Drivers for transformation

The need to act on climate change

The automotive sector is a cornerstone of mobility systems worldwide, as well as a key pillar of the global economy. However, it is also a major contributor to climate change. In 2021 alone, passenger cars and vans caused 3 gigatons of CO₂, almost one tenth of global CO₂ emissions\(^1\).\(^2\). This only includes tailpipe, thereby excluding additional emission sources along the value chain, such as parts and vehicle production.

To avoid the most catastrophic impacts of global warming by limiting average temperature increase to 1.5 °C, all sectors would be required to substantially reduce emissions to achieve net-zero, starting from now (see Figure 1). In contrast to other sectors, a key hurdle for car manufacturers is that compliance with the Science Based Targets initiative (SBTi) requires not only reductions of Scope 1 and 2, but also Scope 3 emissions.

Over the past few decades, substantial improvements in the fuel efficiency of vehicles have been made by car makers. However, the growing prevalence of larger and heavier cars, mainly SUVs, and engine sizes counteracted these efficiency gains—and no amount of efficiency improvements will lead to net-zero emissions. Together with increased vehicle ownership, these factors led to a steady increase of the sector’s CO₂ emissions by an average of 1% per year between 2010 and 2021\(^3\).

To effectively curb tailpipe emissions, governments around the globe therefore have implemented policies promoting and enabling the shift to electric vehicles (EVs).

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Figure 1:
Total CO₂ emissions and contribution from the passenger car sector

<table>
<thead>
<tr>
<th>2021 CO₂ emissions from energy use and industrial processes</th>
<th>2050 SBTi conform carbon budgets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global total CO₂ emissions</td>
<td>37.9 gigatons</td>
</tr>
<tr>
<td>Passenger cars and vans</td>
<td>3.0 gigatons</td>
</tr>
<tr>
<td>Global total CO₂ emissions</td>
<td>3.79 gigatons</td>
</tr>
<tr>
<td>Passenger cars and vans</td>
<td>0.3 gigatons</td>
</tr>
</tbody>
</table>

Consistent with a Science Based Target (SBT), the automotive sector needs to reduce Scope 1, 2, and 3 emissions by 90% by 2050. SBTs are emission reduction pathways in line with climate science to reach net-zero emissions, ensuring that global warming is limited to 1.5 °C.

Deloitte analysis based on International Energy Association (IEA) Cars and Vans September 2022 tracking report
A strong regulatory push for EVs

2022 was the first year that the overarching political framework for achieving the National Determined Contributions (NDCs) of the Paris Agreement was tightened worldwide. However, climate ambitions still vary widely across countries.

Europe has taken the global lead in the efforts to reduce greenhouse gas emissions (see Figure 2). The main initiative affecting the automotive industry is strict tailpipe emission targets for new vehicles. The European Union has legislated that original equipment manufacturers (OEMs) are required to reduce average emissions by 55% by 2030 and by 100% by 2035 (compared to 2020). This effectively restricts original equipment manufacturers (OEMs) to selling battery electric vehicles (BEVs) and fuel cell electric vehicles (FCEVs) from 2035 onwards. In Norway, one of the leading EV markets, BEVs already represented 80% of new car sales in 2022 and the country has set the target to achieve 100% by 2025 at the latest.4

In the US, so far only ten states plan to phase out vehicles with internal combustion engines (ICEVs) by 2050 (at the latest).5 China has for several years promoted the market uptake of EVs. Similar to the US, however, there is no clarity on the extent of new sales of ICEVs that may be phased out in the future. Nevertheless, China has the strongest growing EV market6.

Redirection of capital flows

International climate treaties, strict national sector targets, and shifting market dynamics have started to threaten the profitability of business models based on conventional car production. In turn, it seems increasingly difficult for OEMs and suppliers to gain access to capital at competitive costs if they cannot demonstrate their ability to decarbonize their products and operations.

Changing customers’ attitudes on sustainable mobility

While customers today are still hesitant to fully embrace sustainable mobility options, this may change in the future with increasing awareness for climate issues. A no-regret option for automotive players is therefore to move fast towards the net-zero goal as well as to extend their product portfolio by offering shared mobility solutions. Otherwise, there is a risk that customers may shift their preferences towards other modes of transport, particularly if the automotive industry cannot demonstrate its ability to transform fast.
Decarbonization challenges

**OEMs and suppliers in the driver seat**

The goal for the automotive industry seems to be clear: to be compliant with the 1.5 °C temperature goal, it is necessary to decarbonize their entire value chain, which will likely be built around EVs.

Current decarbonization discussions are mainly driven by regulation, however car makers (OEMs, suppliers, dealerships, etc.) need to take the “driver’s seat” by being part of the solution. While long-term targets have yet to be set (according to their SBTi commitments), the industry has demonstrated their intention of driving the solution through ambitious near-term targets. For example, in some cases OEMs already partly plan to phase out ICEV production ahead of regulatory requirements.

However, putting targets into practice has proven difficult as the industry faces multiple external and internal challenges (Figure 3). The transformation requires not only high investment costs for ramping up EV capacity, but also a net-zero business model that is still not competitive due to higher technology costs that cannot be passed on to consumers.

**The challenge to decarbonizing the global vehicle fleet**

What is left unspoken: Even though CO₂ emissions from new sales of vehicles have started to decline with increasing EV shares, the global fleet of 1.2-1.6 billion cars consists predominantly of ICEVs (around 98.5%) and this will persist for some time. Existing ICEVs currently in use clearly impacts the overarching target to reduce emissions according to the 1.5 °C path. In fact, today’s climate policies target new sales—except for some instruments that increase operational costs of petrol and diesel cars (such as CO₂ taxes on fuels).

Furthermore, the inconsistency of global regulatory frameworks requires tailored business models, technological responses, and decarbonization strategies for different regional contexts. The automotive ecosystem is already complex, and, in the future, there will likely be even more actors involved. As a result, cross-sectoral collaboration and joint activities, mainly with the power sector, but also basic materials production and recycling, may increase. A successful transformation depends, therefore, also on the progress of other sectors in providing green solutions at scale. As a result of these challenges, the majority of automotive companies still find it difficult to establish a comprehensive sustainability strategy.

![Figure 3: Net-zero challenges of automotive players](image-url)

Consumers are reluctant to absorb the cost of lower emission solutions, counteracting the OEMs’ motivation to shift the product portfolio.

The current infrastructure (e.g., electrical grid and charging stations) and renewable energy production are not ready for the transition to net-zero.

The markets of EU, US and China provide different conditions for subsidies, fleet standards, and the availability of renewable electricity. The climate implications of the global car fleet are significant, but an understanding of adequate policies is still lacking.

**GREEN TRANSFORMATION**

- Insufficient customer buy-in
- Insufficient EV infrastructure
- Dispersed regulatory support
- Strong sectoral dependencies
- Insufficient EV infrastructure
- Traditional business focus
- Immense up-front investments
- Decentralized accountabilities
- Unclear transformation path

OEMs and suppliers require new business models to maintain competitiveness. Incorporated second-life approaches and recyclability-adapted vehicles are potential options. Moreover, finding the right partners is still a challenge.

Investments needed for the transition of production plants and the ramp-up of battery plants are immense and challenging given limited resources.

A dedicated team, including executive members, needs to oversee the transformation and drive progress along all value chain segments. This is a necessary ingredient for a successful transformation.

Companies struggle to understand drivers and have limited visibility in tracking progress. Nevertheless, speed is essential when setting the course for decarbonization.
Call for action

Establishing a decarbonized value chain

Decarbonization should be actioned across the entire automotive value chain. A combination of a fast EV ramp-up, the use of renewable energy along the entire value chain, and the establishment of circular materiality are necessary ingredients for a 1.5°C temperature compliant pathway (Figure 4).

As Figure 4 shows, most emissions are caused during the usage phase that captures tailpipe emissions as well as emissions from fuel/electricity production. The supply chain phase includes vehicle production, including raw materials extraction and processing (e.g., steel, aluminum, and polymers) and component and part production (e.g., electric components and batteries). It also captures related logistics activities. During the return phase, greenhouse gas emissions are caused from scrappage and recycling activities.

Decarbonization levers

There is a wide range of levers to be pulled for decarbonization—addressing all areas of the value chain (Figure 5). All divisions must anchor to sustainability, from administration and purchasing to development and production, and even distribution, sales, and aftersales. This focus on sustainability will be enabled by reporting structures that align climate and financial reporting to better understand the emission footprint and the potential to address decarbonization.

The transformation includes adopting circular business models and transitioning both production plants and usage to clean energy. There is a need to extend and collaborate beyond the owned value chain by seeking to involve suppliers and customers to join forces to help achieve net-zero emissions by 2050.

Abatement strategies: Various offset mechanisms including nature-based solutions
A blueprint for changing the industry

With so many different areas of action, one critical task is to prioritize and define them as part of a holistic plan for implementation. A successful strategy must account for the evolving automotive ecosystem. This depends also on external factors and how these develop over the coming years and decades, such as consumer preferences, macroeconomic and geopolitical factors, regulations, and the pathways of closely interrelated sectors.

Conversely, the transformation of the auto sector will have wide-reaching impacts at the regional and national level as specific industry branches will be heavily affected, with repercussions to the entire economy. It is therefore opportune to develop an industry blueprint for decarbonization based on scenario analysis—closely examining the future—with collective action across the entire value chain to navigate the complexities and reach 90% CO2 reduction targets by 2050.

Authors and contacts

This paper is part of a collection of insights on possible pathways to decarbonization for high-impact sectors. Each sector perspective offers a foundational starting point for leaders who would like to better understand the landscape across these critical sectors. For additional sector papers and links to in-depth reports, please visit Pathways to decarbonization on Deloitte.com.

At Deloitte, we support power and utilities players on their path to net-zero by helping them develop, finance, and implement the sustainable solutions required to achieve a multi-faceted transformation. With in-depth knowledge of the evolving regulatory environment, extensive power and sustainability expertise, and a vast client ecosystem, we provide an invaluable hub for the development of enhanced business capabilities, transformation know-how, and behavioral change management.

To learn more about how we can support your organization, contact us.
Endnotes

6. Canalys, “*Global EV sales up 63% in H1 2022, with 57% of vehicles sold in Mainland China*,” August 11, 2022.
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