



eMobility accelerated

Creating a seamless customer experience
through value chain convergence


accenture

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Overview

Without significant and rapid improvement, poor customer experience could risk delays in EV adoption and hinder global efforts to reduce carbon emissions.

eMobility's evolution is dependent on an ecosystem working in harmony to achieve scalability that helps meet net zero objectives.

Cross-industry collaboration is critical, no single company or industry has the scale, technological expertise or customer base to succeed alone.

We see strong convergence of the oil and gas, utilities and automotive value chains, focused on a seamless charging experience.

This convergence at the EV charging point relies on cross-industry IT infrastructure that is similarly seamless.

Companies will be better able to navigate the needed convergence by continuously changing the game and their industries, driving a new imperative. Embracing what we call **"Total Enterprise Reinvention"**.

Driving convergence at the charge point

For many organizations, total reinvention is a route to create a foundation that vastly improves the customer experience.

[Total Enterprise Reinvention](#) – defined as a deliberate strategy aiming to set the art of the possible – is characterized by the ability of organizations to rapidly react to changing customer needs, where change becomes a foundational state. Reinvention should be boundaryless.

Organizations need to break down internal and external silos, enabling collaboration across entire value chains and between industries. It provides organizations with the means to create a new performance frontier in eMobility, where innovation can go beyond benchmarks, generate new value pools, and accelerate EV adoption.



The new eMobility customer journey

As the race to net zero intensifies, eMobility is emerging as a vital building block. Road transport accounts for 28% of global carbon emissions¹, making electrification vital if the world is to meet its net zero commitments. Currently, batteries are the only viable alternative to internal combustion engine (ICE) vehicles.

The significant momentum behind electric vehicles (EVs) is propelling them into mass-market adoption - eMobility is inevitably becoming big business.

Last year, EVs accounted for over 20% of passenger vehicle sales in Europe 1 year-on-year while the global sales surged by 60%, reaching nearly 15% of sales².

This was despite supply chain obstacles and rising inflation, well in advance of other low-carbon alternatives such as hydrogen or biofuels. Moreover, the

massive electrification of transport is not just about decarbonization. The benefits are plenty. Battery powered electric vehicles are more energy efficient and can travel three to four times further than ICE vehicles using the same amount of energy³.

Their low emissions can help improve air quality. EVs also help strengthen the energy security of countries that rely on hydrocarbon imports, by shifting reliance away from fossil fuels toward locally generated and renewable power.

And because EVs are essentially batteries on wheels, they will play an important role in balancing power networks, providing much-needed flexibility to the power system.

Global EV sales 2022 increased + 60 % despite energy crisis – while EV drivers remain disappointed with public charging

However, the industry has faced some huge barriers – some of which remain. Affordability has been an issue facing early adopters, while a new generation of smaller, cheaper models and government incentives are likely to bring costs down soon. “Range anxiety” is decreasing as the battery performance is improving rapidly⁴.

Awareness of eMobility offerings is another issue⁵. However, by far the biggest barrier facing EVs is the unreliable, complex and fragmented charging experience with both US and European EV drivers expressing dissatisfaction especially on malfunctioning stations and payments⁶.

EV charging is much harder than ICE refueling

Refueling an ICE vehicle is easy. A driver pulls up at a pump, fills their tank and pays for the fuel – all within a couple of minutes.

We may take that for granted today but remember that this seamless ICE vehicle customer experience was built over many decades.

The industry is a finely-honed machine supported by a mature ecosystem, making the customer experience generally consistent regardless of location.

Given the pace of the transition to EVs, the eMobility industry needs to replicate this seamless customer experience in just a few years. However, the industry has not yet delivered. Why has the transition been so difficult? EVs effectively remap the customer journey.

The transition to EVs is not just an exercise in exchanging a vehicle's fuel cap for a charging point. There are

fundamental differences between refueling ICE vehicles and charging EVs that demand a transformation in driver behavior.

Ultimately, it is the responsibility of the eMobility industry to make these behavioral changes as seamless as possible. It is truly a once in a lifetime opportunity to redefine customer experience in mobility.

The good news is that, theoretically, the infrastructure that supports the EV customer journey is less complicated than that for ICE vehicle drivers.

The petroleum industry needs to manage a complex set of activities – such as wet stock management, deliveries, and tank leakages. eMobility needs to overcome less complex barriers to create a seamless charging experience.



Poor customer experience is felt across the customer journey

So, what makes early adopters' experience consistently poor, across the customer journey? And what causes that? First-time EV owners have no experience of charging, either at home or when on the move, and need guidance on how to do it.

Yet the industry has been slow to educate new consumers on the transition to EVs. After buying an EV, many first-time owners can be left waiting months for a charge point to be installed. But the problems do not end once an installation appointment has been booked.

In some locations, private charge point installations are not successful on the first visit⁷. In all other cases, to complete the installation, the installer has to return to the customer's premise at least once more. Why is this? Often, it is because the installer had the wrong information regarding the location's suitability for a charge point installation.

Today, most charging happens at home or at the workplace⁸. But that will change. The industry will soon need to confront new challenges for EV drivers who rent, live in multi-unit dwellings, or do not have a dedicated parking space.

These customers will be forced to use public or semi-public charging infrastructure, where the user experience is currently not optimal.

There are too few public charge points, they are not fast enough, they are often out of service, and they use a range of payment systems that are incompatible.

On the move, drivers cannot easily access real-time data on where public charge points are, their capacity, their availability, or the cost to charge their vehicles.

There is a profusion of different eMobility apps, creating confusion and frustration among drivers.

And a lack of data sharing means there is no single source of information on the complete charging network. For example, some charge points may appear available on an eMobility app, but when a driver arrives, they are either in use or are out of order.

The owners and operators of charge point infrastructure are not entirely to blame for this lack of public infrastructure. Many want to install more points but are often forced to wait months for permit approvals, for suppliers to deliver the charging hardware, and for distribution operators to connect them to the grid.

One out of five drivers were unable to charge their EV in a public US station – after a long wait for both vehicle and a home station⁹

Improving the eMobility customer experience

It is essential the industry improves customer confidence in eMobility, from corporate fleets to private owners. As a matter of urgency, the eMobility ecosystem should seek to tackle the issues around device and vehicle interoperability, accessing and using charge point infrastructure, EV management, and understanding energy use and demand.

The industry needs to make it easy for customers to select the right vehicle that aligns with their needs, install a charger at home, and access and pay for charging in public. Pricing transparency – particularly at public charge points – needs improvement.

Customers also require trust in the EV technology, from ensuring that an EV's battery range can support daily routines to the availability of charging infrastructure.

As part of efforts to make EVs cheaper, automakers need to offer a wider range of cheaper models.

New renting, leasing and on-demand models will allow customers to drive an EV without having to purchase one outright. Using EV batteries in flexibility programs will reduce the need for grid reinforcement and take advantage of green energy at the cheapest price, bringing down electricity costs.

Both public and private charge point installation need to be timely and efficient. Charge points have to be delivered on time, installers need availability to fit the equipment, and distribution network operators have to ensure that grid connections are timely and that the whole process is as quick as possible. Corporate fleets and public charging need large numbers of high-capacity charge points.

These sites may not be supported by existing grid infrastructure, which may require significant upgrades. It is therefore important that distribution operators also perform any required grid upgrades fast and efficiently.

It is only through vastly improved collaboration that more customers will experience a “perfect start” and the industry can rapidly achieve scale.

We also need to remember that the charging infrastructure is being deployed as part of much broader urban infrastructure upgrades – including integrated transportation systems, fiber broadband, intelligent street lighting and surveillance equipment.

It is important that the industry works with city planners to ensure that charging infrastructure is deployed where it is needed most and in a way that is least disruptive to citizens.

Drivers need much more help finding the charge point that best serves their needs in terms of charging speed and cost. The functionality of eMobility apps needs strong improvement. They must provide clearer, more complete, and real-time information on public charging infrastructure, including availability. This requires not just a focus on user experience, but also on vastly improved data sharing across the industry.



eMobility ecosystem convergence at the charge point

As a new industry, eMobility introduces a new “value chain” – the charging infrastructure – which integrates with two existing value chains, automotive and power utilities. While the automotive and power value chains are well known, the EV charging infrastructure is comprised of completely new players. However, they are nevertheless vital to the eMobility customer experience and central to the development of new business models. But neither goal will be achieved if the industry simply replicates ICE-based business models.

eMobility requires a reinvention of the “**mobility value chain**”, and of individual organizations. In the emerging EV value chain, the first movers have a massive opportunity. The winners will be those with the courage to reinvent their business models: to become customer-centric organizations with a digital core that enables rapid growth.

It is also important to remember that across the three interconnected value chains sits a layer of regulation and governance. eMobility is a vital aspect of net-zero commitments urban redesign. Several levels of government have a significant interest in eMobility’s success and will play an important role delivering it.

The emerging EV charging infrastructure value chain

The EV charging infrastructure value chain encompasses the manufacture, installation and operation of charge points, and related eMobility services.

The ecosystem includes several different players, all facing a requirement to massively scale their businesses. The value chain starts with hardware manufacturers, which supply both public and private charge points.

They must scale production rapidly to meet the huge new demand over the next few years. This new demand will also require charge point installers to increase their scale of operations.

Charge point operators (CPOs) operate networks of charging points. They have been at the forefront of charge point deployments at highway locations, and have developed new opportunities at hotels, restaurants and retail sites. eMobility service providers (eMSPs) provide EV drivers with access to charge point networks.

Software companies are another important part of the value chain, providing the industry with roaming platforms, payments systems, and IoT platforms to manage EV charging infrastructure.

Over the next two years, 23% of global utilities execs are planning to partner with car retailers/manufacturers for eMobility¹⁰



Requires close integration with the mature automotive and power value chains

A key long-term goal of the eMobility ecosystem is to seamlessly integrate this new charging infrastructure with the automotive industry and the power system, particularly distribution operators. And all players, across all three value chains, have a responsibility for this close integration.

One of the key principles of total enterprise reinvention is that it is boundaryless. Reinvention breaks down organizational silos. It helps organizations tackle capabilities end-to-end, not just within the organization but across industry value chains.

This will be imperative if eMobility is to deliver excellent customer experience at scale in just a few years. So, what does this boundaryless reinvention look like?

Automakers and the charge point infrastructure need to adopt aligned hardware and software standards to

ensure that vehicles can connect to charge points and participate in new EV-related programs. An example includes the Improvement of driver access to information regarding the cost and availability of charging infrastructure – or enabling two-way power flows that support vehicle-to-grid (V2G) functionality.

Charging infrastructure needs to become as standardized as the power system. Today's power system was not designed with EVs in mind, so grids have to be reinforced to cope with the increased demands of EV charging. However, the power system will also use smart charging approaches to delay or remove the need for costly system upgrades. Smart charging relies on significant data interchange, and charge points need to be able to react to market signals sent by the power system.

Friction across the customer journey causes poor customer experience

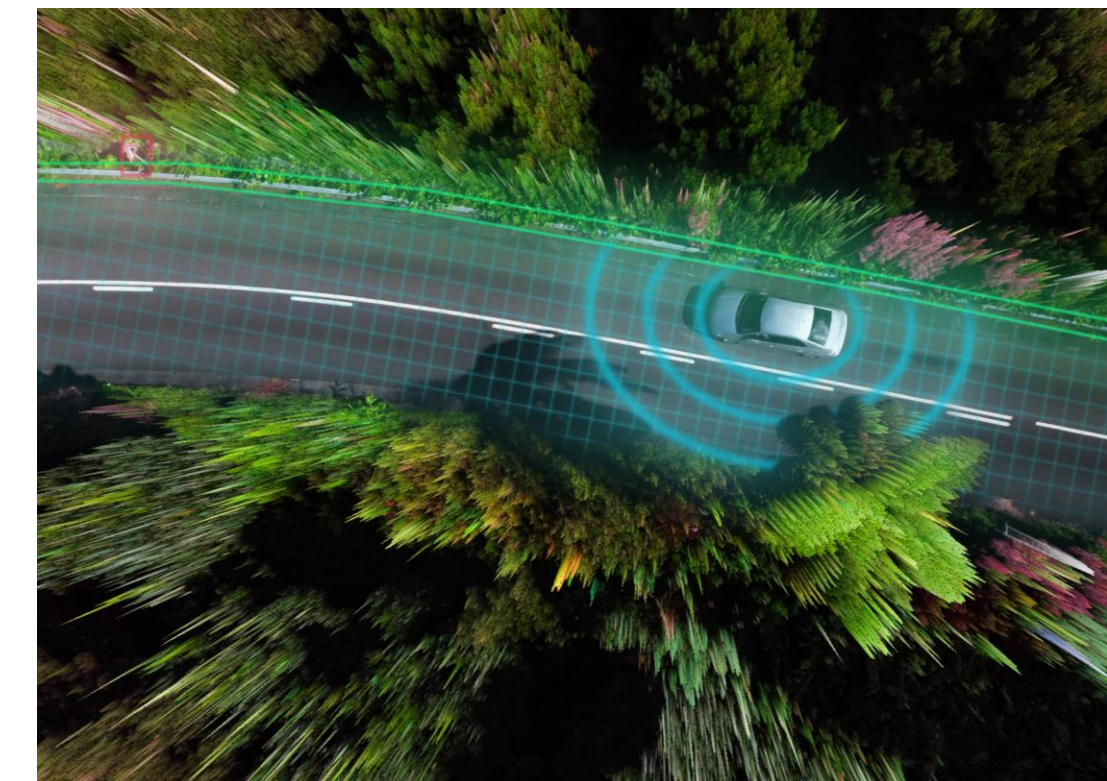
Failure points occur across the eMobility ecosystem, and each one adds further friction to the charging experience. This frequently occurs when elements are not synchronized across the three value chains¹⁰.

While an individual point of failure may result in a minor inconvenience, too often many frictions combine to create a poor experience. These problems will persist because these three value chains largely operate independent of each other.

The lack of synchronization exists especially because the eMobility industry is so new. It still has plenty of room to collaborate more because individual organizations operate with deeply ingrained incentives and behaviors. eMobility requires the automotive and power industries to work together in completely new ways – and both must

work alongside ecosystem partners fulfilling the host of new roles in the EV charging value chain.

The problems are exacerbated by the fact that each type of business has different strengths, resulting in different strategic approaches to EV charging.



The eMobility value chains need to converge at the charge point to address poor customer experience

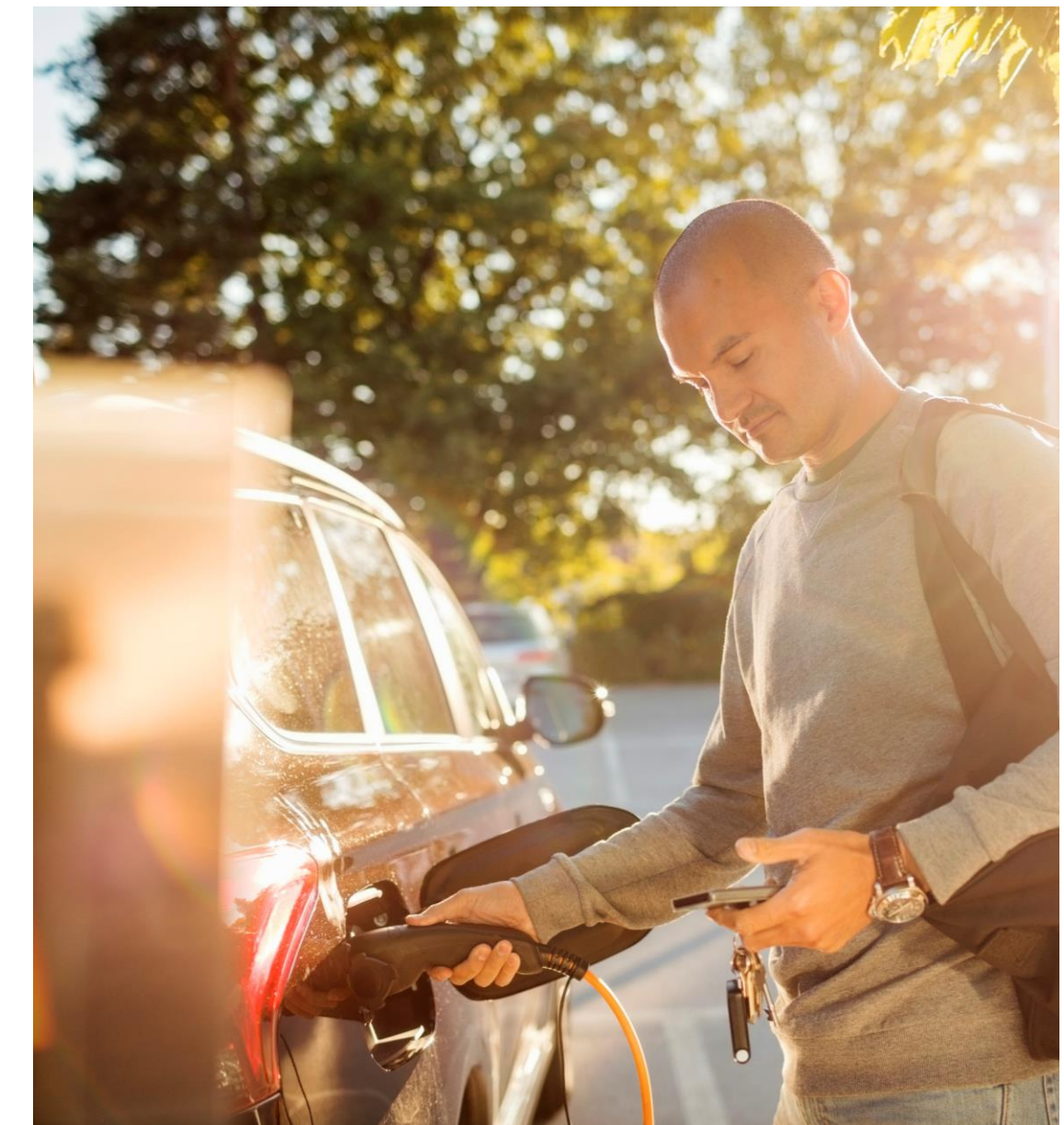
Recent cross-industry research by Accenture found out that blurring physical and digital worlds can make customer experiences more challenging, over-complicating the experience for the user, without achieving the utility that the technology promises.

This “complexity tax” can be addressed by a more life-centric approach designing for simple but significant interactions across a unified experience continuum – promising both higher speed-to-market and higher customer satisfaction¹¹. From an EV customer perspective, what does reinvention look like? Another key element of total enterprise reinvention is to embrace the art of the possible.

To leverage the digital core to enable new ways of working and create a new performance frontier. And where is this new frontier? In terms of customer experience, the three value chains converge at the charge point. The more seamless the value chains become, the greater the interoperability and the more services can be delivered.

The charging experience becomes more frictionless and the result is a more satisfied customer. But collaboration is not just about improving customer experience. It also creates much more value across the eMobility ecosystem – and releases the potential for entirely new business models.

Across industries, companies reducing complex customer experience are 26% more likely to achieve highest levels of speed-to-market¹²



Deliver a Tesla-like experience in an open ecosystem

Not all EV drivers have necessarily a poor charging experience. Tesla drivers can access a network of dedicated, well-maintained, and widely available charge points.

To encourage early adoption, Tesla built a closed system charging network for its customers. It provides a blueprint of what a reinvented industry could look in the future.

Tesla owns the entire ecosystem, up to the connection with power networks. And it collects data from across the entire ecosystem, giving it a complete end-to-end view. Tesla has created a seamless experience because all the essential elements are synchronized.

The challenge for the rest of the eMobility industry is to replicate this seamless experience in an open system. That requires a huge drive toward standardization, access, reliability and safety. It also needs a robust digital core that leverages the power of cloud, data and AI through an interoperable set of systems that that enables the rapid development of new capabilities.

Improvements and innovations should be shared widely to ensure a higher level of awareness and usability of the EV and associated infrastructure. Increased collaboration across the different value chains will incrementally remove points of failure, and steadily move the eMobility industry toward a well-functioning, open charging network that is available to all.

All eMobility players should take a value chain perspective

Outside Tesla's infrastructure, eMobility players have too often taken a monolithic view, focusing their strategies on control and ownership of their own part of the market¹³.

The lack of collaboration or focus on the customer journey means that automakers are not shipping EVs with V2G functionality, CPOs lock drivers into their charging networks, and network utilities have requested direct control of charge points to prevent drivers gaming smart charging programs. The industry should understand that enterprise reinvention is a central pillar in any organisation's eMobility strategy, which will increase the value and improved customer experience that cross-industry collaboration can bring.



Regulators can help achieve this

While it is important that regulators do not stifle competition, they can help the industry move in the right direction. Regulators played an important role in stimulating early demand for EVs through subsidies and incentives¹⁴.

Now that the costs of EVs have fallen, economics will increasingly drive the future adoption of EVs. In many markets, incentives will no longer be needed, and regulators have an opportunity to refocus their attention on the charging experience.

People without access to a private charge point will rely on public charging networks. However, in some instances it is difficult for private players to create a profitable public charging business model¹⁵.

In these instances, the public sector has great potential in taking steps to help enable access for reliable charging – which is partially already happening – eg with the EU policies recognizing minimum requirements for EV charging infrastructure¹⁶.

Increasingly, public-private partnerships can help delivering this infrastructure, as part of public sector collaboration across the eMobility ecosystem.





Creating value through collaboration

Collaboration between parties across each value chain will be instrumental in delivering a great customer experience, by aligning all the hardware, software and data within the eMobility ecosystem. But customer experience is merely a foundation, not the end goal.

Once all players take this ecosystem-wide perspective, many opportunities will emerge to generate customer value around the charge point.

EVs play a vital role in increasing power system flex

The millions of EV batteries and charge points connected to the distribution network can provide utilities with a fantastic resource to help balance the power system – while also enabling EV owners to save or even earn money when their EVs are parked.

There are many approaches to EV-based flexibility, ranging from simple rate plans and smart charging (also known as V1G), through to technologically complex V2G programs¹⁷.

As the industry evolves, it will increasingly rely on organizations with a powerful digital core, able to share data across the value chain.

The simplest option is to use a rate plan that incentivizes overnight charging when demand is lowest. All this needs is a smart meter, a charge point that enables timed charging, and a utility rate plan.

V1G programs are more sophisticated. For example, when renewables generation is high and demand is low, energy markets can send signals to charge point operators (CPOs) to automatically initiate EV charging. Conversely, when demand increases and grids become congested, the energy market can request that EV charging be turned off (although, in practice, shutting off a charger is complicated and difficult to manage).

Missing flexibility can lead to 4 years of local grid expansion – vs just a <6 months for EV chargers¹⁸

V2G programs take smart charging one step further, where the EV dispatches power from its battery into the grid. Questions remain regarding V2G's long-term viability. It could cause an EV's battery to degrade more rapidly, and calculating incentives is complex. V2G is only possible if EVs and charging infrastructure are connected and support bi-directional charging.

To realize these opportunities, automakers, CPOs and charge point original equipment manufacturers (OEMs) need to install hardware and software that enables interoperability with power networks, and CPOs' eMobility platforms must also support a flexibility mechanism. Most importantly, these programs should be designed around

the customer's needs to ensure their charging requirements align with those of the grid.

Incorporating EVs into flexibility markets relies on significant data sharing. An open eMobility data infrastructure will be vital if EVs are to participate in future flexibility markets. For example, the grid operator needs to know what resources are available, when they are available, where they are, and who owns them.

However, this data is either not created, not collected, or not shared by different parties – OEMs, CPOs, eMobility service providers (eMSPs), etc.

Managing electric fleets

We expect commercial fleets to electrify much faster than privately-owned vehicles. But, driven by corporate ESG commitments, fleet electrification may be much more sensitive to any deterioration of the charging experience.

Although fleet electrification helps companies reduce their carbon emissions, it is likely to be only attractive if there are no significant downsides. In practice this means that if fleets cannot charge, organizations cannot execute their business and delivery companies cannot deliver. Emergency services cannot reach citizens.

Bus companies cannot transport passengers. Unless companies are confident their vehicles can be charged when and where required, fleet electrification could either slow down or be canceled. This makes the uptime of charging infrastructure increasingly important. eMobility collaboration can build the necessary confidence. EV fleets charge either at company locations or on the road. If the industry works together to provide

accurate and real-time availability of charge points, new business models can be built to serve the commercial EV market.

The owners of large EV fleets own many – often high-capacity – charge points¹⁹. While these EVs are in use, these charge points are idle. There is an opportunity to make this charging infrastructure available to other fleets. Rather than compete with private EV owners for access to public charging infrastructure, fleet owners can build an extensive, shared network of charge points with other companies and use public infrastructure only as a last resort.

This model requires a central orchestrator, along the lines of a fleet-specific eMSP, and relies on significant data sharing²⁰. Fleets could share the availability of their charging infrastructure and each EV's battery levels. For example, eMSP can help each driver find an appropriate charge point, but also prioritize charge point availability for its owner's fleets.

Finding a home for second-life batteries

The question of what happens to EV batteries once they reach the end of their useful lives will be answered by a new and important connection between the automotive value chain and the power grid.

While used batteries may no longer be suitable for an EV, grid operators can find many uses for them. However, creating this new economy will require collaboration and convergence between these two, previously separate, industries.

EV batteries have a life expectancy of between 100,000 and 200,000 miles, or between 15 and 20 years for the average privately-owned vehicle. Once a battery's capacity drops to below 70%, it can be repurposed for a second life²¹.

There are many potential applications for second-life batteries²². They can be installed in residential and commercial properties to store self-generated renewable power, or power from the grid when prices are

cheapest. They can then be used to charge an EV or power appliances when prices increase. And utilities can use them to build grid-scale storage to balance networks, or power street lighting.

In light of these opportunities, a new industry is emerging that takes the old batteries from EVs and repurposes them for different second uses. This industry needs to interoperate with energy markets to maximize the customer value they collectively create. Many major automakers have trialed second-life business models that extend way beyond the traditional automotive value chain.



eMobility value chain

Collaboration within the eMobility ecosystem – and with the public sector – is vital in order to create seamless charging experiences, or the new business models we previously described. Incumbents need to rethink their positions in this new industry and develop strategies that define their approach to cross-industry collaboration.

When orchestrating this convergence, each player should bring a deep understanding of what they require from others, and what they can provide to the rest of the ecosystem. Each step toward convergence strengthens and reinforces these interdependencies, but also improves overall customer experience. The charging experience becomes increasingly seamless, steadily addressing the issues that could stop drivers from buying or leasing an EV. Significant change is required.

Reinvention of the oil and gas industry in an electrified world

Eventually, the eMobility ecosystem will displace the ICE fuel value chain for passenger vehicles²³.

Electricity is replacing petroleum as the fuel; and charge points are replacing service stations as the refueling location. The oil and gas industry may also face a lost monopoly it holds over ICE vehicle refueling.

EV charging has much lower barriers to entry because virtually anyone with an off-street parking space can install a charge point. The challenge for the oil and gas industry is how to remain relevant in an electrified world. However, oil and gas companies have many competitive strengths and could play a major role across eMobility²⁴.

Transforming forecourts to support new business models

Service stations amount to significant real estate in convenient locations worldwide²⁵.

Road transport electrification could be the catalyst to reimagine service station forecourts. For example, they could become mobility hubs that include fast charge points, battery exchange points, or a vehicle exchange service for a shared ownership scheme or mobility-as-a-service. They could also add convenience services such as quick-service restaurants or coffee shops to add value while customers are charging.

Oil and gas companies become integrated energy companies

But why should oil and gas companies stop at installing charge points on their forecourts or being CPOs? Why not become a power provider as well?

Those with the courage to undergo a reinvention will find that they have the skills that will give them a competitive edge, for instance by leveraging experience in trading to capitalize on flexibility.

Many oil and gas companies are already making the transition to integrated energy companies, acquiring utilities in Europe and North America. Their strong brand recognition, and their experience in running huge networks of service stations and procuring or hedging commodities, give them a competitive edge.

▶ **Three months into 2023, European big oil invested >\$1.2 bn in Mobility²⁶**

Power company transformation

EVs represent a once-in-a-generation growth opportunity for the power industry, with their demand for power set to help grow utilities' revenues.

But EVs also present a significant challenge to power network operators. Furthermore, in competitive markets, electricity retailers will face stiff competition to supply power²⁷.

So although there is significant growth potential, it is far from a given that the power industry will profit from it. Networks must be redesigned and new incentives developed to optimize EV charging when the supply of renewables is at its highest. These business models must be developed from the ground-up in the space of a few years. Consequently, the power industry must undergo a reinvention, or find itself left behind.

Distribution networks to ensure safe, reliable and clean power

The eMobility ecosystem depends on robust and reliable power networks. To meet net zero goals, they need to be powered by clean electricity. However, power networks were not designed around EV charging, which could overload parts of the distribution network. Nor were the power networks designed to cope with high levels of intermittent renewable electricity. It is incumbent on network operators to ensure the grid is sufficiently robust to supply safe and reliable power when it is needed. They should also ensure the grid is sufficiently flexible to maximize the use of renewable electricity

► **Between 2022-2030, public EV chargers may need up to global \$35 bn investment/year, but distribution grids at least \$300 bn/yr²⁸**

Energy markets to provide new incentives

Energy markets face a strong need to find ways to incentivize EV charging when renewable power is abundant, effectively monetizing the flexibility potential that these 'batteries on wheels' offer.

The goal is balancing the grid in times of high demand, incentivizing customers to charge their vehicles only when demand is low – built on a foundation with dynamic pricing and new market structures that support EV aggregation and local balancing. What's needed is new infrastructure that directly communicates with charge points and EVs, and manages payments to drivers who participate in flexibility markets.

Utilities to encourage drivers to participate in flexibility programs

The power industry needs to proactively attract EV owners into some of these programs. It is far from guaranteed that mass market participation will occur just by creating financial incentives. EV owners should be encouraged to participate. Even the simplest approaches – charging significantly less to charge overnight – are ineffective if customers do not know these tariffs exist. The challenge of recruiting drivers into flexibility programs increases with the additional complexity of V1G and V2G approaches. Customers need to feel that they are sufficiently rewarded for their participation, so the program needs to be simple and easy to understand. The power industry should also provide insight to raise awareness and allay any worries customers may have. Finally, flexibility programs need to be convenient and the driver should feel like they are in control.

Regulated utilities can become trusted advisors

While regulated utilities' ability to participate in eMobility may be restricted, they are still a vital part of the ecosystem. For example, they can generate a regulated return on new infrastructure deployed to support EV charging. But opportunities exist beyond their core business model. For example, they may look into working with the owners of large fleets, advising them on renewable energy procurement strategies, such as how to best use power purchase agreements.

Electricity retailers guide drivers on the complete customer journey

Electricity retailers in competitive markets may be less encumbered. While the increase in electricity demand will grow an energy retailer's revenues, several other opportunities may emerge for them to facilitate customers' net zero journey. The options include creating integrated offers that include the supply of clean electricity, orchestrate residential EV charge point installations, provide charge cards for charging on-the-go, provide rooftop solar, enable access to a local energy community, install a stationary battery and/or sell heat pumps.

Automotive diversification

The automotive industry is faced with a challenge to make significant changes as well. For one - our recent research indicates how the ongoing race to capture value in the sector is lacking a clear plan for [monetizing digital services](#). But also in eMobility, it's not just a simple case of transitioning from one drivetrain to another. It has already sparked a wave of innovation and reinvention among automakers, some of whom are moving into electricity supply, EV charging infrastructure, insurance, solar panels and home storage.²⁹

Likely not all automakers will adopt all these strategies. However, all EV manufacturers have a role as eMobility enablers. The functionality automakers deploy in an EV determines the level that vehicle can interoperate with the rest of the eMobility ecosystem. For example, as we have noted, V2G business models are only possible if EVs support bi-directional power flows. eMobility open data relies on the EV communicating its whereabouts and battery status.

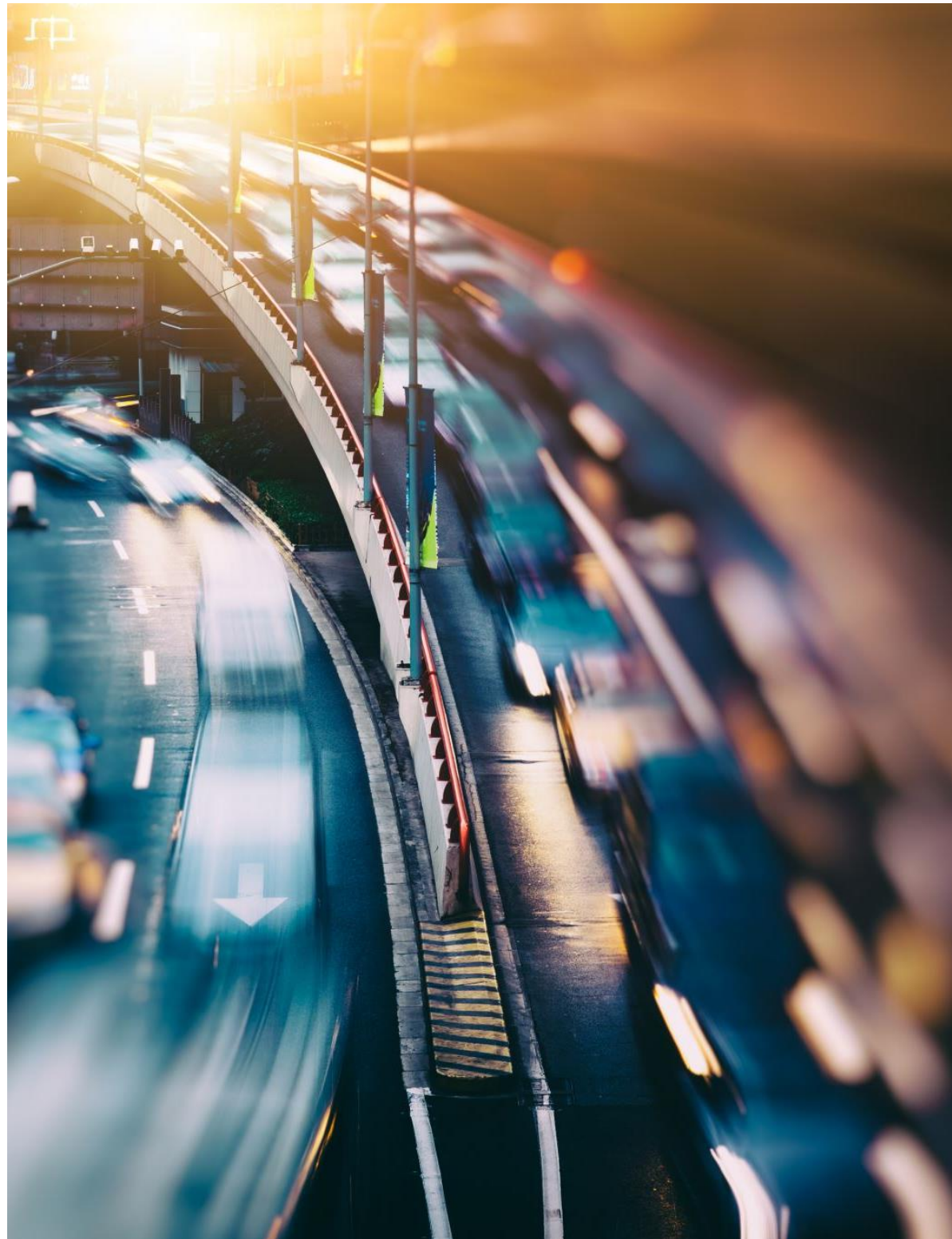
► **EVs may enable up to 40% recovery of aftersales profits³⁰**

Developing cleaner batteries

Although EVs are intended to be a cleaner alternative to ICE vehicles, batteries are receiving significant bad press. There is scope for the automotive industry to address this issue by driving improvements in the battery value chain, all the way from sourcing raw materials to disposal. New battery chemistries will reduce or negate the need for unsustainable materials – for instance those in short supply, whose extraction is environmentally harmful, or relies on unethical labor practices. Lengthening battery lifespan lengthens the replacement cycle, which reduces demand. And new approaches to recycling will reduce demand for mined ore.

Rethinking the ownership model

Service station forecourts could be transformed into new integrated transportation hubs. This opportunity can be boosted through collaboration between the oil, gas and automotive industries. There are significant opportunities for alternative ownership models – with shared ownership, leasing, rental and vehicle-as-a-service models all potentially helping to reduce traffic and demand for parking. Alternative approaches to EV ownership may also help transition customers with no off-street parking.



A shift in focus from hardware to software and services

One of the biggest impacts eMobility will have on the automotive value chain is the product itself. While an ICE vehicle can have over 2,000 moving parts, an EV has around 20³¹. An ICE vehicle's engine contributes significantly to product differentiation. For EVs, the focus shifts to driver experience, amplifying the overall urgency in the sector to shift to [digital services](#).

That essentially means a shift from hardware to software, because it is software – including advanced battery management, route planning and infotainment – that will deliver this differentiated experience. And as EVs move into the mainstream, drivers will think less about EVs' environmental benefits and more about the experience. In fact, that shift is already underway. A recent survey of US drivers found that Gen Z's primary interest in EVs was because they are cool, not because they are better for the environment.³²

Reinventing the dealership model

The shift from hardware to software will likely have wider consequences, particularly for dealers' revenues. Because EVs are far simpler machines than ICE vehicles, their servicing needs are much lower.

When automakers focus solely on building vehicles, their dealership networks will be the only face-to-face contact consumers have with the EV value chain³³. So, consumers will be likely to heavily rely on dealers to ease the transition from ICE to EV, helping them understand how public and private charging works, planning routes, fixing problems when en route, finding useful apps and, in the future, discussing participation in utility flexibility programs. But to do all of this, dealerships need people who understand all these areas, which will require significant training of sales teams.



From vision to reality

For the eMobility industry, getting the customer experience right will lay the foundations for mass adoption and significant additional value creation. Without a seamless charging experience, many drivers may be deterred from buying a new EV. And the only way to create a seamless experience will be for the different eMobility value chains to work in harmony.

Players across the eMobility ecosystem must ask themselves one simple question: “How do I reduce friction across the customer charging journey?”

All companies have a responsibility to remove this friction and increase customer confidence in EV charging

For most – if not all – organizations, the answer lies in closer alignment between the many parts of the ecosystem. Many organizations are well aware of the problems in their own value chains but are doing less to address problems in the other two value chains.

So the second, but equally important question, is “What must I bring to the table to reduce friction across the entire EV charging value chain?” Alignment effectively means standardization, opening interoperability between EVs, charge points and power networks.

- The oil and gas sector faces an existential threat – including those from EVs – and needs to reinvent itself. Many may become CPOs. As with other CPOs, they have the opportunity to seek to implement services that increase interoperability, not diminish it. The charge points deployed today should support the functionality required by the energy market of tomorrow. Their technology cores need to share data with the rest of the market, not lock it into silos.
- Power networks should ensure their assets are sufficiently robust to support the localized increases in power demand over the coming decades. Their business practices should be reinvented so they can adapt to the speed and scale the growth in EVs requires. Their technology cores need to support mass-market flexibility programs to control EV charging.

- Automakers need to fit their EVs with technology that can connect seamlessly with charge points. They should ensure EVs interoperate with new charging infrastructure and redefine their business models around a completely new drivetrain.

The more seamless the charging experience, the more satisfied the customer – and the more business models can be created on this infrastructure. This can only be achieved by adopting a value chain perspective. All stakeholders – including regulators – need to recognize the additional value and improved customer experience that cross-industry collaboration brings. And to do that, all participants require a deep understanding of what they need from others and a willingness to supply and support the rest of the ecosystem.

Collaboration will not be easy, at least initially. But it is vital. Each point of friction in today’s charging infrastructure may delay EV adoption and impede the development of new business models. **Accelerating eMobility serves as a net positive for the industry, consumers and planet, bypassing the only alternative of ICE vehicles.**



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