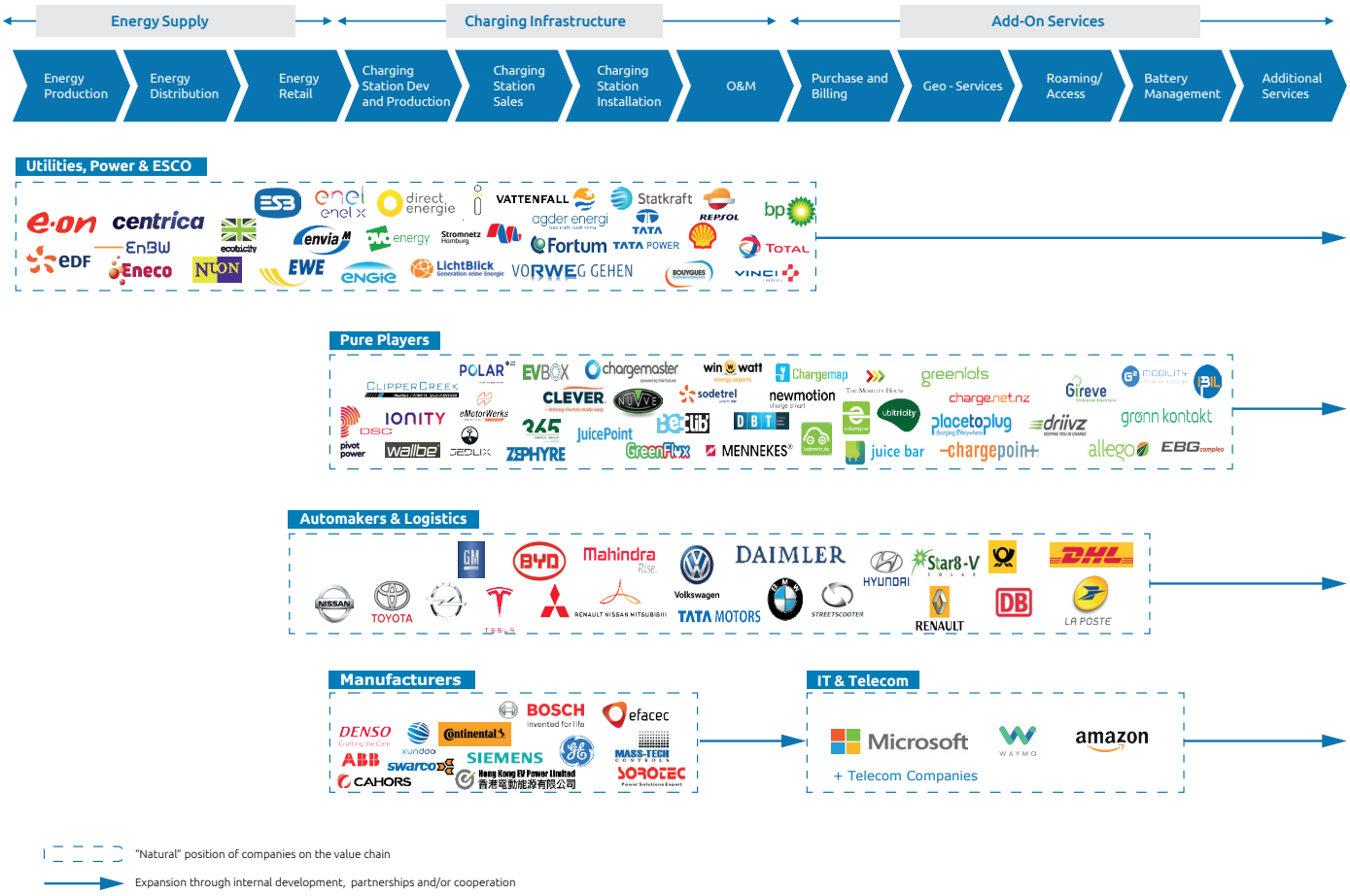
EV CHARGING VALUE CHAIN

While technologies, policies and customer preferences are likely to shift according to the scenarios described, digging further is crucial to get a clearer picture of the existing environment. Indeed, EV charging infrastructure is the product of a new value chain made of both conventional players and new entrants. Furthermore, as the market evolves, players move along this value chain and contribute to further complexifying and densifying it. By doing so, they impact other value chains and combine links with different industries, from financial companies to IT and Telecom, generating spillovers. *(The demonstration of the links between varying value chains is available upon request).*

For every challenge that electrification creates, there is an opportunity for the creation of new business models, or the enhancement of existing ones along the value chain. Even though many different business opportunities are covered along the e-mobility value chain – starting with vehicle sales and battery provision; going on to energy management and value-added services and, ultimately, the resale of the vehicles or reuse of its components – we are specifically focusing on the charging angle. We purposefully exclude EV production from the picture and define the EV charging value chain as a combination of three streams:

- **Energy Supply**, which involves activities ranging from energy production to distribution and billing end-users
- **Charging Infrastructure**, which covers all activities ranging from charging station production to sales, installation, operation and maintenance of chargers and charging stations
- **Add-on Services**, which aggregate all activities required or enabled by the development of the EV charging infrastructure, from billing and roaming to battery management.





Note: Companies are moving within the boxes, their position on the value chain does not necessarily correspond to their current position.

Figure 1 The EV Charging Value Chain

Players operate along different segments of the EV charging value chain depending on their position in other, more traditional, value chains.
The ecosystem is also attracting competitors from different industries, such as banks, leasing companies, independent resellers, and so on.
Currently, we observe that **Utilities, Power companies and Energy services companies (ESCO)** are logically located upstream, in the energy supply segment. **Automakers and logistics** initially developed on the charging infrastructure part as they sought to make it viable to drive EVs or to improve sales. Similarly, **manufacturers** leveraged their core skills and assets to focus on chargers and charging stations production. **IT & Telecom companies** started developing add-on services based on their traditional technology and networks offerings.
We have defined **"Pure Players"** as companies which have been created for, and operate only on, the EV charging infrastructure market. This clustering is thus broad and generic, however it offers a good understanding of current innovations and market threats to established players present in other groups. Following our terminology, Pure Players can be involved in upward activities, like EV charging points manufacturing, or downward ones, like additional services. Still, most leverage all tools offered by innovative technologies to develop brand-new value proposals.

How energy players are strengthening through Mergers & Acquisitions and Partnerships

OEM, Utilities and O&G are scaling up their activities in the EV charging space.

Utilities & Power companies continue to reshape their investment strategies and to transform their business models through mergers and acquisitions (M&A) and partnerships in this crowded EV charging ecosystem. Furthermore, these moves demonstrate that these players are getting ready for the future load-balancing challenges, due to increasing green energy production usage.

They are mainly targeting investment areas where they could leverage their know-how. For instance, Engie's ambition to become a fully integrated energy provider is exemplified by their acquisition of EVBox, one of the biggest public charging networks operators, coming from the Netherlands. Another important move came from Shell with their acquisition of Newmotion, to use their charging base for their rolling out of fast-charging points at their stations. Additionally, the main industry players - BMW Group, Ford Motor Company and the Volkswagen Group with Audi and Porsche, Daimler - have already joined their forces to form the joint venture Ionity[4], with the objective of creating a high powerful charging network across Europe by 2020. Lately, Enel X also signed an e-mobility cooperation agreement with Ionity aiming to further spread e-mobility in Italy[5].

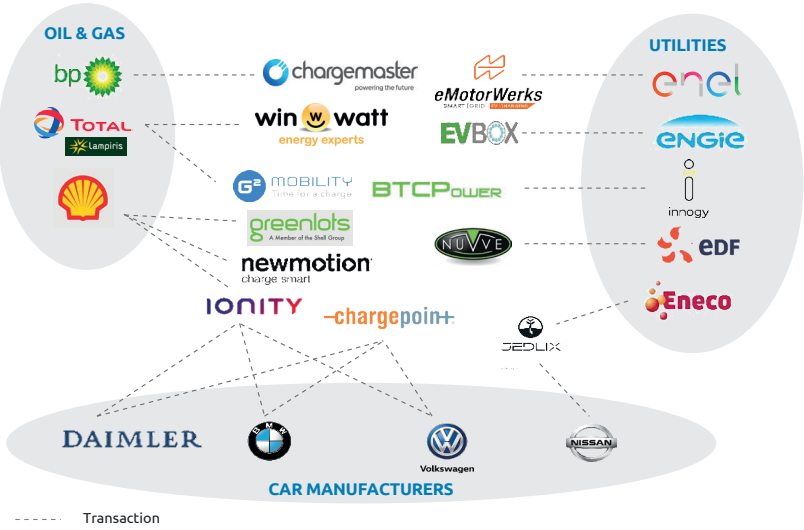


Figure 2 EV ecosystem M&A activities and partnerships

4 - Daimler, 2018 - *Joint Venture IONITY. E-Mobility for Long Distance Travel*
5 - Enel, 2018 - *Enel teams up with IONITY to build the first network of ultra-fast 350 kW charging stations in Italy*

MARKET POTENTIAL BASED ON CHARGING USAGE PREFERENCES

Unearthing customers' mobility and charging habits are prerequisites to building a competitive advantage in the highly complex EV charging ecosystem

The customers' relationship with cars is undergoing radical changes as explained. Driven by a decrease in ownership and emergence of autonomous cars, the mobility revolution is at our doorstep, awaiting to become part of our daily lives. In fact, Shared Autonomous Electric Vehicles are not a buzzword anymore.

It is thus essential to understand how customers will react to these new mobility modes, and more specifically how their habits will shape the EV charging ecosystem. We identified **4 types of charging options**, corresponding to different mobility use-cases and **locations**.

We further refined the previous segmentation by adding key characteristics for all 4 charging locations. From our first analysis, it is clear that some business models are better positioned to answer specific mobility needs *(Details are available upon request)*.

Market segmentation based on customer's charging locations and habits

	Individual charger owners	Shared charger users	Corporate users	Public charger users
Charging locations	Individual house	Collective building	Corporate	Public
Parking lots	Private	Shared or public	Shared	Public
Customer charging habits	Overnight slow charge	Overnight slow charge	Slow charge during the day Overnight slow charge Fast charge for punctual use	Slow charge during the day Overnight slow charge Fast charge for punctual use
Mobility use-cases	Professional use of car for long - & short - distance trips Commuting to work Leisure mobility, holidays, shopping/groceries,...	Professional use of car for long- distance trips Commuting to work Leisure mobility, holidays, purchase	Use of car for sales trips Use of car for delivery	Leisure mobility for holidays (short & long trips) Professional use of car for long-distance trips Functional use, puncutal trips

EMERGING BUSINESS MODELS IN THE EV CHARGING ECOSYSTEM

The EV charging value chain creates different business models as it is at the intersection of other value chains and involves different players from various industries. Therefore, we found it essential to analyze this ecosystem in two steps: first, understanding all the relations between different players by mapping the ecosystem players, and then identifying emerging business models.

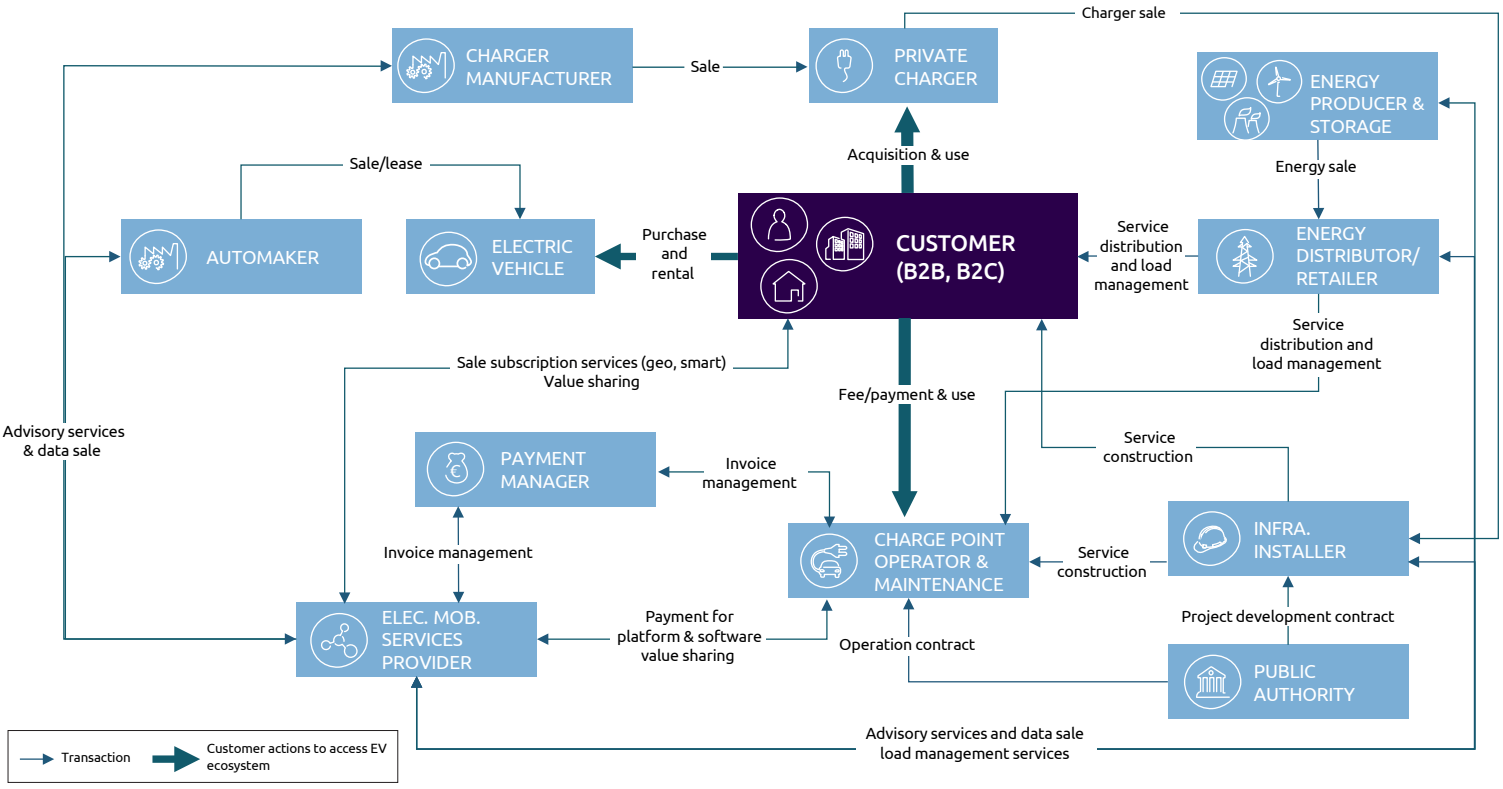
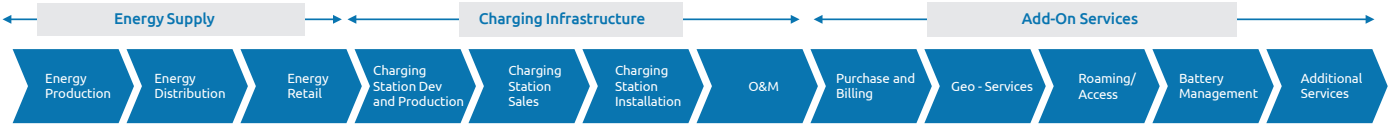


Figure 3 Map of transactions between key players of the EV charging market

Arguably, the picture remains challenging

We thus narrowed down our analysis to isolate specific business models and then mapped each of them in the charging ecosystem to highlight key transactions and roles. Finally, we related each Business Model to the EV charging value chain, to get both a transactional and dynamic comprehension of Business Models. As a reminder, here is the value chain that we use for the identification of BMs:



We identified seven distinct types of business models, classified under 4 categories, that market players adopt during their journey, bringing them varying business opportunities. Position of the players in the EV charging value chain depends on the BMs adopted.

The first three categories, makers, maintainers and energy masters, correspond to distinct parts of the value chain outlined above. On the other hand, seamless mobility providers are adopting BMs involving stages across the entire value chain, combined in different fashions. By doing so, they create entirely new value propositions, with innovative offerings, unlocking new revenue streams.

We highlighted which players are likely to adopt a given business model. In fact, players like automakers and oil & gas providers or electricity retailers that may not compete in other markets, are now adopting the same business models and entering in direct competition. **Boundaries between players are therefore on the way of getting blurred.**

Classification	BM Name	Value proposition
Makers	BM 1: Manufacturing	**DESIGN AND PRODUCE CHARGERS** that match both regulatory standards and customer needs
Maintainers	BM 2a: Direct Billing	Operate public charging stations and **BILL CUSTOMERS FOR THEIR USE THANKS TO AUTHENTICATION METHODS AND SIMPLE PLATFORMS**
	BM 2b: Indirect Billing	Operate public charging stations and **BILL A THIRD-PARTY WILLING TO ATTRACT CUSTOMERS OR SUPPORT THE DEVELOPMENT OF EV CHARGING STATIONS**
	BM 3: Public Private Partnership (PPP)	**DEVELOP, MANAGE PUBLIC SERVICES** through concessions granted by local authorities with potential delegating after given period
Energy masters	BM 4a: Smart charging	Use data generated by public and semi-public charging **TO DEVELOP SMART SOFTWARE** and to provide advisory services
	BM 4b: V2X (V2G, V2B,...)	Leverage the potential of EV batteries, **ALLOWING BIDIRECTIONAL CHARGING**, to provide storage and supply of energy to public or private electricity networks
	BM 5: End-to-End Energy	Propose **END-TO-END ENERGY OFFERS** and develop smart services thanks to data collection
Seamless E-mobility	BM 6: Interoperability Platform	Aggregate Charge Point Operators (CPO) through interoperability platforms to maximize network coverage and offer unified authentication methods, shortly **ENABLING CUSTOMERS TO ACCESS MULTIPLE CHARGING POINTS OPERATED BY DIFFERENT CPOs**
	BM 7: Charging-as-a-Service	Offer a **SEAMLESS CHARGING OFFER** and cover all electric mobility uses in everyday life

All the details of these BMs – with their detailed value proposition, revenue streams, positioning on the value chain, attractiveness to the business and customer segments concerned - are available upon request.

Tentative assessment of business models according to three criteria

Assessing identified Business Models is a risky and necessarily partial exercise. Given the rapid pace of technological changes and the sustained expansion of the market, it is likely that the picture drafted here would rapidly evolve.

	Maturity	Competitive intensity	Growth	Comment
#1 Manufacturing				- High competition and established technologies - Commoditization will severely reduce profits, pushing integration
#2a Direct billing for charge point operation				- Numerous players have adopted this BM with established revenue streams - Long-term perspectives unclear as profitability is not guaranteed
#2b Indirect billing for charge point operation				- Niche players are starting to develop this BM - Durable model, adaptable despite limited revenue potential
#3 Public Private Partnership (PPP)				- Most Charger Points Operators or E--Mobility Service Providers subsidized thanks to this BM, fuelling growth - Concession likely to remain albeit public delegation limits profits
#4a Smart charging				- Maturing with few players trying to develop - Essential to develop renewables and EVs, numerous revenue streams
#4b V2X (V2G, V2B, ...)				- Niche players are started to develop - Market will grow with client acceptance and good demonstrations of current ongoing projects
#5 End-to-End Energy				- Investments being made but low volume and unclear go to market - Questions around go to market likely to remain despite sizeable value
#6 Interoperability platform				- Key to develop infrastructure with established players - Essential BM for the future with sizeable fees
#7 Charging-as-a-Service				- Competition with numerous experimentation and developments - Appeal for businesses and mobility provider will sustain growth

Nascent BM · Maturing BM · Mature BM · Numerous players · Several Players · Few Players · Steady Growth · Exponential Growth

Nonetheless, we believe a few critical factors can already be singled out. We conducted our analysis based on qualitative data derived from interviews with experts, quantitative data obtained from international organisations, and hands-on experience from Capgemini Invent's global teams. This comparison provides a compass to navigate complexity and is a healthy baseline for future assessments.

When considering **Business Models' maturity,** defined by the stability of their value proposition and revenue streams, **4 business models initially stand out:**

- **Manufacturing** and **PPP with potential delegation** unsurprisingly count among the most stable as they were the first to appear on the market and to last until today.
- **Direct billing for charge point** operation also became a classic feature of EV-users' everyday life, like **Interoperability platforms**, which have established communities and stable revenue streams.

Nonetheless, **smart charging**, which is primarily B2B, and **V2X**, which is both B2C and B2B, appear to be **the most profitable business models.** With very limited costs and an enormous potential opened by technologies like V2H or V2G, as well as load management, they could redraw the TCO of both charging infrastructure and EVs.
On the other hand, **end-to-end energy** is poised to grow. Notwithstanding high initial investment costs, a growing number of players are developing this business model:

- **Oil & Gas players** were the first to redefine boundaries between fuel and electricity supply thanks to an extensive wave of M&A. Total's purchase of Direct Energie for instance transformed it in a full-scale Utility, able to address all its customers' energy needs.
- **Automakers** were the second to enter the space and try to exploit opportunities opened by this business model. Tesla is by far the best-known case of bundled energy packages, but Nissan is beefing up its offers as well. Noticeably though, automakers do not aim at directly selling energy to customers. In fact, they offer a package enabling customers to be self-sufficient: an EV, solar panels and an additional battery, in the case of Nissan.

Looking ahead

Despite a clearer understanding of the EV charging value chain as well as of associated business models, it remains uneasy to conclude which business models have the highest potential to dominate this ecosystem in the future. Furthermore, players' movements along the value chain and their adoption of different business models make it difficult to understand who is best placed to act as a leader.
Looking more carefully at customers' preferences is therefore necessary to understand which segments are the most promising for which business model. Indeed, customers' expectations will determine who can win, and who will not. The current ecosystem is mature enough to start detailing customers' needs and preferences.

IDENTIFYING WINNER(S) OF THE E-MOBILITY ECOSYSTEM

With the start of the e-mobility era, established companies are trying to understand how to adapt their core business to this changing environment and profit as much as possible from new business opportunities. As competition accelerates, **the question remains as to whether any players will take the lead in this complex ecosystem and potentially dominate the industry.** For companies willing to enter the leadership race, the priority should be to shortlist business models worth adopting and to define a clear scope of relevant market drivers.

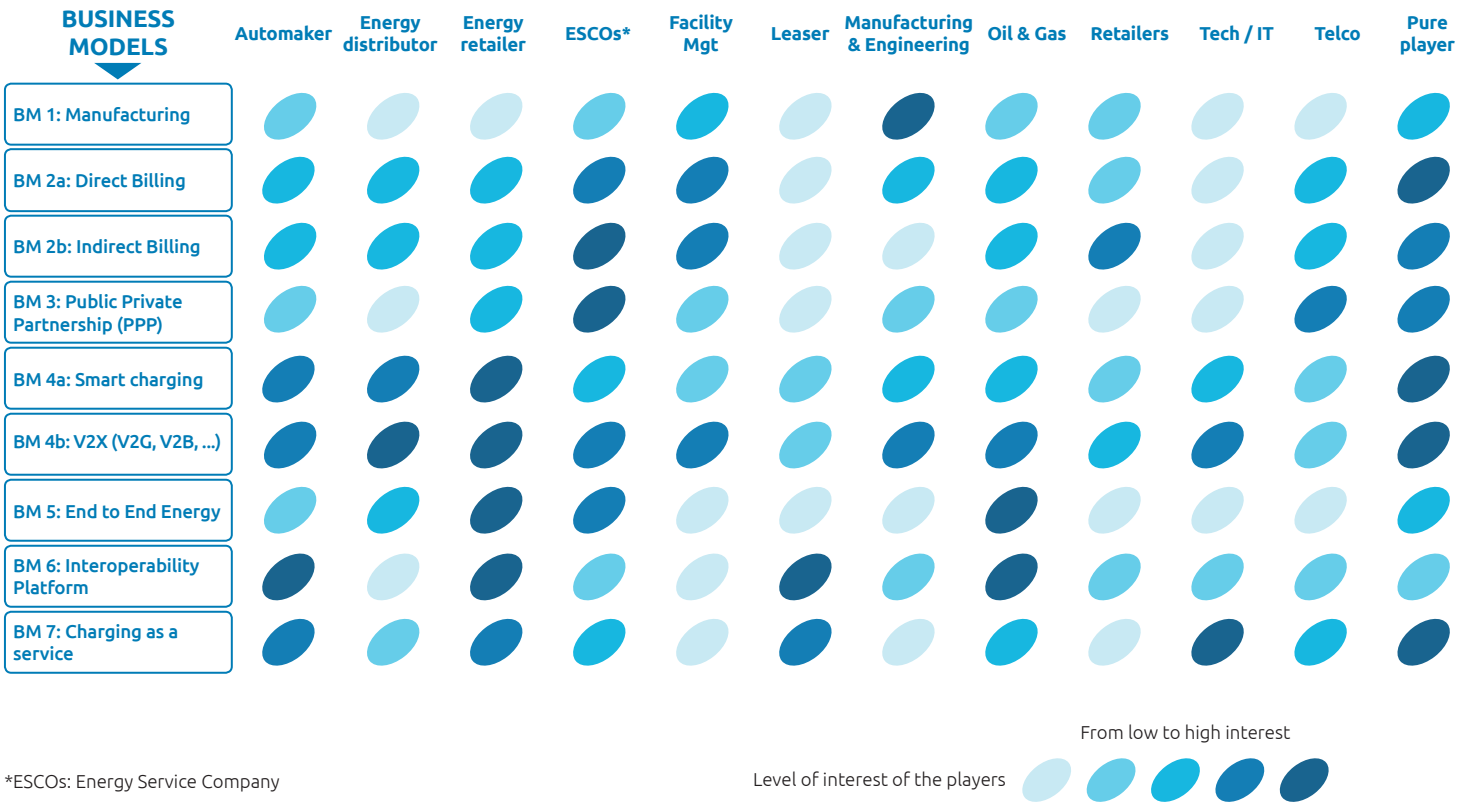


Figure 4 Players level of interest per business models

Facility Manager

"Why look for a leader? Someone will develop a business model at one time or another. There may be alliances. Start-ups could bring interesting solutions, as they are more agile. The impulse of public authorities could also change everything."

Throughout this study, we have shown that the EV charging value chain is genuinely new and that players keep moving along it. In doing so, they complexify the existing ecosystem and adopt various business models among the seven that we categorised. Boundaries between players from different sectors are therefore increasingly blurred. Nonetheless, not all value propositions are equally promising, and we have shown that mobility and charging habits are key to understand which value proposition will cover customers' needs best. The better a company's understanding of **customer preferences – in other words its ability to process data and to offer tailored solutions –** the more it can profit from this burgeoning industry.
As coalitions and clusters begin to form, it can already be stated that some players will be more successful than others if they adopt given business models.

Utilities could become the one-stop shop for energy and mobility provision – or be relegated to mere commodity suppliers

There are two main avenues for utilities: focus solely on producing energy and increase their profits thanks to the demand for greater production capacity or look beyond electricity sales and develop mobility services. As mentioned earlier, utilities could also leverage their knowledge on distributing and transporting energy to develop smart charging and/or V2X related offers.
By developing end-to-end energy offers with smart charging services, utilities could retain a pivotal role and build a direct link with end-customers. More specifically, they could cater to the needs of frequent EV users, especially daily commuters, taxi drivers, or occasional corporate drivers. Utilities could benefit from their established brands, especially when dealing with corporations and elder generations of EV owners. Utilities could nonetheless be challenged by Oil & Gas giants if they keep diversifying through partnerships and mergers & acquisitions (e.g. Total with Direct Energy) as well as by automakers who have started developing their own energy services (e.g. Nissan or Volkswagen).

CEO, Startup in EV industry
"The player who is in the cloud and who combines services and payment activities could be the best positioned. Charge Point Operators might be the best placed to offer these services…"

Automakers can lead thanks to an exclusive access to data

While unknown to customers when it comes to electricity provision, automakers have developed strong customer relationships. They could remain the main point of entry into the EV ecosystem for daily commuters, taxi drivers and inner-city car owners. By doing so, they would be ideally positioned to cross-sell their services, although efforts at diversification have not yet proved to be successful.
Developing interoperability platforms and smart charging solutions could help them retain ownership of data and the associated value. Automakers could also ideally cater to the needs of occasional leisure drivers thanks to interoperability platforms coupled to free-floating offers, modelled after start-ups like Ubeeqo, Zipcar, or Renault's Moov'in. Paris is a case-in-point and could pave the way for the massive deployment of similar schemes.
Furthermore, automakers could start buying electricity in advance from utilities, in the form of pre-purchased MWs, and resell them in all-inclusive mobility offers (with parking and insurance for autonomous driving algorithms that they would have designed). Automakers could therefore play a pivotal role in the market by mastering technology and developing encompassing mobility services.

Pure players, providing smart charging solutions, are ideally placed to fulfil the needs of both automakers and utilities

Pure players offer tailored services for the electric mobility space, powered by original intellectual property. They thus boast a native advantage compared to established players trying to enter the space and could directly challenge utilities and automakers in their race to capture customer relationships and margins.
Thanks to encompassing and agile offers, they can cater to the needs of corporate EV drivers and of urban as well as rural drivers. They are also the enablers of end-to-end energy offers, thanks to their native mastery of EV charging data.
In fact, pure players allied to car leasers could prove to be the major disruptors of the EV charging market.

Chairman, Leading European Automaker
"In a few years, half of the revenues in the auto industry will be from digital services"

Strategy Director, Major Utility in Europe
"EV drivers are feeling more and more comfortable with public charging stations."

Even if they do not produce electricity, they could set up packaged offerings and purchase electricity in bulk to cater to their needs. By doing so, they would in fact act like indirect energy retailers. As such, utilities would remain mere providers of commodities while value generated by additional services would be captured by pure players and leasing partners.

O&G giants are particularly threatened, unless they seize the transformation imperative that EVs represent

O&G are particularly well-suited to answer the needs of taxi drivers, holidaymakers, occasional corporate drivers and service workers thanks to their national coverage and presence along main transportation networks. They could therefore offer charging services against direct or indirect billing, especially to cover fast charging needs. Their knowledge of customer service and retail as well as their ability to master a necessary transition period during which different types of fuels would coexist could prove to be a strength. By transforming their existing network of petrol stations into rapid charging stations, they could help address the experience anxiety faced by many EV drivers. Still, their inability to provide end-to-end energy offerings or charging as a service in urban areas could prevent them from addressing the mobility needs of entire segments. While Shell, Total or BP seem to have understood the need to diversify, other O&G giants are still lagging behind and are at risk of seeing their profit shrink dramatically from 2022 onwards.

CEO, Startup in the EV industry
"What is important is the peace of mind: easy customer journey, and especially being able to charge everywhere in an easy manner."

GAFAs et al.'s intervention will be a matter of years

Major tech companies like Google, Amazon, Facebook and Apple (GAFA) have become famous for their ability to disrupt entire industries in short periods of time. Their success, driven by data mastery and customer-centric approaches, has nonetheless not reached the EV charging market – for now. Indeed, most have focused on artificial intelligence and autonomous driving – as Alphabet, Google's parent company, and their Waymo unit. Current experiments from Alphabet or Alibaba in the smart city space will necessarily lead them to become relevant in the EV charging ecosystem. Especially since data and platforms are key for its efficient functioning . Waymo's commitment to purchasing 20,000 jaguar i-pace could be a move in this direction.

Manager, Leading Oil & Gas Company
"B2B & B2C customers look for simplicity, unification and interoperability."

Innovation Director, European Utility
"For consumers, an electric vehicle is a car. While for grid operators, it is a battery on wheels."

VALUE PROPOSITION OF CAPGEMINI INVENT

Why choose us in the e-mobility sector? Because we are the leading digital transformation company with strong know-how in developing innovative solutions and identifying business models. We are combining this background with our expertise in the energy and utilities sector, which helps us to think out of box with a concrete base.

YOUR LEADING PARTNER FROM EV CHARGING BUSINESS DESIGN TO IMPLEMENTATION AND OPERATION

"Thanks to our extensive experience in the field of e-mobility, we are the ideal partner along the entire value chain up to the roll-out

E-MOBILITY STRATEGY

- Identification of market and competitive trends, evaluation of market position and entry strategies
- Development and reengineering of business models
- Definition of sales and service models and implementation roadmaps for E-Mobility offerings

SOLUTION IDENTIFICATION AND SOURCING

- Development of charging infrastructure and service portfolio, pricing target pictures
- Identification of target customers, their expectations and needs
- Make or buy decision and Sourcing potential partners for products or services

SOLUTION DESIGN

- Business and technology know-how are combined and leveraged towards optimal solutions and assets, e.g. rapid prototyping, app development, IT landscape target pictures, vendor selection, Back office-as-a-Service, etc.

SOLUTION INTEGRATION

- Develop the delivery process
- Cybersecurity in the electrical age

SOLUTION OPERATIONS

- Data valuation and management
- Outsourcing 1st-level support, if necessary self-service 2nd/3rd level

Capgemini invent

Capgemini

CAPGEMINI INVENT ESTABLISHED AN E-MOBILITY TEAM WHICH COMBINES REQUIRED CAPABILITIES FROM ALL RELEVANT INDUSTRIES AND DISCIPLINES

AUTOMOTIVE PRACTICE

- We know the future sales and service model of OEMs in terms of E-Mobility
- Numerous projects for the largest automotive players in Europe

INNOVATION AND STRATEGY	OPERATION TRANSFORMATION	DIGITAL BANKING	CUSTOMER ENGAGEMENT
Business models, innovation, organization, operating models	Planning, distribution, warehousing, make-or-buy	Payment solutions, blockchain, regulation	Marketing and sales strategy, USP & Customer journeys, Platforms & apps public services

- We know and work with the largest energy companies, public services and niche players in Europe
- Strong footprint in Sales, Infrastructure, Network and Risk Management

ENERGY & UTILITIES

CAPGEMINI INVENT E-MOBILITY TEAM

- The team consists of 10 experienced consultants
- Functional expertise and industry know-how from energy and automotive combined
- Running activities on fairs, research and publications

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WE HAVE SUCCESSFULLY CONDUCTED MULTIPLE PROJECTS CONCERNING INNOVATION AND E-MOBILITY

LEADING OEMs	Subscription services in the automotive industry	LEADING AUTOMOTIVE COMPANY	New automotive brand creation with a focus on electric vehicles	LEADING INTERNATIONAL CAR MAKER	E-mobility business models selection and go-to-market roadmap
LEADING CANADIAN UTILITY	Charging infrastructure: partners selection, make-or-buy strategy, pricing, roadmap	LEADING EUROPEAN UTILITY	Set up an e-mobility business unit	LEADING OIL & GAS MAJOR	Set up an e-mobility business unit
LEADING OIL & GAS MAJOR	Electrification of Urban Transportation Fleets with a focus on e-buses	LEADING OIL & GAS MAJOR	10-year forecast of the evolutions needed by the service stations network, due notably to the impact of new mobilities	PUBLIC SERVICE	Market study on the digital transition in the mobility sector
LEADING EUROPEAN CAR MAKER	Selection of EV charging partners	LEADING EUROPEAN UTILITY	Market study on electric vehicles in the Netherlands	LEADING TIRE COMPANY	Animation of an open innovation process regarding the new mobility concepts, including recharging infrastructure and electric vehicles
LEADING EUROPEAN CONCESSIONS AND CONSTRUCTION COMPANY	Smart City offer – Positioning and argumentation, in particular for electric mobility infrastructure services	MOBILITY PILOT PROJECT FOR DEPARTMENT	Testing of new mobility solutions	LEADING FRENCH PUBLIC INSTITUTION	Smart Charging : definition of the various recharging architectures – services evolution scenarios and impacts on data

SPECIAL THANKS

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About Capgemini Invent

As the digital innovation, consulting and transformation brand of the Capgemini Group, Capgemini Invent helps CxOs envision and build what's next for their organizations. Located in more than 30 offices and 22 creative studios around the world, its 6,000+ strong team combines strategy, technology, data science and creative design with deep industry expertise and insights, to develop new digital solutions and business models of the future.

Capgemini Invent is an integral part of Capgemini, a global leader in consulting, technology services and digital transformation. The Group is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital and platforms. Building on its strong 50-year heritage and deep industry-specific expertise, Capgemini enables organizations to realize their business ambitions through an array of services from strategy to operations. Capgemini is driven by the conviction that the business value of technology comes from and through people. It is a multicultural company of 200,000 team members in over 40 countries. The Group reported 2017 global revenues of EUR 12.8 billion. People matter, results count.

Visit us at www.capgemini.com/invent.

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