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## The automotive sector: ready to step up a gear

Thematic Research Paper

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**Amundi**

ASSET MANAGEMENT



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# The automotive sector: ready to step up a gear

The automotive sector has known a deep transformation over the last two decades. First, because **the EU legislation has pushed automakers to better treat end-of-life vehicles by imposing high recycling, reusing and recovering rates**. Secondly, because **the fight against climate change and the rise of electrification are questioning the whole business-model and thus, companies have to reinvent themselves**.

We will see that **because of these two reasons, the sector is quite in advance on Circular Economy and that the subject is well taken into account in their business strategy**. Besides, design – as being a crucial step for the sector – has already moved to eco-design by taking into account environmental considerations to facilitate the reuse

or the disassembling of cars. However, we do think that if companies have built strong foundations that could allow them to expand Circular Economy faster, companies need to develop partnerships with suppliers so that solutions are co-designed if they want to make it real.

## Two main drivers : more stringent legislation and climate change

According to the Ellen MacArthur Foundation<sup>1</sup>, “the automobile industry lends itself to the Circular Economy, as it requires a large quantity of high value components and materials. Vehicles are built to last and designed for easy repair. That is why it is also the perfect product for reuse, remanufacturing and recycling throughout multiple use cycles”. Indeed, the automobile sector is a heavy consumer of natural resources and is responsible for approximately 80% of all rubber consumption, 25% of all aluminum and 15% of all steel consumption<sup>2</sup>. On average, cars contain 1.4 tonnes of material. Because of this heavy consumption of natural resources and since the potential of circularity is high, the automobile industry and its value chain have been identified by the EU Circular Economy Action Plan in March 2020 as a key sector to put in place Circular Economy strategies. As part of the plan, the European Commission will amend the rules on end-of life vehicle to foster more circular business models and on eco-design to better integrate end-of life treatment. It is also considering rules on mandatory recycled content for materials and components and will require recycling efficiency to improve.

The European Union has long regulated the use of resources by automobile manufacturers. In 2000, the directive on End-of Life Vehicles<sup>3</sup> (which is currently being reviewed) aimed at reducing the waste arising from end-of-life vehicles and achieving reuse, recycling and recovery targets. Another piece of European legislation<sup>4</sup> - specifically on reusability, recyclability and recoverability - states that new vehicles may only be sold if they can be reused and/or recycled to a minimum of 85% by mass or reused and/or recovered to a minimum of 95% by mass. These two European directives explain to a large extent why the industry has embraced the principles of the Circular Economy - reduce, reuse and recycle - since the 2000's.

Another important incentive for the automobile industry to adopt the Circular Economy business models is the climate emergency. **To limit global warming to 1.5° C, the industry needs to reduce its carbon emissions by around 50% in absolute carbon emissions by 2030<sup>5</sup>**. A number of Original Equipment Manufacturers (OEMs) in our panel have set targets to become carbon neutral.

1. [www.ellenmacarthurfoundation.org](http://www.ellenmacarthurfoundation.org)

2. [www.wbcscd.org](http://www.wbcscd.org)

3. Directive 2000/53/CE on end-of life vehicles.

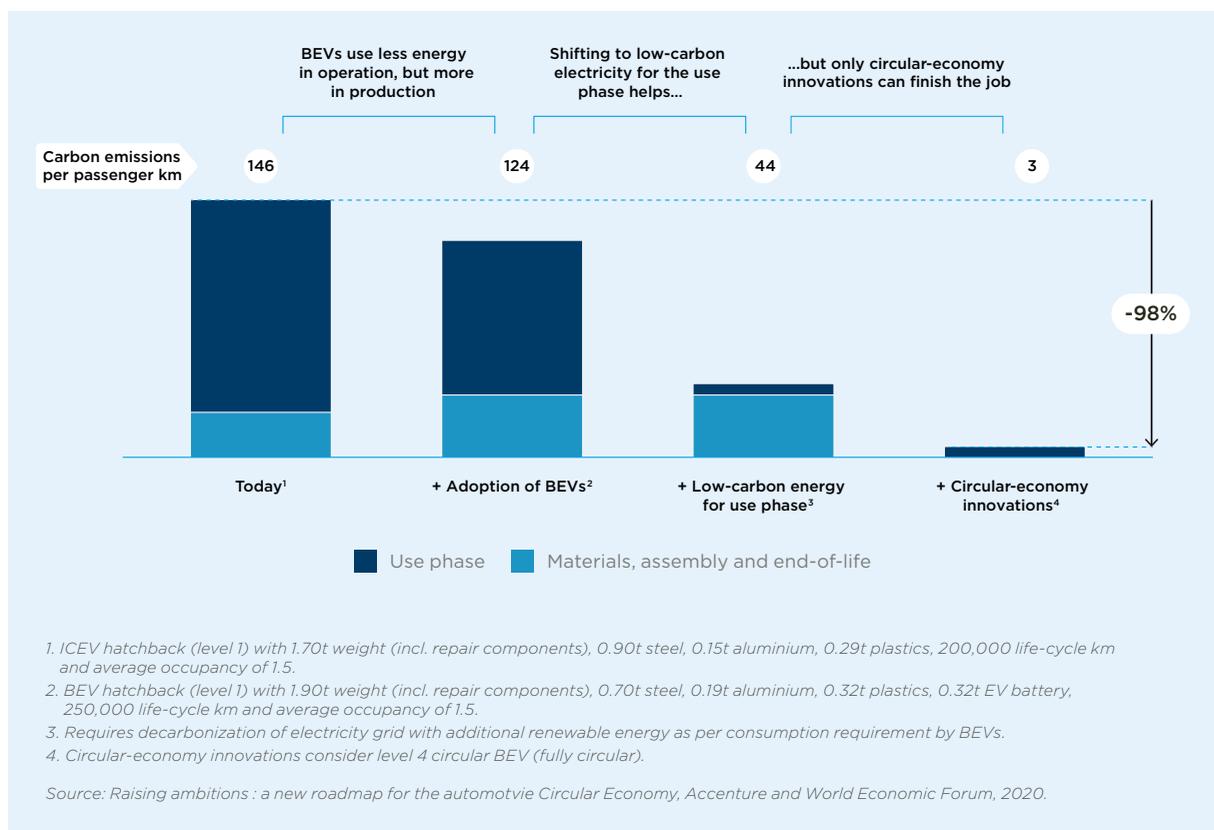
4. Directive 2005/64/EC on the type-approval of motor vehicles with regard to their reusability, recyclability and recoverability.

5. Accenture and World Economic Forum, *Raising ambitions : a new roadmap for the automotive Circular Economy* (December 2020).

The room for improvement is quite big and requires rethinking the production process. Indeed, currently, 20% of the industry GHG emissions are directly attributable to manufacturing. A McKinsey & Co<sup>6</sup> analysis forecasts that 60% of the total automobile lifecycle emissions will be attributable to materials and manufacturing in 2040. This is mainly due to the considerable carbon footprint of electric vehicle batteries that are fast developing. The remaining

40% will result from logistics, disposal and use<sup>7</sup>. In other words, the industry will have to significantly reduce its impact during the manufacturing phase. **Both circularity and electrification will be necessary to the sector's decarbonisation but electrification will make circularity even more important for the industry - the industry will need to find new market opportunities once batteries are used.**

**Figure 12: Decarbonising the car also means implementing a Circular Economy<sup>8</sup>**



Across the value chain and as shows figure 12, circularity covers for instance the sourcing of recycled and reusable products, the eco-design, the extension of product life (repair and remanufacturing), the setting up of material closed-

loops and the end-of-life of vehicles. Circularity also implies the development of car sharing capacities. For electric vehicles, this also means offering a second life for batteries – which contain precious metals – for storing renewable energy for instance.

6. MacKinsey study mentioned in the Accenture and World Economic Forum, Raising ambitions : a new roadmap for the automotive Circular Economy (December 2020).

7. <https://www.weforum.org/projects/the-circular-cars-initiative>

8. Accenture and World Economic Forum ; Raising ambitions : a new roadmap for the automotive Circular Economy (December 2020).



Regarding the Circular Economy strategy itself, we note that the vast majority of companies have set themselves quantifiable targets, be they on the minimization of waste or on the proportion of recycled materials in new cars (of up to 30% recycled and/or natural material for one of the players).

The most advanced auto manufacturers are seizing the opportunities offered by the concept, in particular to show publically that it is financially worthy. For instance, one manufacturer discloses an economic assessment of its circular activities in terms of cost savings and generated revenues. In line with its efforts to manufacture vehicles with 30% of recycled polypropylene and polyamide (rather than the virgin materials), the company saved EUR 10 million in 2019 and reduced production costs accordingly. It also reports on having generated EUR 221 million from its remanufactured parts offer, repair & return services and end-of-life vehicle dismantling. Another example is that of Renault which circular activities enabled it to generate a turnover of EUR562 million in 2019. Renault has also announced that its historical Flins factory will become the first European center/factory dedicated to Circular Economy between 2021 and 2024.

## Eco-design is a pre-requisite

**Eco-design is widely taken into account in the sector and is well integrated in companies' operational strategies.** The need to recycle 85% of the vehicle's mass at end-of-life and to recover 95% of this (in Europe) has certainly helped. Indeed the ELV directive states "that the requirements for dismantling, reuse and recycling of end-of-life vehicles should be integrated in the design and production of new vehicles" and "that producers should ensure that vehicles are designed and manufactured in such a way as to allow the quantified targets for reuse, recycling and recovery to be achieved".

**All companies in the panel systematically carry out product life-cycle assessments** and strive to reduce their environmental impacts from raw material sourcing to disposal. Indeed eco-design serves a number of other purposes in the industry such as the reduction of vehicle mass, fuel consumption and pollutant emissions. Eco-design also ensures that resource use is minimized at the design stage. For instance one of the companies

The Re-FACTORY will refit, and recycle vehicles. Renault intends to set a "competitive industrial model based on the potential for value creation generated by the vehicle throughout its life".

Finally, we can say that Circular Economy strategies are well implemented for the main actors of the sector by the definition of quantitative targets – both on minimization of waste and integration of recycled materials and eco-design processes. The responsible consumption is partly taken into account by the electrification. However, **on the subject of responsible consumption, we would welcome more defined strategies and transparency on the companies car sharing activities as companies remain too weak on their dedicated strategy.** Leaders in this area are able to complete their commercial and expand their customer base. One of the companies in the panel has set clear quantifiable targets (1 million users in 2020) for the development of its car sharing fleet and well positioned to reap the benefits of this new market. In a world where we must reduce our CO<sub>2</sub> consumption, we do think that it is not impossible to think that car sharing activities are going to go up over the next decades.

in the panel plans to bring the share of recycled materials in the weight of new vehicles to 30% in 2030. Besides, and as mentioned before, recycled products reduce production costs. However not all companies disclose such recycled materials targets.

**We consider that auto manufacturers should increase transparency on the use of recycled and renewable contents.** Disclosure should be increased both in terms of current performance and targets. One company in the panel uses environmental certificates that provide information about vehicles components made of recycled materials and renewable raw materials. Some companies also seek to reduce the number of plastics used to make sorting easier and to facilitate the dismantling of powertrains to ease remanufacturing.

For implementing a fully Circular Economy strategy, companies need the full support of their supply chain so that they can reduce waste generation and increase recycled and renewable contents.

## Circularity requires strong partnerships, especially with suppliers

### **Achieving circularity requires companies to obtain the full support of their suppliers and partners.**

Auto manufacturers cannot deal with the challenges of Circular Economy on their own and innovation must also come from the supply chains to ensure access to technology as well as Research & Development. Collaboration is needed across the value chain. One of the companies in our panel, for instance, prides itself on having set up its own circular ecosystem to recycle and reuse materials. It operates a joint venture specializing in end-of-life vehicle dismantling and second life parts. The joint venture collects end-of-life vehicles from car dealers, insurers, garages and individuals. Cars are dismantled and then reintroduced into the supply chain for the production of new vehicles. As for spare parts, they are reused for vehicle repairs in the company's post-sales network through a fully-owned subsidiary. Remanufactured parts are then sold at a reduced price (-40% in average) and have the same guarantees in terms of qualities and warranties. The system set up by the manufacturer is totally integrated as the company has heavily invested through partnerships and holdings in the development of recycling channels to secure materials supplies and reduce its impact on resources.

Strong practices also include working with suppliers to implement environmental improvements across the supply chain. For instance, it is with the help

of suppliers that automobile manufacturers can increase the proportion of secondary and renewable materials in their vehicles. Some companies have defined secondary materials targets for important materials and included these targets in their supplier selection processes. One company aims to systematically involve suppliers to meet its environmental objectives by selecting them based on their suggestions to enable the group to meet its Circular Economy targets. Long-term strategic partnerships that encourage suppliers to invest in their own circular transition can help the automobile manufacturers achieve their own goals. Finally, closing material loops cannot be done without the support of suppliers and business partners.

### **We consider that companies should further develop the eco-system of their circular activities.**

### **They can do it either in developing themselves the solutions they need internally or by helping suppliers to develop and reach the level of circularity they want.**

To improve, the automobile sector needs to drive the whole eco-system it works with. As of today, we consider that companies of the automobile sector are in advance regarding Circular Economy and that they are building the foundations for the instauration of a real Circular Economy. However, we do think that Circular Economy needs to be expanded faster, especially with suppliers so that solutions are operationally put in place.

## Conclusion

Companies have clearly integrated the principles of the Circular Economy in their strategies and practices. It makes business sense for them to do so. Eco-design is in their DNA. As some companies intend to become carbon neutral, others have the ambition to become a circular business to optimize the efficient use of resources over their lifecycle and maximize their value.

Circular Economy already shapes the automobile industry, but improvements in the governance

would be welcome with identified board or executive management members. The latter should also be incentivized to foster the principles. In more general terms, disclosure, in particular disclosure of quantifiable key performance indicators should be enhanced so that progress can be monitored over time. Finally, business opportunities and the development of car sharing activities should be pursued, especially with the help of the whole eco-system and more specifically with suppliers.



## ► Closing the loop for the batteries of electric cars by Renault

Figure 14: Reducing environmental impacts by implementing circularity for the electric batteries



Raw materials account for 50% of the price of an EV battery which itself account for 40% of the price of an electric vehicle. Lithium-ion batteries are currently favored by manufacturers because of their performance and discharge qualities. They are made of different materials including lithium, cobalt, nickel and aluminum which are finite resources. The number of electric vehicles is expected to grow from 10 million in 2020 to 100 million in 2030<sup>10</sup> and the supply of these materials is becoming strategic. Renault seeks to optimize the use of electric batteries before recycling them.

After their life in electric vehicles (8 to 10 or 15 years), batteries still have around 60%-75% of their previous charge-storing capacity<sup>11</sup>. Renault then uses their remaining capacities in stationary storage and mobile applications. That's the second life of electric batteries for

which Renault has developed a number of industrial partnerships. Batteries can be repurposed to store renewable energy and release it in the form of electricity when needed. In 2018, the company announced the launch of its Advanced Battery Storage<sup>12</sup> project using electric vehicle batteries which is set to reach 70 MWh. Renault is also developing mobile applications for the second life of its batteries.

When batteries reach the end of their life, they are recycled and Renault has set up a partnership with Veolia and Solvay which will extract and purify the strategic metals. The goal is to reuse at least 95% of the cobalt nickel and lithium in new batteries. The loop will be closed!

10. <https://www.renaultgroup.com/en/news-on-air/top-stories-2/groupe-renault-veolia-and-solvay-todays-batteries-will-be-tomorrows/>

11. HSBC, *More than just emissions* September 2020.

12. <https://en.media.renaultgroup.com/news/groupe-renault-veolia-solvay-join-forces-to-recycle-end-of-life-ev-battery-metals-in-a-closed-loop-1564-989c5.html>

## Table of best practices

### The automotive sector

	Strategy	Commitments	Designing & preparing for a CE	End-of-life
Company 1	CE strategy strongly integrated in business model with commercial opportunities developed in re-manufactured parts as well as investments in recycling ventures. Member of Ellen McArthur Foundation.	Very strong and clear commitment with clear targets and objectives : <ul style="list-style-type: none"> <li>- Bring the share of recycled materials in the mass of new vehicles produced to 33% by 2030.</li> <li>- Reduce by 30% the quantity of non-recycled waste per vehicle produced on the group's manufacturing sites between 2013 and 2023.</li> </ul>	First CE plant in Europe entirely dedicated to the Circular Economy (an industrial and commercial ecosystem to develop CE innovation and foster the reconditioning of second-hand vehicles for example.	—
Company 2	—	Extensive disclosure on CE ambitions: <ul style="list-style-type: none"> <li>- Build vehicles with 30% of recycled or bio-sourced materials and hence control material purchasing costs.</li> <li>- 100% of waste recovery in local loops of the Circular Economy.</li> <li>- Select suppliers on their ability to enable the group to meet its CE targets by 2035.</li> </ul>	Strong strategy on car sharing solutions with quantified commitment to develop them.	For high voltage batteries, the group is implementing specific business models to extend as much as possible the life duration of the batteries in its vehicles or in other applications (stationary storage etc).
Company 3	Board member with CE responsibilities identified.	—	Communication and transparency efforts with the use of environmental certificates that are public and provide information on the vehicle components made of recycled materials and renewable raw materials.	—
Company 4	Board member with CE responsibilities identified.	—	One of the strongest car-sharing ecosystem to increase the use of driving services, parking, vehicle charging as well as multimodal transport.	—
Company 5	Member of the Ellen MacArthur Foundation.	Clear, quantifiable targets: <ul style="list-style-type: none"> <li>- vehicles to contain at least 25% of recycled or bio-based plastics,</li> <li>- 25% recycled aluminum and</li> <li>- 40% recycled steel by 2025.</li> </ul>	—	—
Company 6	—	—	—	—
Company 7	—	—	—	—

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