

Overview

Automotive:

Priority actions towards a nature-positive future

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Introduction

The automotive sector has an important role to play in the transition to a nature-positive world. With a global annual production of 94 million vehicles in 2023[1], the sector contributes 3% of global GDP output, and up to 7% in fast-growing markets such as China and India[2]. The sector is expected to grow at a rate of 6 to 7% until 2030, driven by a rising global middle class, the expansion of emerging markets, and shifting consumer preferences towards sustainable mobility and larger cars[3, 4, 5].

In particular, the shift towards sustainable mobility has transformed the automotive market over recent years, with electric vehicle sales rising from 1 million to 14 million per year between 2017 and 2023, and half of the electric cars on the road today located in China[6]. This shift is supported by governments across the world, and 43 countries have signed a declaration accelerating the transition to 100% zero emission cars and vans[7]. These goals have also been integrated into national policies, including in Europe, the United Kingdom, Canada and the United States, which typically focus on the scale-up of zero-emissions vehicles and circularity.

However, despite the efforts underway to reach a global net-zero future, the automotive sector continues to significantly contribute not only to global greenhouse gases (GHG) emissions, but also to drivers of biodiversity loss including pollution, water use and land use change. Impacts on nature occur at all stages of the value chain, from the sourcing of materials to manufacturing, vehicle use and end-of-life.

To complement ongoing sustainability initiatives, businesses across the sector should use The Nature Strategy Handbook – that draws on the **A**ssess, **C**ommit, **T**ransform, and **D**isclose framework (ACT-D high-level business actions on nature) to help businesses understand their relationship with nature and develop a credible nature strategy. The Handbook forms the basis of 'It's Now for Nature', a global campaign to rally all businesses to act on nature. It helps companies to acknowledge the value of nature to their business; identify, assess and measure their impacts and dependencies on nature; set transparent, time-bound, science-based targets; take actions to address their key impacts and dependencies and transform their business; and publicly disclose performance and other relevant nature-related information.

This overview provides a non-exhaustive, sector-level summary of potential key impacts and dependencies on nature. Importantly, it also sets out the priority actions that leading businesses in the sector should take now to transform and ensure the automotive sector plays its part in meeting the global goal to halt and reverse nature loss by 2030 - the mission at the heart of the Kunming-Montreal Global Biodiversity Framework.

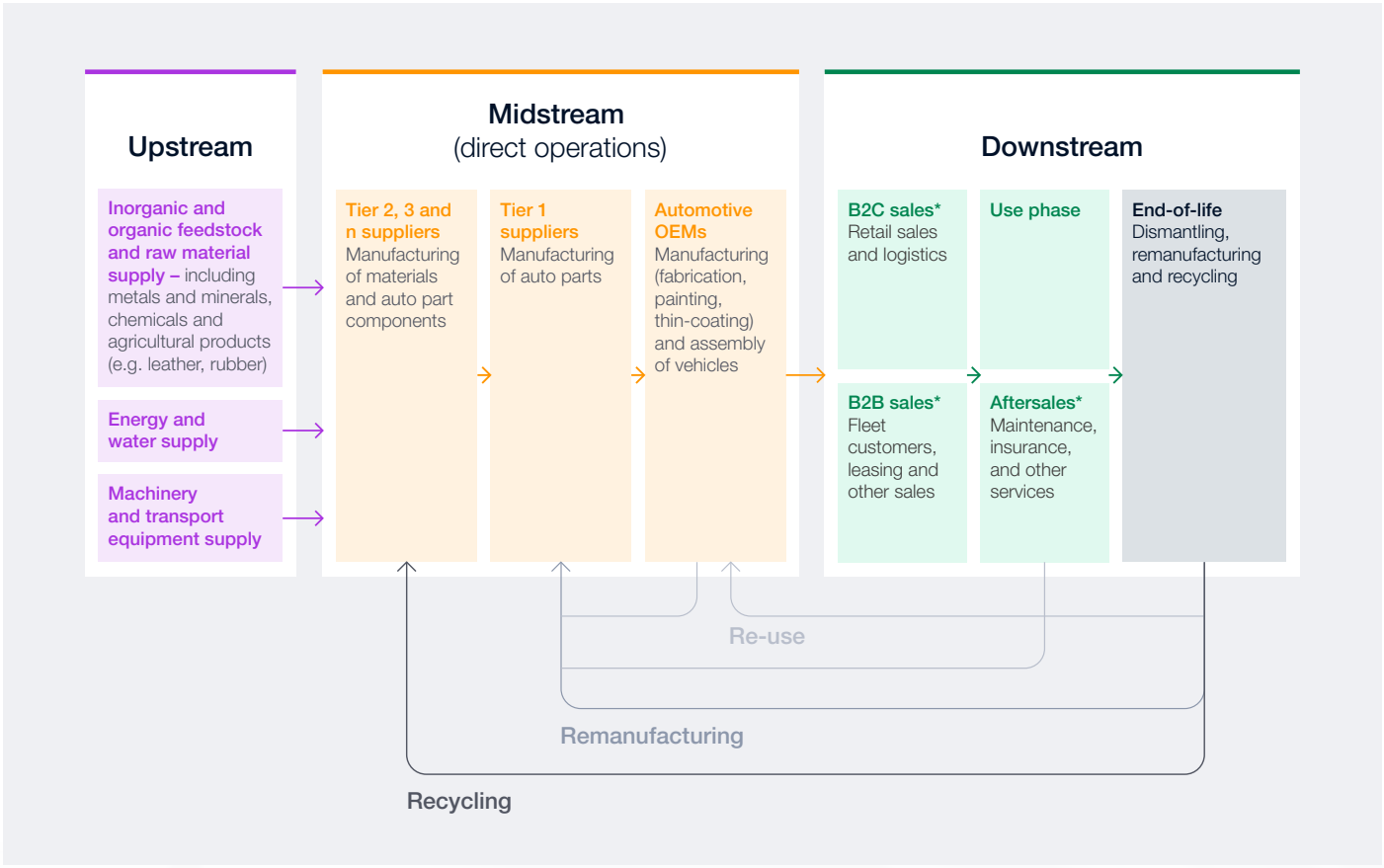
Scope of this overview

This overview focusses on the automotive sector, covering automotive parts production by Tier 1, 2, 3 and n suppliers, and vehicle manufacturing by original equipment manufacturers (OEMs) of light passenger vehicles and trucks, 2- and 3-wheelers and compact tractors (SICS codes: TR-AP, TR-AU).

In addition, it also considers the full value chain for automobiles, including industries which provide inputs to automotive parts manufacturers or OEMs, downstream product distribution and aftersales, vehicle use and end-of-life management.



Automotive value chain



**Sales and aftersales may be conducted by OEMs (midstream) or by independent retailers/service providers (downstream)*



Nature-related impacts

To protect and enhance ecosystems on which they depend, businesses in the automotive sector should direct their efforts towards addressing the most significant impacts on nature in their operations and value chains, namely:

- **Pollution** – There are four main types of pollution occurring across the automotive value chain: 1) land, freshwater and ocean pollution (incl. from harmful chemicals and persistent or toxic materials); 2) atmospheric pollution (incl. nitrogen dioxide and particulate matter, e.g. from tire degradation); 3) waste from non-product outputs (incl. resins, sludges, tailings, metals, glass and polymers); and 4) noise pollution. Automotive pollution impacts both nature and people: for example, road transport was the largest emitter of nitrogen oxides in the EU in 2020, responsible for 37% of emissions[8]. In Europe, 52,000 deaths were attributed to nitrogen dioxide in 2021[9].

- **Water use** – Over 400,000 litres of water are required across the value chain to produce one car[10], with lifecycle analysis indicating that 99% of water is consumed upstream, in particular, during metals sourcing and electrical components manufacturing[11].

- **Land use change and ecosystem disturbance** – Upstream input industries are the primary drivers of land use change for the sector. Specifically, the production of high-impact commodities such as metals, rubber and leather[12], as well as energy supply, can result in land clearance and ecosystem fragmentation, in soil degradation and erosion, and in the disruption or diversion of water systems. Indeed, 8% of mining-related deforestation is attributable to the motor vehicle sector[13], and the sourcing of leather in car supply chains has also been linked to deforestation. One fifth of all bovine leather produced globally from cattle for the meat industry is estimated to go into cars, including over 40% of all leather produced in Brazil, where cattle ranching is the primary driver of deforestation[14].

- **Greenhouse gas (GHG) emissions**[i] – Car and van transport accounts for 10% of global GHG emissions[15]. Whilst manufacturing emissions are primarily generated by energy-intensive processes, such as material transformation and cooling, value chain emissions (Scope 3) make up over 80% of total GHG emissions for the sector. However, the distribution of emissions across the value chain differs between internal combustion engine (ICE) vehicles and battery-electric vehicles (BEVs) (and other alternative solutions): ICE vehicles currently generate 65-80% of their lifetime emissions in the use phase, whereas over 60% of BEV emissions are expected to come from upstream materials by 2040[16, 17].



[i] *While GHG emissions are one of the highest materiality drivers of nature loss for the automotive sector, this is included last in this document given the automotive sector's net-zero transition has been covered extensively elsewhere.*

Nature-related dependencies

Like many sectors, the automotive sector is highly dependent on a number of ecosystem services and assets to function and grow. In particular, these include:

- **Freshwater** – The sector depends on freshwater as an important resource - for example, as an input into industrial processes such as cooling during power generation and chemicals cracking, or for manufacturing processes including painting and leak testing.
- **Climate regulation, soil and sediment retention, and flood protection** – Global climate regulation protects upstream industry operations, particularly those sensitive to increased temperatures. Mass stabilization, erosion control and green infrastructure[18, ii] provide protection from landslides, flooding and other natural hazards to upstream operations and midstream manufacturing.
- **Metal, mineral and energy resources** – Metal and mineral resources are crucial input materials for the sector, alongside a stable supply of energy to operate (with an increasing shift towards renewable sources).
- **Cultivated biological resources** – The sector relies on the provision of rubber for tyres, crops to produce fibres and dyes, and livestock farming for leather.

These dependencies strengthen the business case for investing in the protection and restoration of nature.



[ii] *Green infrastructure has been defined as "A strategically planned network of natural and semi-natural areas with other environmental features, designed and managed to deliver a wide range of ecosystem services, while also enhancing biodiversity".*

Priority actions and opportunities

To reduce negative impacts on nature, mitigate risks to operations and unlock commercial opportunities, automotive companies should prioritize five key actions:

1. **Avoid and reduce impacts from operations –** Companies can reduce their impacts across material issues such as water stewardship, pollution, biodiversity loss, and emissions.

   For example, reduce freshwater consumption in the midstream stages by replacing water-cooling processes with air-cooling, switching from freshwater to alternative water sources, and recycling water back into operations (e.g. by introducing closed-loop recycling systems). Adopt nature-based solutions to alleviate flood risks, and support water replenishment across landscapes.

   Transform production processes to tackle pollutants, monitor their use and impacts, and divert hazardous waste away from landfills.

   Strengthen biodiversity assessment, planning and management, starting with priority sites; conduct site-level biodiversity assessments and develop management plans for all owned land.

   Accelerate GHG emissions abatement by decarbonizing heat and power sources, increasing the use of renewables and electrifying heat production, optimizing production processes to accelerate energy efficiency, and decarbonizing logistics and transport for materials and completed vehicles.

2. **Avoid and reduce impacts from materials –** ***Key materials include steel, aluminium, critical minerals, polymers, rubber and leather.***

   Innovate to avoid and reduce material waste across the value chain and to embed circularity. Establish circular inputs, re-design products and processes for resource efficiency (e.g. minimizing scrap metal), prioritize recycled, circular or renewable materials (e.g. by co-designing materials with upstream providers), and invest in reuse, remanufacturing and end-of-life management at scale.

   Engage with suppliers to source responsibly: identify, assess and disclose impacts, dependencies, risks and opportunities across the supply chain, starting with priority sites and high impact commodities[18]. Establish common data requests for suppliers, incorporate nature-related performance criteria (for example, deforestation-free inputs) into supplier due diligence and management processes, and partner with other purchasers to incentivize vendors to shift to actions and practices that protect and restore nature.

3. **Transform product offering –** Transition from ICE vehicles to BEVs and other alternative solutions[iii], following a lifecycle assessment of environmental impacts that evaluates trade-offs between GHG emissions and other nature impacts to ensure that actions align with both climate and nature goals. Redesign vehicles to tackle nature impacts from vehicle use, for example to address nitrogen oxide emissions, or by reducing the size and weight of vehicle bodies, as well as key components such as batteries.

   Expand into new business models such as mobility-as-a-service, component-as-a-service[iv], and leasing and subscription models, to shift consumer behaviors towards more sustainable practices.



[iii] *Including plug-in hybrid electric vehicles (PHEVs), flexible-fuel hybrid electric vehicles (FFV-HEVs), sustainable biofuels, low emissions hydrogen and derivatives (including synthetic fuels).*

[iv] *Examples of mobility-as-a-service models include vehicle-on-demand services (such as car rental / sharing, P2P sharing and micro mobility), and mobility-on-demand services (such as ride hailing, ride sharing and demand-responsive transport / ride pooling). Examples of component-as-a-service models include battery swapping or providing a guarantee on battery service.*

4. **Conserve and restore nature, with Indigenous Peoples and local communities –** Following rigorous application of the mitigation hierarchy (avoid, reduce, restore, compensate)[19], compensate for unavoidable impacts as a last resort in alignment with a No Net Loss or Biodiversity Net Gain goal for each project (following industry guidelines)[20]. In addition, contribute to systems-wide conservation and restoration both across and beyond own value chains, for example, by investing in the management of protected areas and credible and effective nature-based solutions[21] or conservation projects, in collaboration with environmental NGOs, local governments, Indigenous Peoples and other local communities. Engage with investors and financial institutions to develop and invest in innovative nature financing mechanisms.

5. **Drive cross-sector collaboration on standards and transparency, infrastructure and policy –** Collaborate across the supply chain to improve access to quality data on nature, and enable data sharing by establishing common impact assessment methodologies and data management technologies.

Engage with downstream distribution and aftersales networks to deploy site-level biodiversity assessment and management across all owned land, starting with priority sites, and support the expansion of energy grid integration infrastructure, including smart charging and vehicle-to-grid technology.

Educate customers to make more environmentally-friendly choices, and call on governments to strengthen nature-related policies that encourage the sustainable supply of critical minerals, circularity in materials production, and data transparency and sharing.

Importantly, efforts to deliver these priority actions and transform the sector must be delivered in alignment with a just and equitable transition, including meaningful dialogue with affected groups, such as employees, local communities, Indigenous Peoples and marginalized communities.



Resources

This summary was derived from the report Nature Positive: Role of the Automotive Sector, written by the World Economic Forum.

The following **sector-specific guidance documents and tools** are currently available to companies in the automotive sector:

- The "No-Excuse" Framework to Accelerate the Path to Net-Zero Manufacturing and Value Chains (World Economic Forum, 2023)
- Driving Ambitions: The Business Case for Circular Economy in the Car Industry (World Economic Forum, 2022)
- Raising Ambitions: A New Roadmap for the Automotive Circular Economy (World Economic Forum, 2021
- Forging Ahead: A Materials Roadmap for the Zero-Carbon Car (World Economic Forum, 2020)
- Bringing Batteries Production to Europe – in a Green and Responsible Way (WWF, 2024)
- ENCORE (UN Environment Programme World Conservation Monitoring Centre - UNEP WCMC)
- Materiality Screening Tool (Science Based Targets Network – SBTN)
- High Impact Commodity List (Science Based Targets Network – SBTN)

For additional **sector-agnostic resources**, please refer to Business for Nature's High-level Business Actions on Nature and The Nature Strategy Handbook.

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