



WHITE PAPER

SUSTAINABILITY: AN OPPORTUNITY FOR CHANGE IN THE AUTOMOTIVE INDUSTRY

LECTRA

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Reinventing the automotive industry: sustainability, innovation and collaboration

An increasingly urgent energy transition, changing attitudes toward vehicles, lack of policies to encourage people to buy electric vehicles, and a decline in purchasing power in all regions of the world, all these factors being exacerbated by the proliferation of conflicts and sometimes unpredictable customs duties: the automotive industry is shaken to the core.

The second most polluting sector, transportation plays a major role in global warming. Road transport alone accounts for 94% of the transport sector's GHG emissions (119.2 Mt CO₂ eq in 2023).

In this context, automotive players need to rethink their approach, whether it is vehicles themselves, their design and manufacturing processes, or the organization of production, the supply chain, costs, and the relationships between all stakeholders in the value chain.

But it's not all gloom and doom! The positive aspect of any crisis is that it also means new opportunities and change. By forcing companies to step outside their comfort zones, it opens up new possibilities, previously overlooked due to the use of methods and processes that, although proven and reliable, no longer meet the new challenges.

This new approach leads all stakeholders—manufacturers, equipment suppliers, and subcontractors—to review their operational processes, which must be carried out in close collaboration in order to pool their efforts and share the benefits.

Sustainability, a new opportunity

Sustainability is undoubtedly the main challenge facing the automotive industry. The boom of electric means of transport, which has accelerated over the past two years, is both changing customer behavior and expectations, particularly among younger generations, and forcing manufacturers to rethink their production process.

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The goal is to reduce CO₂ emissions throughout the value chain and to encourage the circular economy within the automotive industry with recyclable and recycled materials, as well as an optimized use of raw materials.

This also requires to design—and above all, manufacture—vehicles differently. Finally, it also requires getting closer to customers and therefore relocating production sites and rethinking vehicle delivery methods. All this is happening in a context of eroding margins and ever-increasing price competition.

But innovation and technology provide solutions to each of these obstacles and challenges. For example, digital technology, artificial intelligence, and software are not only integrated into cars themselves, which are increasingly smart and customizable, but they are also used to optimize production tools and their performance, as part of Industry 4.0.

Sustainability also involves improving quality of life and workplace safety, as well as preserving jobs.

These factors are all the more important as the automotive industry plays a major role in the economy. For example, this industry directly and indirectly employs 13.8 million Europeans, representing 6.1% of total employment in the EU.

The road to 'economy'

Vehicles will only become sustainable if they are sustainably designed and produced, but also sustainably used and recycled. This is the key to the transformation the sector is undergoing. The current approach is no longer based on opposing economy and ecology, or sustainability and productivity, but, on the contrary, on reconciling them "as they equally contribute to each company's success," explains Maximilien Abadie, Deputy CEO at Lectra.

"Today, companies are showing such a desire to combine ecology and economy that a new term is emerging to describe this approach: 'economy'. This concept combines economy and ecology. It reflects the fact that, as economic and ecological issues are increasingly intertwined, brands no longer have to choose between sustainability and profitability," continues Maximilien Abadie.

"Today, companies are showing such a desire to combine ecology and economy that a new term is emerging to describe this approach: 'economy.'"

Maximilien Abadie

Deputy CEO at Lectra

13 million Europeans
are employed directly or indirectly
by the automotive industry (6.1% of total EU employment)



PART ONE

The automotive industry is undergoing a deep and multifaceted transformation

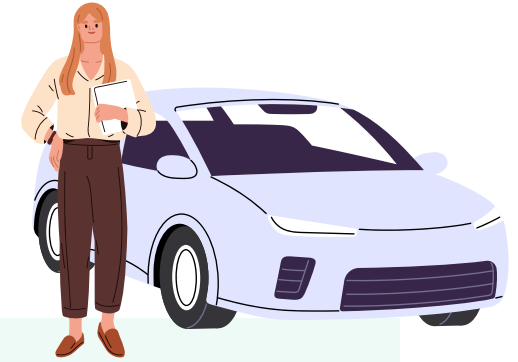
An increasingly challenging context

The automotive sector is currently facing what is proving to be one of the greatest crises in its history. It is shaken to the core by the challenges raised by energy transition, digital transformation, and the boom of electric means of transport. These changes are driven by technological innovation and new regulations in Europe and worldwide, the objective being to reduce the industry's carbon footprint by fostering sustainable production. "Sustainability is driving unprecedented change in the automotive industry," notes Clémentine Mitard-Manteau, Marketing Strategy Director automotive & furniture at Lectra.

"The aim is obviously to reduce its environmental impact, but it also encompasses many other aspects linked to production, the economy, social aspects... Several challenges are combining to shake up the sector!.." But these challenges are also opportunities to **rethink current practices** and **adopt new tools**, to **implement new processes**, and to take a fresh look at these challenges to **transform them into opportunities for progress and improved performance**.

The automotive industry has been heavily impacted by the inflation that has affected all global economies in recent years. This has resulted in a loss of purchasing power, particularly for middle classes, for whom buying a new vehicle is no longer a top priority, especially if it is electric, and therefore more expensive. Added to this are European regulations for transport decarbonization. These require automotive manufacturers to reduce by **15%** the CO₂ emissions from new vehicles in 2025 compared to 2021, or face fines. The European Union has also taken steps to ban sales of new vehicles with combustion engines from **2035** (see highlighted text).

Some governments indeed provide incentives for the purchase of electric vehicles, but these incentives will not last forever... And uncertainty about **customs duties** is putting even more pressure on the market



Strict decarbonization legislation

Many countries have already implemented laws or regulations to ban the sale of new vehicles with combustion engines. Norway led the way in 2025. In 2030, it will be the turn of Iceland, Denmark, and Hainan (China). Five years later, California, the Cape Verde Islands, and the United Kingdom will join them. Finally, in 2040, combustion engine vehicles will be banned in France, Spain, and Canada.

In 2019, the European Union (EU) defined a strict legal framework for the decarbonization of transport. The new regulation, which came into force in 2020, requires a reduction in CO₂ emissions from new privately owned cars and light commercial vehicles sold in the EU. Reduction targets are set according to different timescales compared to 2021 emissions.

- Reduction of **15%** between 2025 and 2029
- Reduction of **55%** between 2030 and 2034
- Reduction of **100%** from January 2035

The European Commission sets emissions targets for manufacturers each year. Those who fail to meet them could be fined €95 per gram of excess CO₂ for each new vehicle sold.

Struggling to comply with these regulations, manufacturers tend to pass on sustainability requirements to their suppliers and subcontractors.

To maintain their positions in their respective markets and protect their margins as price wars are eroding them, manufacturers are reorganizing their supply chains. They are seeking to reduce their production costs without compromising the quality of their vehicles while complying with local and international environmental regulations.

To meet these combined challenges and transform them into opportunities, they rely on technological innovation such as **automation**, **digital technology** and **Industry 4.0**, also involving their equipment suppliers and subcontractors.

The boom of electric vehicles and... China

Transitioning toward an increasing number of electric vehicles is the primary pathway to a more sustainable industry. This energy transition is well underway. One in five new vehicles sold worldwide is now electric or a plug-in hybrid. The market has grown by **20%** between 2023 and 2024, but there are significant differences depending on the regions. In 2024, the sales of new electric vehicles accounted for 45% of the market in China, 25% in Europe, and 11% in the United States. A recent study by Statista¹ shows that the global market for electric and plug-in hybrid vehicles has almost tripled in three years, going from 6.5 million units in 2021 to 17.3 million in 2024. And the trend is accelerating in 2025.

But the market's sustained growth is making it increasingly competitive. Automotive manufacturers in Asia, and particularly in China, benefit from this growth the most. A study conducted by Lectra using data from the **China Association of Automobile Manufacturers** shows that the structure of the Chinese market has undergone a significant transformation between 2017 and 2024. While the number of new cars sold in the country has not increased much, going from 28.9 million in 2017 to 31.4 million in 2024, the share of electric cars has increased from **2.8 %** (800 000 units) to **37%** of the domestic market in 2024 (11.6 million units).

It is also worth noting that the share of Chinese exports increased from 1.1 million in 2017 to 5.9 million cars in 2024, across all engine types. "The Chinese market is currently driven by electric and plug-in hybrid vehicles, which account for nearly half of the domestic vehicle fleet, and by exports," says Aude Reine, Go-to-market Director automotive & furniture at Lectra. It is also characterized by the emergence of brand new players, who start from scratch and benefit from government subsidies.

"There is a fragmentation of the market, notably the car seat manufacturing segment, where the number of players has significantly increased," continues Aude Reine. "The market has grown of course, but historic players have lost market shares in recent years." It is notably the case of the three market leaders, which shared **37%** of the market in 2019 versus only **19%** in 2024."

"The Chinese market is currently driven by electric and plug-in hybrid vehicles, which account for nearly half of the domestic vehicle fleet, and by exports."

Aude Reine

Go-to-market Director automotive & furniture at Lectra

1 vehicle out of 5 sold worldwide

today is whether electric or a plug-in hybrid



¹ Global electric vehicle sales nearly triple in three years, Statista, May 15, 2025

The global ambitions of Chinese automotive manufacturers

These trends also affect non-Chinese automotive manufacturers and suppliers. In 2020, foreign car brands accounted for nearly $\frac{2}{3}$ of the Chinese domestic market (64%), across all engine types; versus only 35% in 2024. The share of Chinese brands increased by 18% between 2023 and 2024 alone, leading brands like General Motors and Volkswagen to downsize or even stop their local production.

"In addition to the fact that Chinese manufacturers benefited from government subsidies to rapidly develop the local industry, they focused on electric vehicles very early on and stuck at it!" "Plus they don't have the same environmental standards as the United States or Europe," adds Adam Ragozzino, Analyst and automotive battery specialist at Wards Intelligence. "Above all, they save money by removing what their customers are not particularly interested in, or by replacing what can be.

For example, many Chinese vehicles have only one wiper instead of two, and therefore only one small motor. Which, of course, is cheaper!."

The ambitions of Chinese electric car brands do not stop at China's borders. Through partnerships with local players, acquisitions, or factory takeovers, they are establishing themselves around the world, closer to customers, particularly in Europe. This is the case, for example, of **BYD** which operates a factory in Hungary and is building a new one in Turkey, as well as **Leapmotor**, which took over a Stellantis factory in Poland, and **Chery**, which manufactures vehicles in Spain as part of a joint venture with Ebro-EV Motors. These local production sites allow brands to partially avoid customs duties and restrictions on importing Chinese products. Manufacturers are bringing their equipment suppliers with them, leading them to relocate their production as close as possible to their clients. Chinese equipment suppliers such as **Yanfeng**, **Nobo** or **Xinquan** for example, now have production sites in Serbia, in the Czech Republic or in Slovakia.

However, the sector's sustainability does not only rely on promoting electric vehicles. To comply with sustainability regulations and achieve their environmental goals, automotive manufacturers must work in close collaboration with their suppliers at every stage of the automotive value chain. Only in this way will their combined efforts result in vehicles that are ecological throughout their entire life cycle, as they are sustainably designed and produced, but also sustainably used and recycled.

+18%
of market shares for
Chinese brands
between 2023 and 2024



PART TWO

Many obstacles but many opportunities as well

Ecological requirements and the transition to sustainability are often perceived as incompatible with productivity and profitability. But this is not actually the case! This is what the 'economy' approach allows, by combining economy and ecology. These two aspects are perfectly compatible. They can be reconciled through the approach called 'economy', which combines economy and ecology. This new concept helps achieve environmental goals through several levers, all of which rely on technology.

The automotive industry will thus be able to reduce its carbon footprint by making the most of technological innovation, first and foremost digital technology, in order to:

- Design products differently
- Optimize the use of materials
- Consider regulations as opportunities rather than obstacles
- Adapt products to consumer expectations and new usages
- Prioritize short supply chains

Thanks to innovation and digital technology, equipment suppliers are not unprepared in their efforts towards a more sustainable automotive industry. **Automation, data analysis and communication technologies**, which are key components of Industry 4.0, lead to more modern production sites, redesigned to quickly manage small-batch production runs, and easily switch to new, easily customizable models. In these modern production facilities, even production lines can be reconfigured on demand to optimize workflow. And water and energy consumption can be controlled at all stages to be reduced to a strict minimum.

"For automotive equipment suppliers and subcontractors, the point is not whether sustainability is incompatible with productivity... The real challenge is to control and reduce costs while maintaining agility at a time when production schedules are now reduced from several years to only **six to twelve months**, which completely changes the duration required for ROI and requires both adaptability and responsiveness," explains Aude Reine.

"The real challenge is to control and reduce costs while maintaining agility at a time when production schedules are now reduced from several years to only six to twelve months [...]."

Aude Reine

Go-to-market Director
automotive & furniture at Lectra



What is Scope?

In terms of carbon footprint, greenhouse gas (GHG) emissions are classified into three categories:

SCOPE 1

GHG emissions resulting directly from the company's activities

SCOPE 2

Indirect GHG emissions, resulting from the production of energy purchased and consumed by the company (electricity, heating, etc.)

SCOPE 3

GHG emissions upstream and downstream of the company's activities and which are beyond the company's direct control (waste, transport and logistics, etc.)

Using data for eco-design

Eco-designing products allows brands to **limit their ecological footprint at each stage of their development and until the end of their life cycle**. This involves reducing the consumption of resources, especially non-renewable resources such as water and energy during production but also their use throughout their life cycle; reducing the use of raw materials, and promoting the use of recycled and recyclable materials; in short, reducing their impact on the environment.

European regulations require companies to assess the measures they have taken in order to report them and use them to improve their results. This is where digital technology comes in handy. All production data, from energy consumption to raw material usage, is recorded in the cloud or in the company's IT system. The more advanced a company is in its transition towards Industry 4.0, the greater and more readily available the volume of production data.

However, as explained in the white paper by the Lectra Observatory entitled *The Rise of Industry 4.0 boosts manufacturing efficiency*², the availability and analysis of all this data provide better visibility on production, helps identify areas for improvement, and optimizes the traceability of components and products.

The analyzed data can be transmitted to regulatory bodies in order to demonstrate compliance, as well as to clients. "For example, the data recorded by our cutting systems allows seat suppliers to demonstrate to automotive manufacturers the efforts they are making to optimize material use, reduce energy consumption and waste when cutting seat covers," explains Clémentine Mitard-Manteau.

This information significantly helps tracking greenhouse gas (GHG) emission reductions. This is also in line with the new reporting framework established by the European CSRD directive for the entire value chain. Each player can easily fill out their target tables for the Scope 1, 2, and 3 categories. **Being able to communicate on this data becomes a differentiating factor to conquer new markets.**

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Clémentine Mitard-Manteau

Marketing Strategy Director
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² "The rise of Industry 4.0 boosts manufacturing efficiency" by the Lectra Observatory



A more efficient use of raw materials

For automotive equipment suppliers, the responsible use of raw materials applies to all aspects of production, from the energy consumption of machines and systems to the use of materials. Regarding seat fabric cutting equipment for example, a key factor for sustainability is that new generation machines use less energy than previous models while being more efficient. This is worth considering when deciding between repairing older equipment to extend its life and investing in a new generation machine.

“The energy consumption of our cutting machines has been reduced over time, while their performance has significantly improved in terms of productivity and cutting quality.” explains Clémentine Mitard-Manteau. “A digital platform that provides automated cutter configuration allows us to **optimize material use**. We use the actual—rather than the theoretical—width of the rolls to minimize waste.” To further optimize this process, Lectra is currently working on **material defect detection** to improve placement and

cutting, as well as maintenance during use. Such maintenance contributes to **extend the lifespan of components and equipment**, by considering both the specificities of customers' businesses and the type of material or product to cut.

“Today, our ambition goes even further: our products increasingly incorporate recycled materials, and we are developing circular solutions and recycled items whose production and end-of-life waste can be reused in our products.”

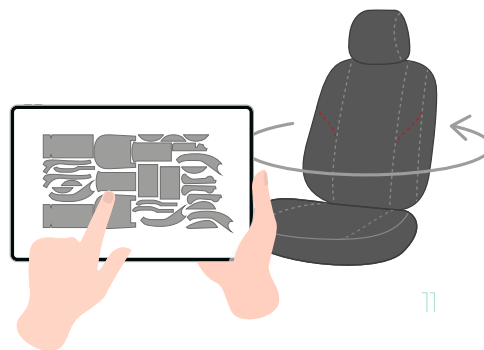
Christine Tonellato

ESG & Sustainability Director
at TESCA

TESCA, an innovative environmental approach

The example of **TESCA** perfectly illustrates what a company can gain by adopting a comprehensive approach to materials. TESCA designs and manufactures fabrics and components for car seats. The company employs 6,000 people at 19 production sites worldwide.

“We have been working for a long time with automotive manufacturers' design teams to develop new materials and finishings. Initially, the challenge was to meet consumer expectations by replacing polyester with bio-sourced and familiar materials from renewable resources. Today, our ambition goes even further: our products increasingly incorporate recycled materials, and we are developing circular solutions and recycled items whose production and end-of-life waste can be reused in our products,” explains Christine Tonellato, ESG & Sustainability Director at TESCA.



However, for some automotive manufacturers, using these new materials comes at a significant cost in terms of sourcing and adapting equipment. They must find the right raw materials and suppliers, and adapt their machines to ensure the most precise cutting possible. Finally, as with any innovation, large volumes of test and trial data must be collected and analyzed to ensure that the new material meets customer expectations.

TESCA conducts internal product lifecycle analyses to select materials with the lowest environmental footprint. The teams are also working on waste reduction. For example, a study is underway to separate very fine and very small waste from the plastic and paper layers placed on the fabric for cutting. Another initiative: "We are working on waste recovery and sorting to produce a new material. We are notably working on a project in collaboration with a polyester yarn supplier and a seat manufacturer to recover waste from the three partners and recycle it to make new yarns and new textiles," explains Christine Tonellato.

"These waste reduction and recycling efforts are carried out in collaboration with suppliers and customers, as well as with local stakeholders. TESCA has been implementing this approach for years, particularly regarding packaging waste (plastic, cardboard, pallets, etc.)," explains Alicia Yoffret Nittmann, Deputy Group HR Director for the EH&S division and Director of the plant in Bezannes (Marne). "We should all think of a new, more positive term for waste, because it's becoming a raw material itself today," notes Christine Tonellato.

The automotive industry has been addressing the issue of recyclability and the use of recycled materials for some time now. "It's a crucial issue for this industry, which uses a lot of extracted minerals. Today, between 25% and 95% of the metal used to make a car, such as iron or steel, come from recycling, particularly aluminum, which recycles easily and is much lighter," explains Adam Ragozzino. "And it doesn't stop there! You can no longer make a car without also considering how it will be used, repaired, and recycled." This applies to the bodywork, the battery and all the interior fittings as well.

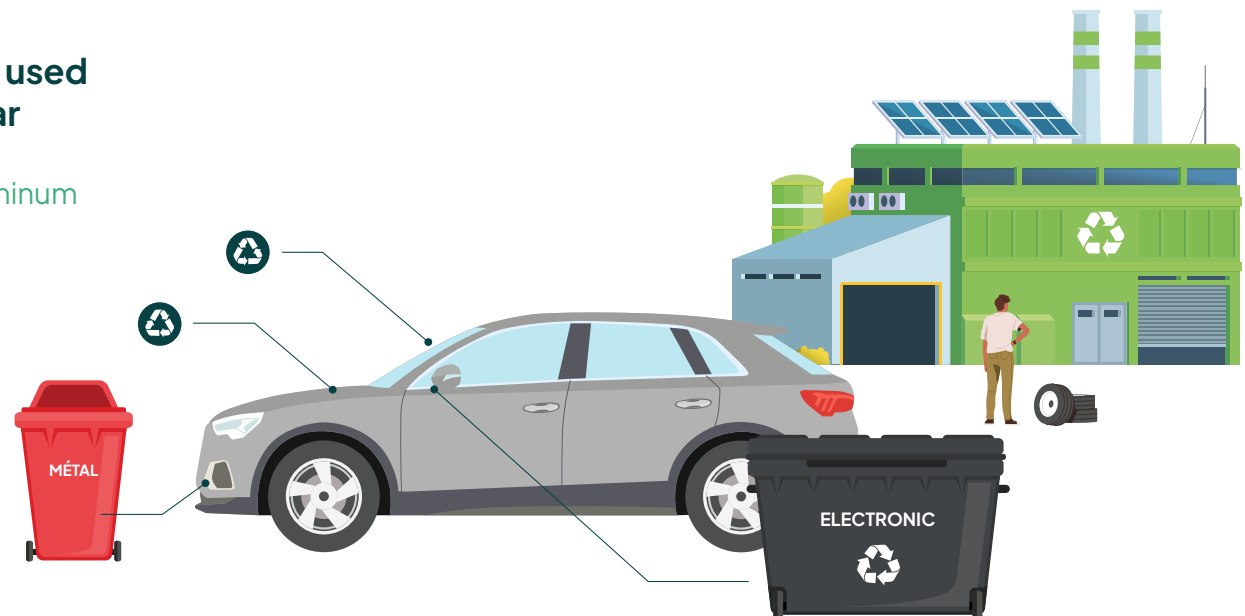
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CSR and ISO Standards

Corporate Social Responsibility (CSR) refers to the efforts made by companies towards sustainability issues. The approach mainly focuses on the ISO 26000 certification and its seven core subjects, but other ISO standards also help transform it into tangible and measurable actions. Automotive manufacturers and their partners can obtain the following certifications:

ISO 14001

Environmental and performance management systems

ISO 50001

Energy management and consumption optimization

ISO 45001

Occupational health and safety, occupational risk reduction

ISO 20400

Sustainable procurement

Regulations: an opportunity rather than an obstacle

As environmental and sustainability regulations are becoming more numerous and more stringent, some companies have decided to consider them as an opportunity for improvement rather than an obstacle.

It is often during the certification process that managers and employees realize the impact a different mindset can have on the company. "The assessment we undertook to obtain the EcoVadis certification, at the request of one of our customers, was very formative. It allowed us to better understand CSR, Corporate Social Responsibility, and to implement a truly managed approach. What was initially seen as an exercise has become an ongoing process, initially led by the EH&S team and now by our dedicated Sustainability & ESG team." After obtaining the "bronze medal" from EcoVadis in 2017, TESCA upgraded to silver in 2019 and has had a gold medal certification since 2022. "At the same time, we have been developing a proper roadmap towards decarbonization," says Alicia Yoffret Nittmann at TESCA.

This example shows how a decarbonization project imposed by regulations can become a true vector for change for a company. Better still, although questioned by employees at the beginning, this approach helped address certain issues as they were formulated differently during the certification process. Making a business sustainable also requires addressing the social aspect, which is key in CSR.

This involves ensuring the safety of machine operators and workplace comfort, as well as raising employee awareness and training them on environmental issues.

This approach involves reducing risks and making everyone aware of practices that contribute to improve safety and reduce the environmental footprint. "Our CSR efforts helped us during the ISO 45001 certification process for occupational health and safety, as it includes both risk reduction and obtaining the ISO 14001 certification for the environmental aspect." notes Alicia Yoffret Nittmann.



New uses and technological innovation

Thanks to software, artificial intelligence, and new generation communications, new cars are now increasingly connected and use even more multimedia.

The German startup **Munda** for example, is developing textile lighting systems. To put it simply, LED light is diffused through fabric that incorporates optical fiber as part of its weave.

Still in the applied research and development stage, the fabric materials produced by Munda are beginning to be used in car interiors. "Light can illuminate or brighten certain areas to provide information or alert the driver when a door is not properly closed or when the temperature or charge level has changed. It is also useful for creating different atmospheres, for better relaxation or comfort, while charging an electric car for example," explains Kai Muxel, CEO of Munda.

"China is ahead of the curve in these applications, as drivers often spend a lot of time in their cars." He also suggests that car roofs and interior spaces, which have not really been addressed so far, offer exciting potential for innovative lighting applications. This example shows the new applications made possible by integrating technology into renewed industrial processes.



Clean driving is becoming a reality

As you can see, there are numerous avenues for developing and accelerating the transition to a more sustainable automotive industry. Sales of electric and plug-in hybrid vehicles are growing worldwide. Supply and transportation routes are now shorter as equipment manufacturers relocate near automotive manufacturers' production sites.

The use of renewable energy by these production sites is progressing, driven by regulations. The convergence is not just geographical as stakeholders seem more aware that it is through consultation and cooperation that the industry will achieve its decarbonization objectives. Data management and traceability also contribute to make the industry more sustainable.

Better designed from the outset, vehicles will become increasingly fuel-efficient and lighter. The circular economy is being implemented for recycled, recyclable, and bio-sourced materials. What remains is to create and implement processes to give a second life to car batteries.





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