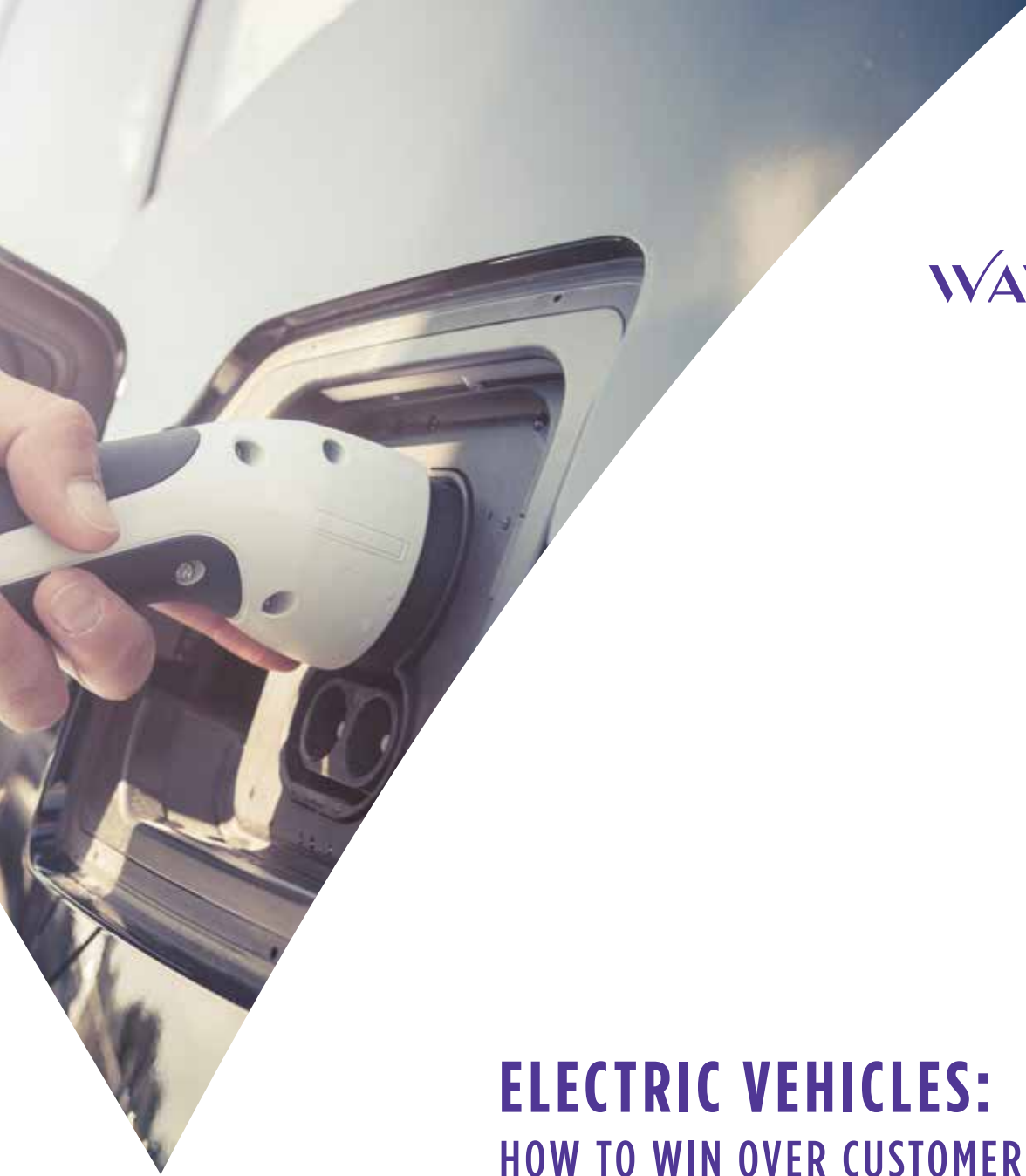


The Positive Way

WAVESTONE



ELECTRIC VEHICLES: HOW TO WIN OVER CUSTOMERS

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How to move beyond the essential political support and industrial transformation needed—to develop services, involve all players, and engage local authorities.

As a result of taking a customer standpoint, the electrification of vehicle ownership envisaged by France's Multi-Year Energy Program appears less a gradual evolution and more a genuine challenge. As a response to climate and other environmental issues, it sets some very ambitious goals for the transformation of France's vehicle stock: 4.8m electric cars in private ownership by 2028. France's Orientation des Mobilités (Future Direction of Mobility) legislation should provide some levers, but it's still at the draft stage.

Beyond these legislative tools, this major transformation requires significant effort across the whole value proposition and involves a range of business sectors and public-sector players—at all levels.

This publication has been produced with input from Wavestone partner Xavier Metz

The transition from a purely combustion-based world to one centered on electric vehicles, or a mixture of different fuels (such as LPG or hydrogen-powered trucks), isn't just about the electrification of the vehicle stock. To **vehicles**, the telegenic cheerleaders, add **infrastructures** (roads, service stations, recharging stations, etc.) and **services** (assistance, repairs, insurance, parking, journey-management applications, etc.), all regulated by a **legal framework** (a highway code, regulations covering highway concessions, legislation regulating condominiums, etc.), and implemented by an **ecosystem of private and public-sector players** (from multinational vehicle makers to local housing associations; from the European Union to local authorities). At the end of this chain is the **user**—an individual or company—a player too often forgotten about in the transition to electric vehicles.

Initial fallout from the transition to electric vehicles tells us that their value

proposition is no match for their combustion-engined counterparts: a lack of information when it comes to making the buying decision, limited choice, inappropriate tax regimes, a lack of maturity in distribution networks, scant information on the costs of recharging, the absence of a second-hand market, etc. However, a widespread move to electric vehicles—and one that's desirable to consumers—can only take place if the value proposition is superior to what's on offer today.

To achieve this, vehicles will need to be produced in Europe, and an appropriate recharging infrastructure and favorable legislative framework put in place. But there are other key success factors too, although some of these aren't sufficiently understood or exploited today: services demonstrating the value proposition that involve all the players needed for a successful transition, and the engagement of local authorities to drive things forward.

OFFERING SERVICES THAT DEMONSTRATE THE VALUE PROPOSITION

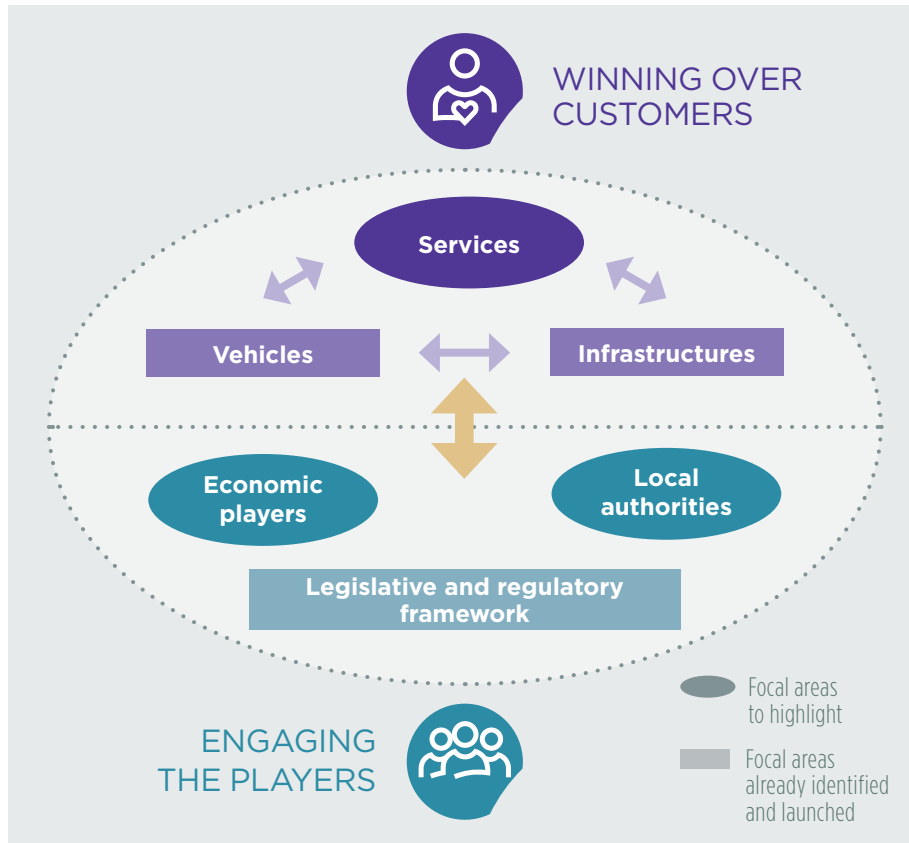
Today, electric vehicle development plans focus mainly on technical aspects: making the cars and putting in place a network of recharging stations. Although these are necessary, they aren't sufficient: a change to the vehicle stock means taking into account sociological factors too. An entire ecosystem of services associated with the use of electric vehicles must be created—reassuring motorists, simplifying the user journey, and helping to disseminate information and build understanding about the system.

A good example of this service gap is that of long journeys in electric cars. When they take to the road in a traditional car, motorists have no need to do lots of planning: whatever route they take, they're likely to come across several gas stations pointed out by roadside panels, enabling them to fill up at a more-or-less standard price, regardless of the type of fuel their car uses.

As a result of technological progress, the new generations of electric vehicle can aspire to a similar scenario: their autonomy now exceeds 300km and the rates of recharge possible generally allow them to fill the tank with (electric!) juice in 30 or so minutes. However, as they travel on their way, "electric motorists" will notice: a lack of information on the roads about which service stations have recharging points; a variety of prices as different in form (often elements that make up the price) as level (the price actually charged); and how difficult it can be to find a recharging point that matches the car's requirements in terms of power, etc. While none of these barriers are, in itself, insurmountable, their cumulative effect is to reduce the quality of the user experience, or even discourage motorists from buying electric vehicles.

These gaps also contribute to the negative and complex image that electric cars suffer from today. Most drivers don't know how they work or what the advantages are. In addition, when they seek information at the pre-purchase stage, they're confronted with conflicting information

Making electric vehicles a success: winning over customers and engaging the players



- Isn't there a website to plan the route you were talking about, John*?

- Well no, not really; that's the problem! You just have to feel your way; it's something you just have to get used to...whatever website you use, you can never put any faith in the recharging stations...whether they'll be there at all, or whether they'll work.

"Forum Automobile Propre"
[Clean Automotive Forum]

*Not the speaker's real name

and may get contradictory advice about electric vehicles from different, often untrained, advisers.

So, to match—or even better—the value proposition offered by traditional vehicles, **a range of services is needed to complement and support both the vehicles and infrastructure.** Here, things like intelligent route-prediction apps that don't display 3.7kW recharging points during a long journey, or show those rated 50kW or more for an overnight stop, come to mind. It's also a matter of simplifying information gathering for customers—through dedicated interfaces and training the advisers who they are likely to come into contact with. There will be other things of course; and the gradual adoption of electric vehicles will reveal a host of different needs.

PRODUCING ELECTRIC VEHICLES IN EUROPE: A STRATEGIC ISSUE

While the development of lithium-ion battery technology has enabled electric vehicles to become a viable substitute for traditional ones, this technological jump isn't, at least at first sight, something that helps European industries; they are masters in the domain of internal combustion but are conspicuously absent from the emerging battery market. In fact, it's Asia that's benefiting. From the upstream to the downstream end of this value chain, China has significant, but not total, market power. Firstly, it accounts for more than 90% of the production of rare-earth

metals¹, and 77% of the cobalt used in batteries is refined there². This control of raw materials has enabled the Chinese to catch up with their Korean and Japanese competitors in terms of battery production: 60% are made in China and 7 of the 10 largest producers are Chinese³. While the United States too has invested in the market, Europe remains on the sidelines.

But strong measures have recently been announced by the French and German governments with the aim of safeguarding the European automotive industry against this technological change, in particular by creating an "Airbus of batteries." Germany has announced an investment plan of €1bn by 2022. In France, the President himself announced, at the centenary gala

of the International Organization of Motor Vehicle Manufacturers (OICA), €700m of support to help develop the sector. Even though they're late to the party, it would be wrong to imagine that European efforts to enter the market would be futile:

- **The market is growing, and demand for batteries will continue to increase:** annual demand for storage capacity for electric vehicles today stands at 68GWh—and is expected to reach between 775 and 2,250GWh⁴ by 2030.
- **Current lithium-ion technology is not the ultimate stage of battery development:** lithium-air or lithium-sulfur combinations have clear advantages, and sodium ions could be used to replace lithium.
- **Both Europe and France have the R&D and manufacturing capability to establish homegrown battery production**

As a result, **the battery market remains open to new European entrants.** But timescales in the battery industry mean that action has to be taken today—if a competitive European industry is to be established in the next decade.

1- Guillaume Pitron, *La Guerre des Métaux Rares, Les Liens qui Libèrent* [The Rare Metal War, The Bonds That Liberate], 2018.

2- The Wall Street Journal (2017), "There's a global race to control batteries—and China is winning," February 11.

3- Jincheng Ni, *L'avenir du VE se trouve-t-il en Chine ?* [Is the future of EVs in China?], France Stratégie, September 2018.

4- International Energy Agency, *Global EV Outlook 2018*, OECD/IEA, 2018.

Standing at **68GWh** today, demand for batteries should reach between **775** and **2,250** GWh by 2030

Deploying a recharging infrastructure that meets the needs of real users

In addition to a poor choice of vehicles, the second barrier usually cited to justify—still marginal—market shares is the lack of recharging infrastructure for electric vehicles. By 2023, the government plans to have about 100,000 public recharging points in place.

This ambitious, quantitative objective is a good fit, in theory at least, with the target trajectory for electric vehicle development. However, it mustn't lead to the diverse needs and uses of recharging stations being ignored:



Main charging station

The motorist's usual charging station: the preferred and most regularly used one.

For example, a private, individual terminal at home, or a collective station installed at work, etc.

3.7-7.4kW



Secondary charging station

A charging station that allows the motorist to recharge at a place other than their main charging point.

For example, a charging station offered by a merchant, one used when the motorist's main station point isn't working, or during a vacation, etc.

7.4-50kW



Charging station used when traveling

A publicly accessible charging station that allows a motorist to recharge during a trip.

For example: a charging station at a service stop, a rapid-charging hub on the outskirts of an agglomeration, etc.

50+kW

The quantitative objective of the deployment of recharging infrastructure must be coupled with the qualitative objective of aiming to install the right recharging stations in the right places. The essential levers are the alignment of the players and the tailoring of the various legal frameworks.



CREATING AN ECOSYSTEM OF PLAYERS WITH VARIOUS LEVELS, OF ENGAGEMENT

Just as the growth of electric mobility is about more than simply putting electric vehicles on the market, it's also about more than just engaging car makers. Their role is key, both in broadening the range and developing services. But bringing an entire ecosystem—buildings, transport, energy, insurance, etc.—to life, in a coherent way, is just as important. However, it should be noted that levels of inter- and intra-sectoral engagement vary widely.

Strong cross-sectoral variations

The players whose business models are directly affected consider the electrification of transport as being central to their strategies: constructors and energy experts, in particular, are taking measures to position themselves in this market,

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adapt their organizational structures, develop new commercial offerings, etc.

Less directly affected stakeholders don't consider transformation a priority, and are waiting for demand to pick up, or more active competition, before they act. Highway concessionaires, long-term car rental companies, parking lot operators, insurers and building players are taking part in pilot schemes or trying to understand their customers' future needs, but they haven't yet fully integrated electric vehicles into their business activities.

However, the involvement of these more peripheral stakeholders is crucial to the development of electric vehicles. Highway concessionaires, for example, have no immediate interest in equipping their service areas with rapid recharging stations that will only serve a small proportion of their users. Nevertheless, these are essential if motorists are to be persuaded to buy electric vehicles. Similarly, condominium associations don't see this as a priority either— and therefore don't take the initiative on the issue. Yet electric vehicles will only become established in cities if these players accept—or even lead—the electrification of their parking spaces.

A range of strategies from manufacturers

The strategies deployed by manufacturers can also diverge from the way they normally position themselves. Players like Volkswagen and Renault-Nissan have made a clear shift toward electricity. Others, such as Fiat and Toyota, are

proceeding more cautiously or focusing their efforts on competitor technologies (LPG and hybrid models, respectively). Similarly, passenger transport operators display significant variations in their approach to electric vehicles: some are highly proactive, with ambitious plans to electrify their fleets (such as Marcel or Uber) while others are adopting a wait-and-see approach. Similar patterns can be found among all players involved in electric mobility.

How to get all business activities and sectors on board?

There's a need to harmonize activities within the ecosystem if the electric vehicle development goals set are to be achieved. However, it's far from obvious that all the relevant economic players will become engaged spontaneously—especially when their priorities differ. There are three main levers, which aren't mutually exclusive, that can bring this engagement about (see the diagram below).

The three main levers to engage all economic players



Pioneering investors

Some players may position themselves in the electric vehicle market for commercial or reputational (communication or CSR) reasons. This is what Tesla did as a vehicle manufacturer. Insurers could also position themselves strongly in the electric vehicle market—differentiating themselves and engaging the sector.



Intersectoral partnerships

Associations between highly engaged players and others who are more tentative could result in increased engagement in some sectors. This is the case with the partnership concluded between Engie (a French utility company) and Arval (a leasing company), which is encouraging the rental sector to take a position in the market for electric vehicles. In addition, they enable new services to emerge, which enhance the attractiveness of electric vehicles.



Legislative and regulatory measures

Some sectors, subject to rigorous standards and regulation, are waiting for public-sector authorities to define relevant frameworks. Typically, highway concessionaires have to deliver against a set of specific commitments. The need to develop highway charging stations must be included in these if they are to fully engage.

Developing a legislative framework that supports electric vehicles



Getting electric vehicles to market

The development of the electric-vehicle sector is driven, first and foremost, by there being a supply of electric vehicles. To encourage this, European public-sector authorities have set vehicle manufacturers targets for reducing CO₂ emissions. These vehicles are then subsidized, with the expectation that economies of scale and greater technological maturity will result; examples are, a consumer subsidy of €6,000 toward the purchase of a new electric vehicle, cashback for converting a vehicle to electricity, exemptions from corporate vehicle taxes, etc.



Facilitating the deployment of recharging infrastructures

There are many legal obstacles that can hinder the installation of recharging stations, and, by extension, the development of the electric vehicle market. This is well known in the case of condominiums; and while metropolitan areas are the most affected by the urgency of greening the transport sector, the issue also affects highway service stations, public parking lots and the companies leasing them, etc. Government authorities have a responsibility to tailor and clarify the legislative and regulatory framework, in order to enable, or even encourage, the various stakeholders to open recharging stations. For example, there should be a clearly defined standard for what constitutes recharging station infrastructure at highway concessions, legislative changes to allow installation at condominiums, and a clarification of safety rules for public parking lots.



Encouraging the emergence of complementary services

To be able to match the value proposition offered by traditional vehicles, a number of services need to complement the electric vehicles themselves and their infrastructure. For example, smart-recharging, which reduces the impact of electric vehicles on the electricity distribution network and saves—or even generates—money as a result of its storage capacity, will only come into widespread use if the recharging stations installed are bidirectional and the various communication protocols that exist today harmonized. Similarly, applications used to locate a recharging station, check its availability, and/or estimate the cost of a journey (regardless of the operator) can only be created if the relevant information is accessible. A normative framework must define the rules of the market to enable such services to develop. For the examples cited, it may be a question of imposing a minimum standard on publicly-available terminals that will be installed in the future or requiring terminal operators to share their data.



ENGAGING LOCAL AUTHORITIES AROUND THE LEVERS AT THEIR DISPOSAL

As a result of its closeness to both citizens in general, and electric-vehicle users, local governments are key to real transformation and play a particular role in making the transition socially acceptable and beneficial to all. Local authorities have a number of levers for developing electric vehicles, and three in particular seem especially relevant.

Promoting the use of electric rather than traditional vehicles

Local authorities can encourage the take-up of electric vehicles by ensuring there are benefits to using them compared with traditional vehicles. Low Emission Zones (LEZs), which ban polluting transport, can encourage individuals or companies to choose clean vehicles instead. For example, in 2018, Madrid introduced an LEZ covering an area of 472ha. In addition, being allowed to use lanes normally reserved for buses and taxis is an attractive proposition for “electric motorists”. Norway does this, although the city of Oslo has recently seen so much success in electric vehicle use that it has had to scale back its measures. Whatever the instrument, implementing such measures must be done carefully: they should not

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harm those who are vulnerable and/or the most dependent on traditional vehicles, and they must offer them viable alternatives (such as public transport, car-sharing, etc.).

Managing the development of recharging infrastructure

To avoid the erratic evolution of recharging infrastructure, which could result in some areas being saturated while others are empty—as well as stress on the electricity distribution network, local authorities must manage its development carefully. This may involve the drawing up of dynamic plans for the creation of recharging stations at local-authority level, which station operators would then be encouraged to offer at attractive rates.

Such plans can offer well-tailored solutions to specific, local issues. In some residential neighborhoods, many homes have no parking space. In such cases, on-demand recharging stations, like the ones developed in Amsterdam, can be designed to enable electric vehicle owners to have a main, roadside recharging point. Only local authorities have the detailed knowledge of their areas, needed to frame such projects and target the beneficiaries.

Lastly, through their powers to award public-service contracts and concessions, public authorities can encourage players on the fringes to make the necessary investments in electric mobility. For example, the City of Paris, through its public parking lot concessions, requires that 30% of spaces be equipped with a recharging point by 2024.

Mobilizing economic players through partnerships

When it comes to electric mobility, partnerships can be an effective way of pursuing innovative projects and/or getting more cautious players on board. A compelling example is the experiment carried out in La Roche-sur-Yon between the Vendée Department’s Energy and Equipment Association (an association of French local municipalities within the Department which assures electricity distribution), Enedis (the French electricity





grid operator), and Bouygues Energies & Services, to equip municipalities with recharging stations attached to street-lamps. This innovation makes it possible to reduce the costs of installing the infrastructure and can be fully tailored to the needs of local residents—guaranteeing that they can recharge their vehicle at the curbside.

Local authorities represent an important level of support for such projects, especially through a new tool at their disposal: the Contrat de Transition Écologique (the CTE, or Ecological Transition Contract). CTEs come about as a result of a co-construction process between central government, a local authority (or authorities), and companies. They are centered around a local project that aims to marry ecological transition to economic development. Although, to date, there are no examples of CTE projects aimed at accelerating the adoption of electric vehicles, it's easy to imagine examples of such initiatives in the future—such as projects that capitalize on synergies with renewable energies.

CONCLUSION

Electric vehicles are an important solution to today's climate challenges. But bringing them into widespread use isn't merely a technical challenge.

Vehicles and infrastructure need to be complemented with services that can improve the user experience and win over customers. While the production of electric vehicles in Europe, with sufficient autonomy which allows a high recharging power, are necessary conditions that seem to have been understood by all players, the enabling role and added value that services can provide tend to be underestimated.

All players agree on the need for favorable incentives to develop a more comprehensive offering. But, beyond supporting measures that boost electric vehicle supply and demand, public-sector authorities need to put in place a clear and normative framework, tailored to the development of infrastructure and services. This engagement must feed through

into local authorities, who are an essential tier in the transition from traditional to electric mobility. Similarly, the involvement of all economic players is a key success factor: only their simultaneous and focused mobilization will improve the value proposition and attract customers.

However, electric vehicles can't provide a complete answer to today's environmental imperatives. To significantly reduce transport's environmental impact, any electrification strategy must be part of a wider approach to mobility. The current paradigm of vehicle ownership, even though such vehicles might be electric, needs to be reinvented in order to promote the pooling of means of transport and focus on their use.

The autonomous vehicle, which has significant synergies with the electric motor, will provide technological solutions that help address this issue. But, as in other areas, future vehicles will only be autonomous, electric, and shared, if the focus is on the customers and the services on offer meet their needs.

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