Circular Economy in the Automotive Industry

March 2025

ESCP BUSINESS SCHOOL

EURO GROUP CONSULTING

MBA students' mission to create value for Eurogroup Consulting clients

Eurogroup Consulting, committed to create sustainable value for its clients

MBA in IM Students from ESCP Business School

Problem statement - The current state of the circular economy in the automotive industry struggles to present financially sustainable practices.

Project Mission - Our objective is to analyze the current and emerging challenges of implementing circular economy (CE) principles within the automotive industry. We aim to identify opportunities within CE practices and deliver actionable recommendations that enable Eurogroup Consulting to drive sustainable value for its clients.

The project will explore strategies that reduce waste, promote material reuse, and ensure compliance with evolving regulatory standards.

Executive summary

Context & Challenge

The automotive sector faces mounting pressure to adopt circular economy (CE) practices amid rising regulatory demands, resource constraints, and consumer expectations for sustainability. Current CE practices struggle with scalability, economic feasibility, and supply chain complexity.

Key Findings

- Component-Level Priorities: Batteries, powertrain, electronics, and plastics offer the greatest potential for CE initiatives.
- Emerging Trends: The shift to EVs increases demand for material recovery and second-life applications.
- Global Disparities: Europe lags in resource sovereignty and cost competitiveness compared to Asia.
- Circularity in Europe: Only a small percentage of vehicle materials are recycled, highlighting inefficiencies in end-of-life vehicle management and resource recovery.

Recommendations

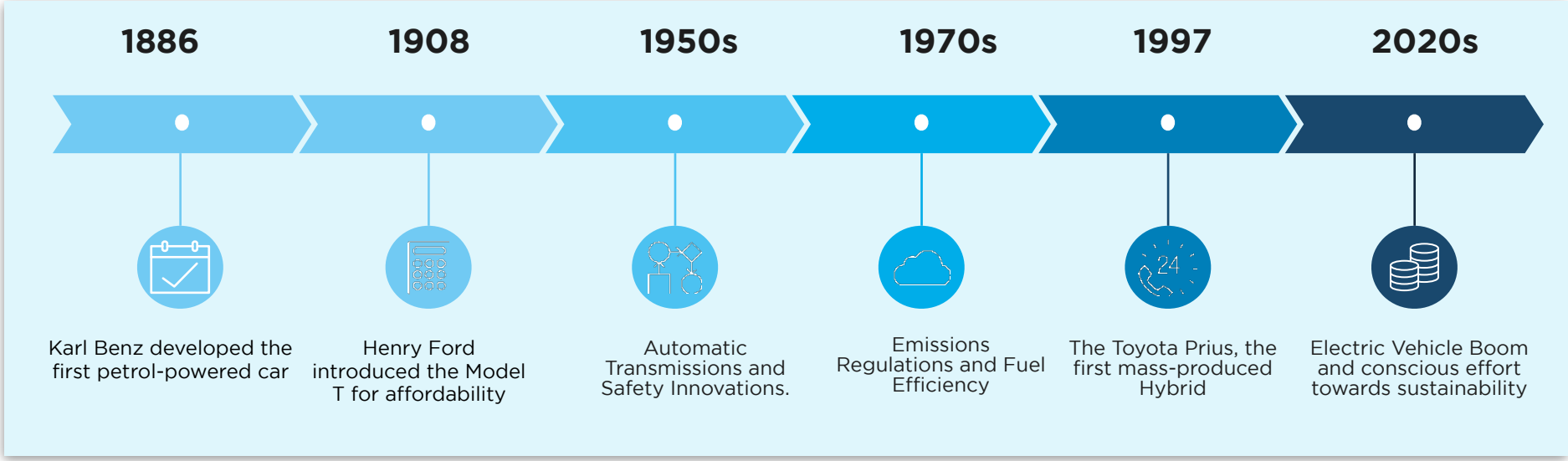
- Short-Term: Strengthen regulatory alignment and incentivize CE adoption (tax breaks, subsidies).
- Medium-Term: Standardize components for easier disassembly and promote modular designs, and scale partnerships across value chain suppliers for CE innovation
- Long-Term: Implement closed-loop systems and introduce component leasing models to drive recurring revenue and integrate advanced technologies like blockchain for lifecycle traceability

What to expect

01 / Introduction to the Automotive Industry
02 / Circular Economy in the Automotive Industry
03 / Project Structure
04 / Key Components
05 / Next Steps
06 / Interviews
07 / Bibliography
08 / Teams

Introduction to the automotive industry

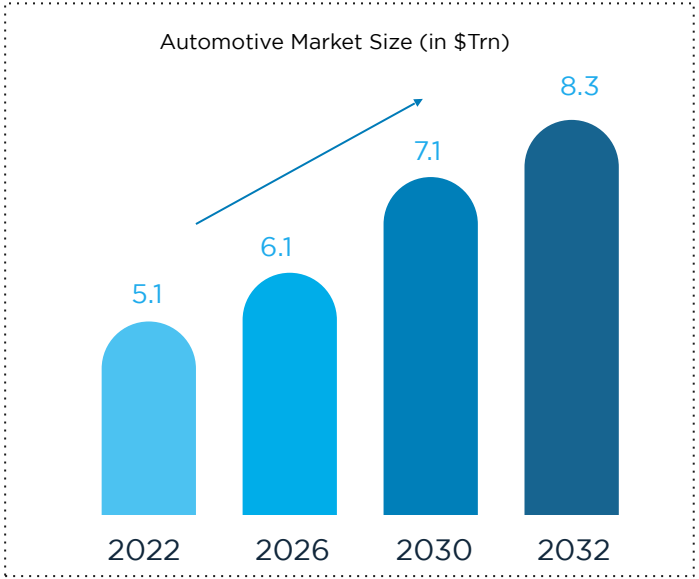
The automotive industry is now transitioning into an era of sustainability



The automotive industry evolved from petrol-powered cars in 1886 to mass production in 1908, safety innovations in the 1950s, fuel efficiency in the 1970s, hybrid technology in 1997, and now a sustainable EV boom in the 2020s

As shifting consumer trends are reshaping the paradigms

Growth in Market Size ~15% per year on an average



72% of consumers consider sustainability when purchasing vehicles.

Overall Trends in the Automotive Industry

- Demand for Sustainable Products
- Preference for Extended Vehicle Lifecycles
- Electrification and Environmental Awareness
- Cost-Conscious Decision Making

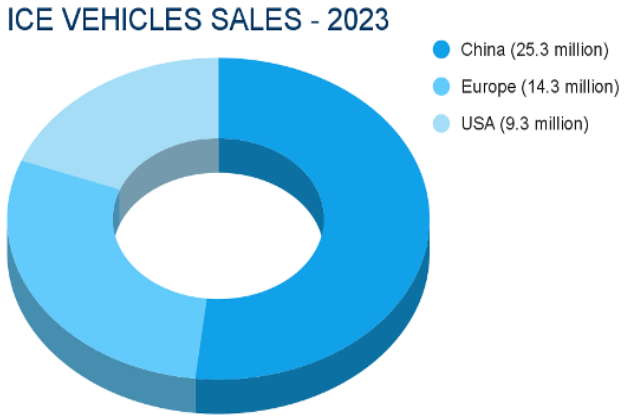
The average age of vehicles in operation in the U.S. hit a record **12.5** years in 2023

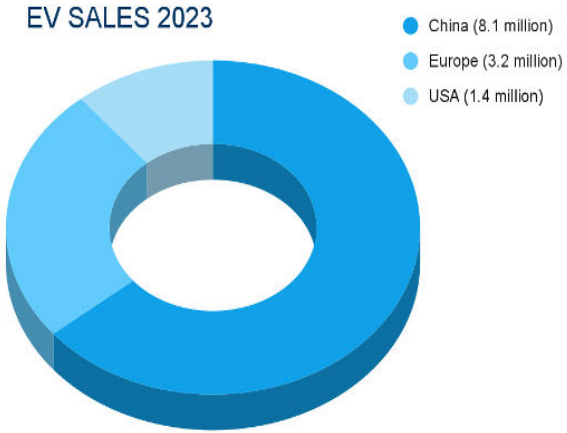
Source
[1]

The present and the future come with different market opportunities

Old generations ICE vehicles are coming to the end of their life, creating market new opportunities at the present

Around 49 million ICE vehicles currently sold annually. Sales are projected to decrease by 45-60% by 2030. This shift creates a greater need for circular economy solutions



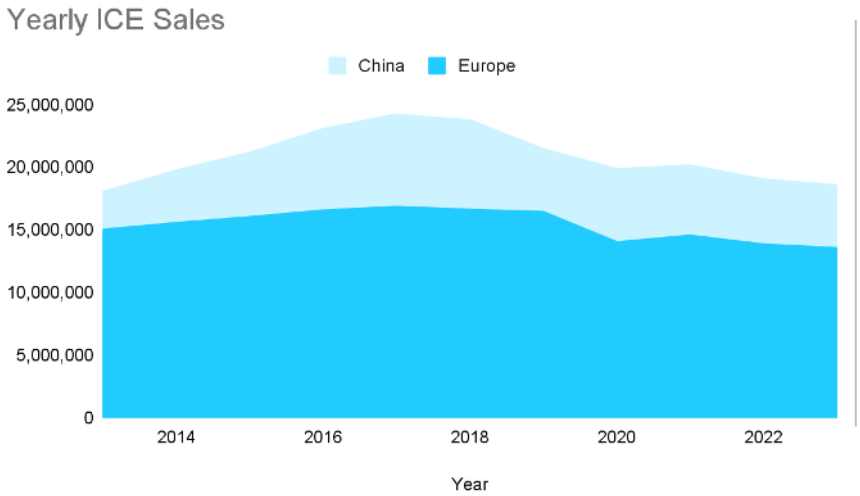


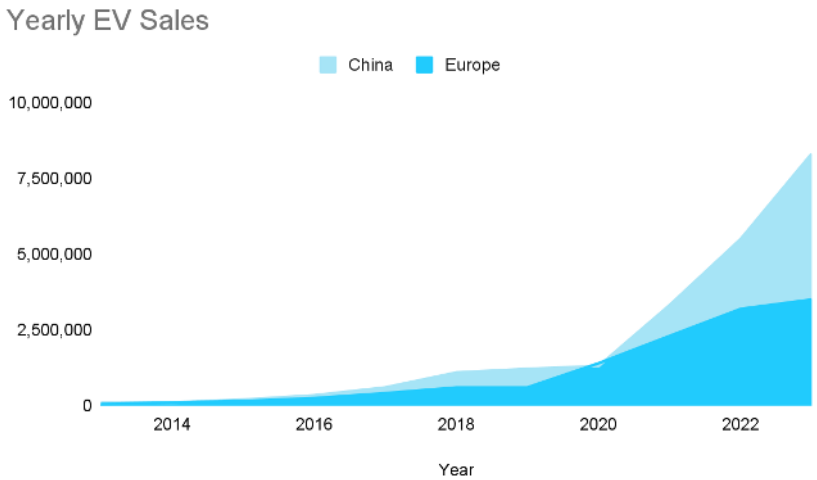
New generation of EV vehicles will create different market opportunities in the future

Global electric car sales reached almost 14 million in 2023, representing a *35%* increase from 2022. By 2030, EVs are projected to make up about *40-55%* of new vehicle sales

Source 1
Source 2

While global ICE sales are on the decline, Asia is taking the lead with TVs





European OEMs are looking for new revenue models that keeps them competitive in global markets

Volumes of sales for EVs in the last 10 years, sources

Europe is losing terrain due to five major challenges

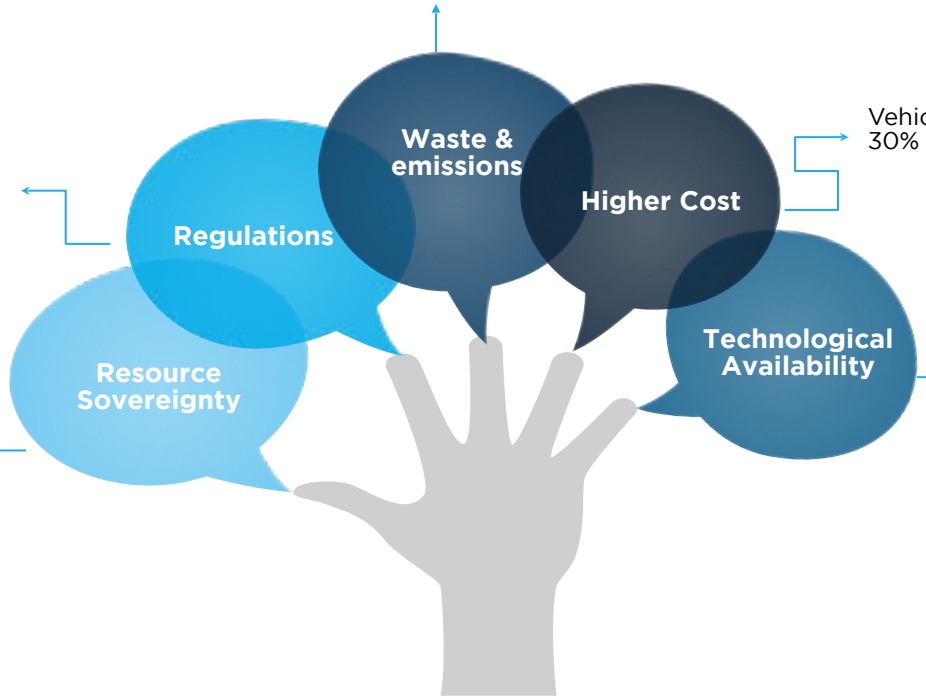
The EU is focused on controlling waste and CO2 emissions compared the rest of the world

New regulations will affect European Carmakers by introducing CE requirements

Vehicle production costs are approximately 30% higher in the EU compared to China

Chinese technology is at an advanced stage to deal with the growing trends

Europe has no control over rare materials like Copper and Nickel, while China does



Source

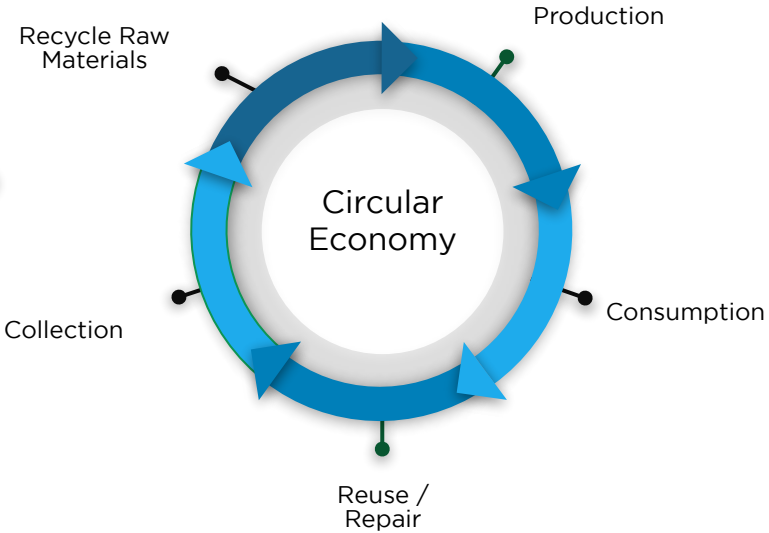
Circular economy in the automotive industry

European Automotive is demanded to shift from linear to circular model

Industry in a Linear Model

The industry generates over 25 million tons of waste annually from end-of-life vehicles with the linear model. Sources

Industry in a Circular Model



Embracing a circular model not only minimizes waste but also unlocks opportunities for innovation, cost savings, and competitive advantage in a resource-constrained future

Circularity constraints come from external drivers...

03

Consumer Behavior Shifts

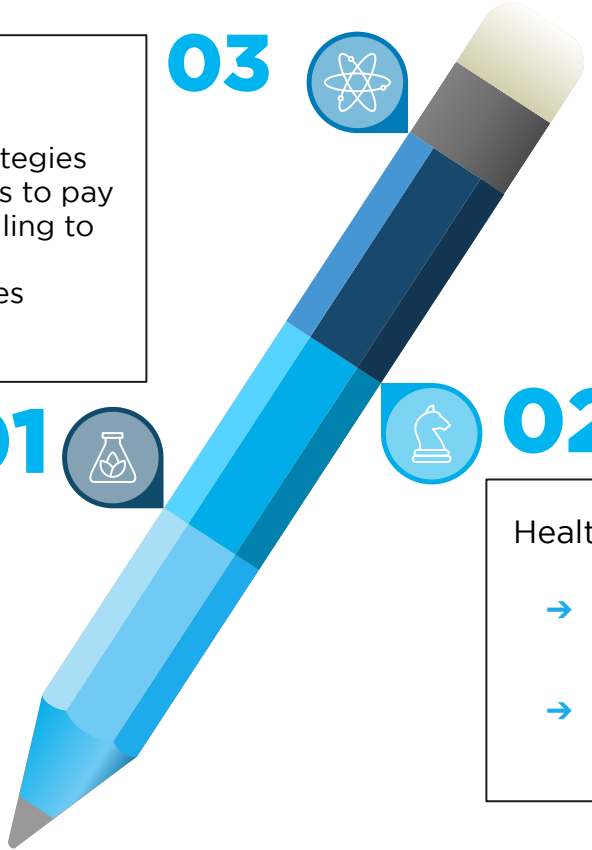
- Need to align pricing strategies with consumer willingness to pay
- 54% of consumers are willing to pay more for sustainable products across categories

Automotive emission accounts for **10%** of the global CO2 emissions

01

Supply Chain Costs for Raw Materials

- Rising costs and scarcity of rare raw materials like Copper and Nickel.
- Lack of resource sovereignty



02

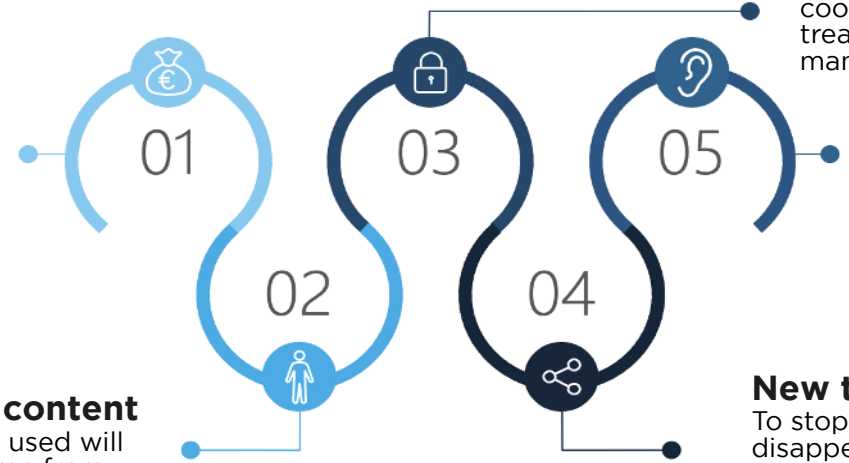
Health Issues and Waste Pollution

- Transport is responsible for more than 25% of the EU's greenhouse gas (GHG) emissions
- End-of-life vehicle waste generates over 25 million tons annually

Sources

...and Europe is addressing them introducing new principles and regulations

Design circular
Car makers will need to provide clear, detailed instructions for dismantlers



Improve governance
fostering enhanced cooperation between treatment operators and manufacturers.

Broader coverage
these measures will be gradually expanded to include new categories such as motorcycles and buses

Use recycled content
25% of the plastic used will be required to come from recycling, of which 25% must be recycled from end-of-life vehicles

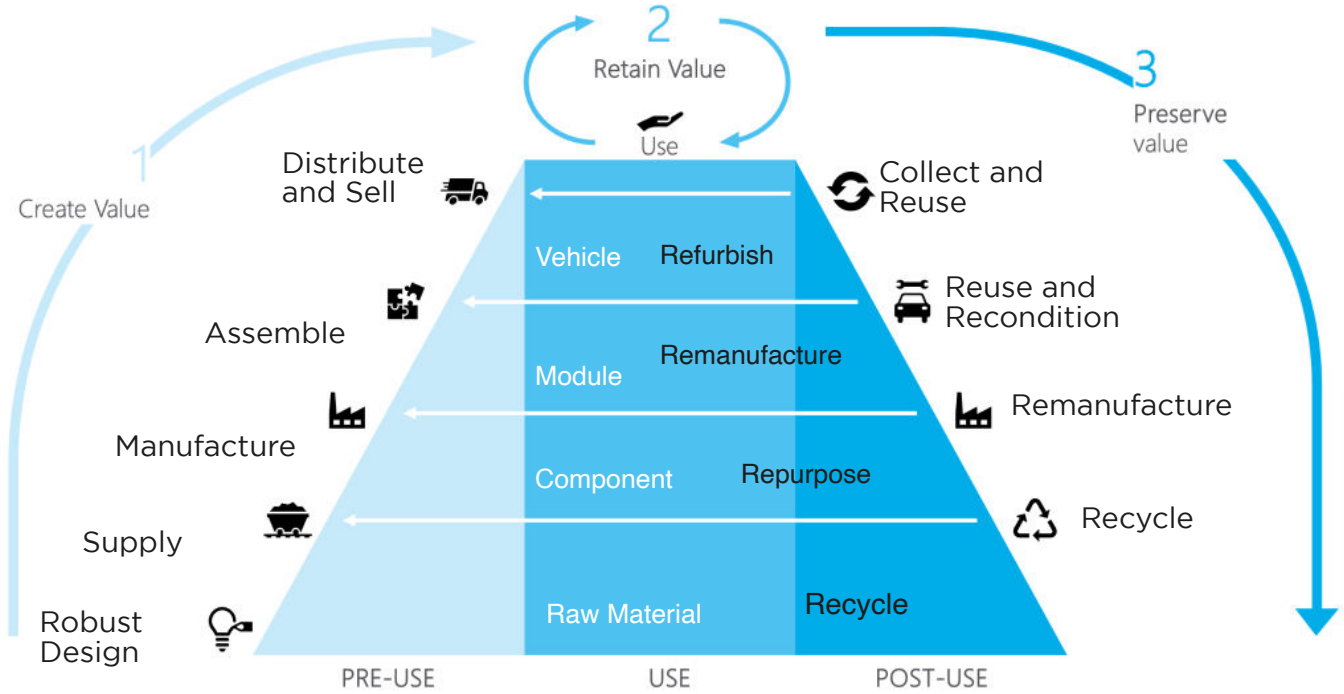
New tracking systems
To stop vehicles from disappearing, more tracking of end-of-life vehicles, better separation of old cars from end-of-life cars, more fines for infringements

Sources here

How can these players balance the decline on value and transit to a circular economy through sustainable models?

03/ Project structure

The circular economy value chain has several players with key roles



01 OEM Level Design for durability, reuse and disassembly

02 Tier 1 Focus on assembly and remanufacturing

03 Tier 2 & 3 Emphasize manufacturing efficiency and recycling.

"7Rs" Automotive Supply Chain Framework:
Reduce, Reuse, Robust-Design, Refurbish, Remanufacture, Repurpose, Recycle

The players work across various components to close the life-cycle loops

CE Drivers

Financial strength
70% Cost savings comes from recycling batteries and electronics

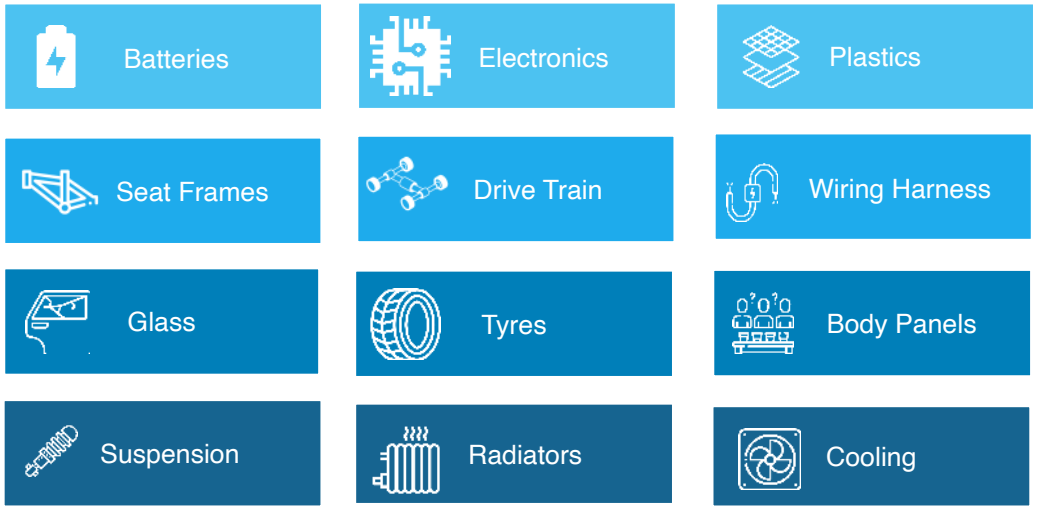
Reselling Globally
Partnerships and facilities for standardized reuse processes.

Partnerships with Tier-1
Collaboration to repurpose batteries, chips, and sensors.

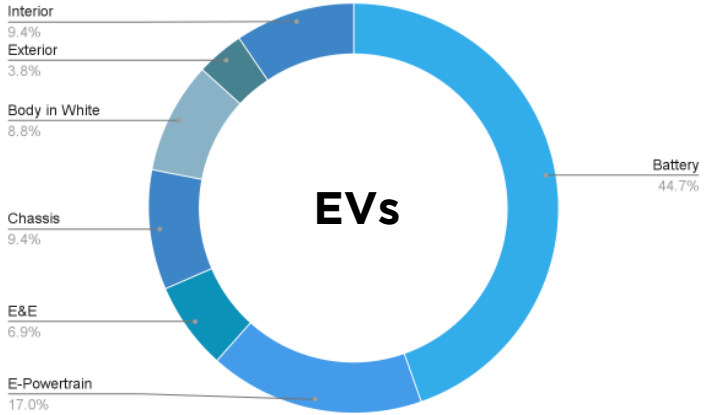
Growth Opportunities
Revenue from second-life batteries and refurbished components.

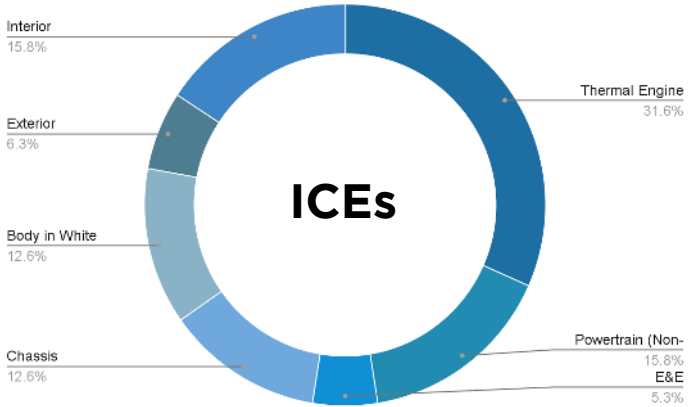
Design for Repurpose
Modular designs for easier recycling and reuse are important for CE.

Key Focus Life-Cycle Loops



The cost breakdown of car components put a spotlight on various opportunities...





A

Batteries are the largest EV cost component, with materials like lithium and cobalt offering recycling potential and make up ~45% of overall cost

B

Powertrain, a key cost in both EVs and ICE vehicles, offers opportunities for reuse and refurbishment to improve sustainability and reduce costs.

C

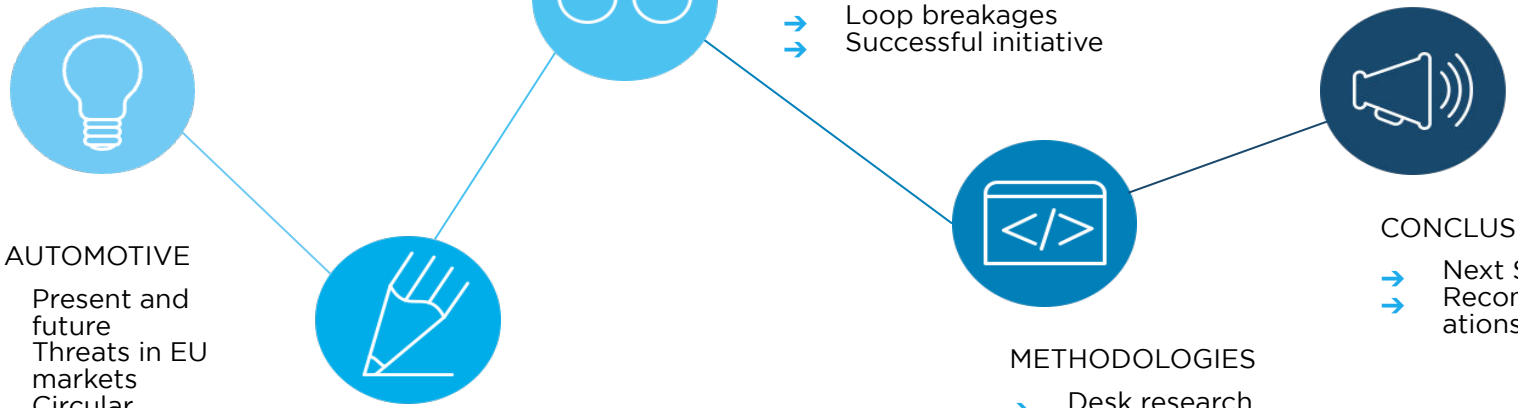
Electronics (E&E) enable key functions like safety, connectivity, and performance, with high potential for recycling and recovery innovation.

D

Plastics in components like Body, Interior, and Exterior are significant; recycling them reduces raw material dependency and environmental impact.

Sources

...That are further developed from two sides, to build our final recommendations



AUTOMOTIVE

- Present and future
- Threats in EU markets
- Circular economy
- Problem definition

TEAM 1

- Electronics
- Power Train
- Key CE Players for Components
- Key components
- Successful initiatives

TEAM 2

- Batteries
- Plastics
- Key CE players in the EU
- Loop breakages
- Successful initiative

METHODOLOGIES

- Desk research
- Interviews
- Swot framework

CONCLUSIONS

- Next Steps
- Recommendations

04 / Key Component

Electronics

Power Train

Battery

Plastics

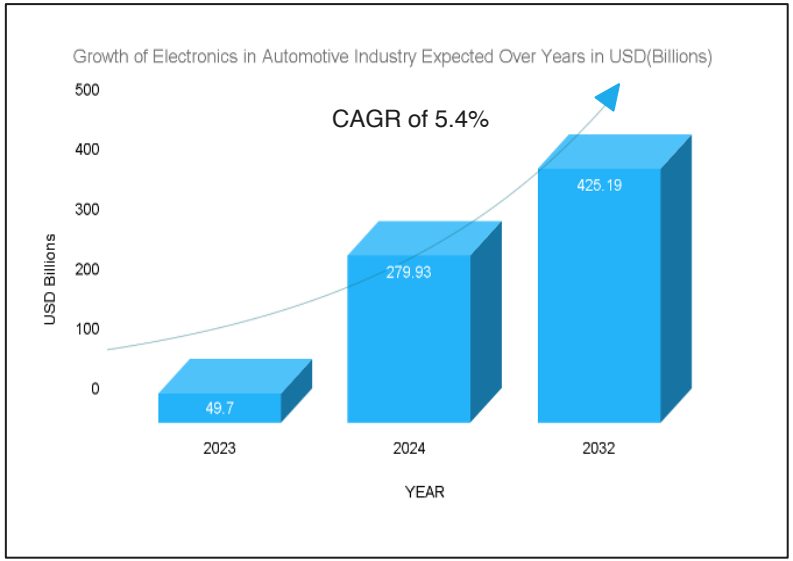
Automotive Electronics Industry at a glance

Present Situation of Electronics in Automotives

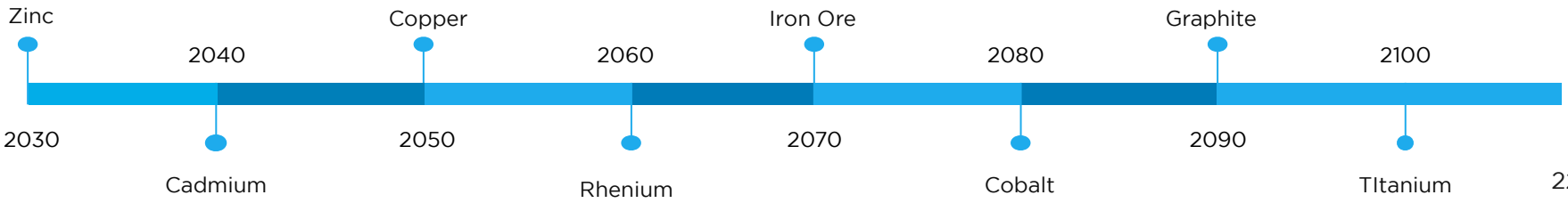
- Safety Features , Autonomous Vehicles, EVs & SDVs driving substantial increase in Automotive Electronics Market.
- Asia Pacific dominates the market share in 2023.

Need for Electronics to integrate into Circular Economy

- Electronics is projected to account for **almost 50%** of all the automotive components for future cars.
- BAU projects increase in manufacturing costs
- Resources such as Copper, Silicon, Neodymium are getting depleted, resource scarcity is the impact.

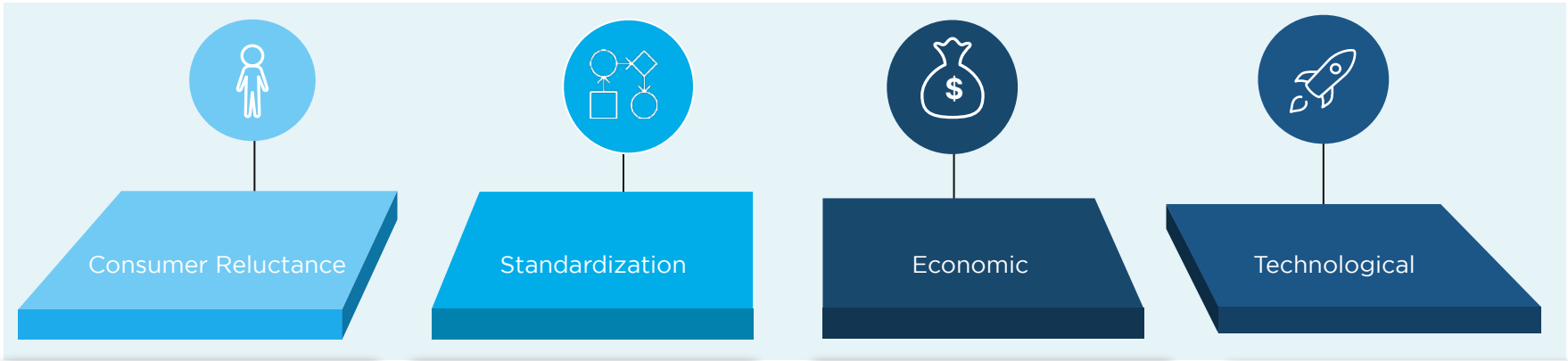


Resources are getting depleted and these raw materials will go scarce in the mentioned years (Scale)



Source

Challenges to CE Adoption in Automotive Electronics for the Industry



Overcoming consumer reluctance, standardization issues, high costs, and technological gaps is critical for accelerating Circular Economy adoption in automotive electronics.

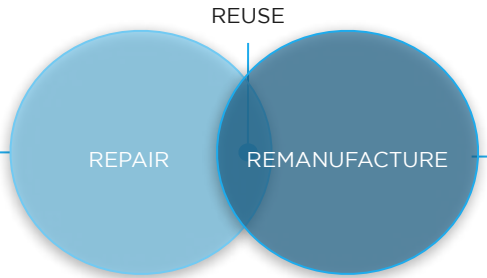
Source

Solutions are being driven by Innovative CE Approaches in Automotive Electronics

Companies are running Reuse (Repair and Remanufacture) and Recycle Programs for Electronic Components to drive Circular Economy

Valeo

Focuses on repairing ECUand other components and it opened its first circular electronics lab at its Nevers site in France.

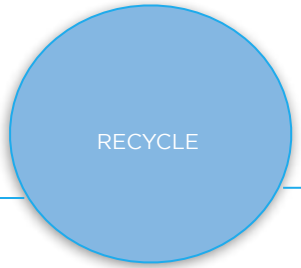


BOSCH

Focuses on Remanufactured alternators, control units, & LiDAR systems for cost-effective solutions.

infineon

Focuses on partnership with Jiva Materials to produce soluble consumer electronics.



TOYOTA

Focus on Copper recycling initiative is part of Toyota's broader commitment. Partnership with more than 8 dismantlers to effectively collect and recycle.

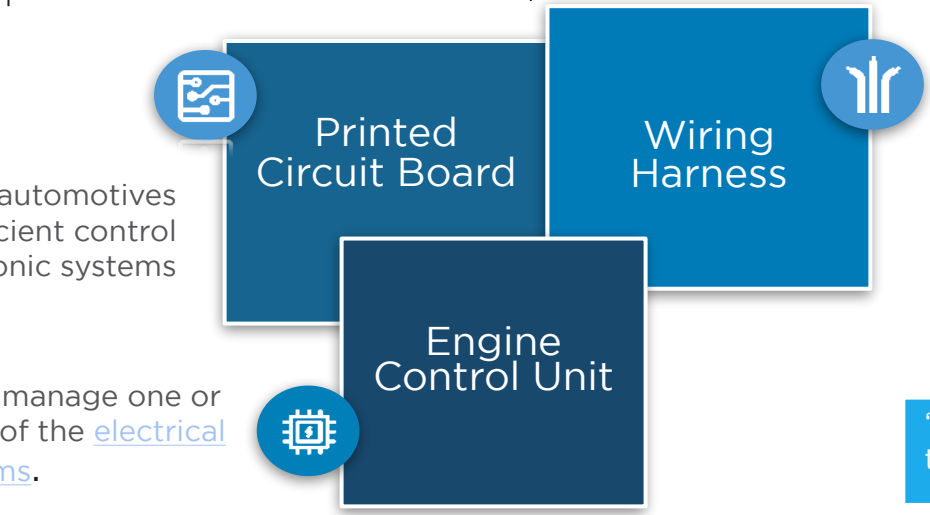
It's difficult for electronics as a whole system to close the CE loop, however above companies are using some R Programs to integrate relevant electronic component in a R Program (Circular Economy)

Source

Deep Dive into High-Impact Automotive Electronics for Circularity

These 3 are major components inside an Electronic System of an Automobile, as these three Components make up almost 40% of the total parts in a modern automobile.

Major Components of an Electronic System of an Automobile



PCBs in automotives enable efficient control of electronic systems

Wire Harness acts as nervous system of the vehicle

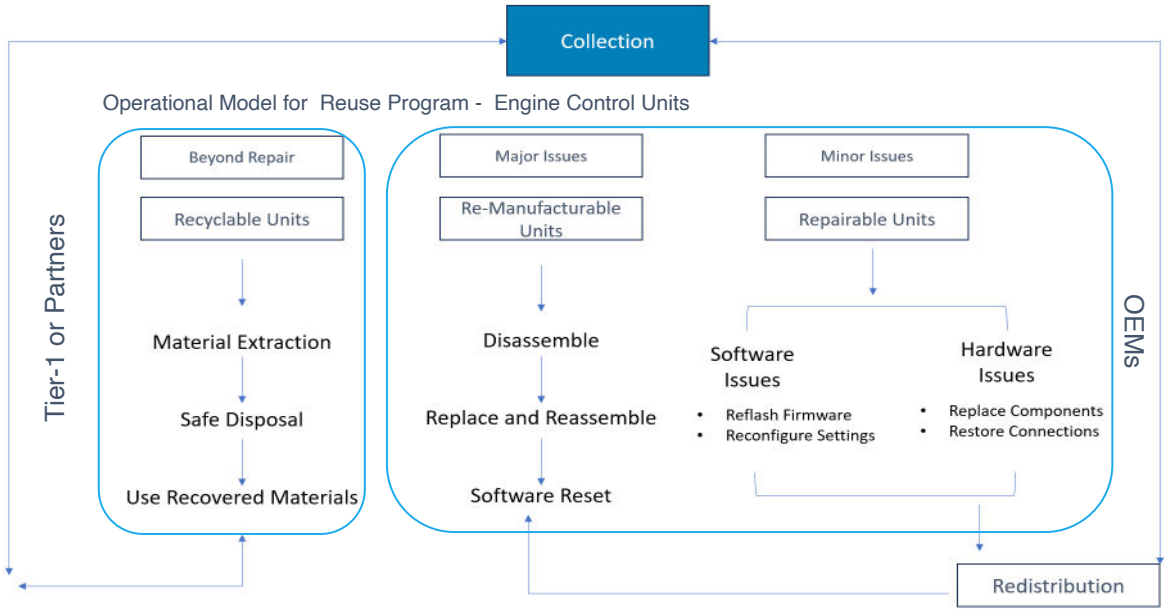
ECUs manage one or more of the electrical systems.

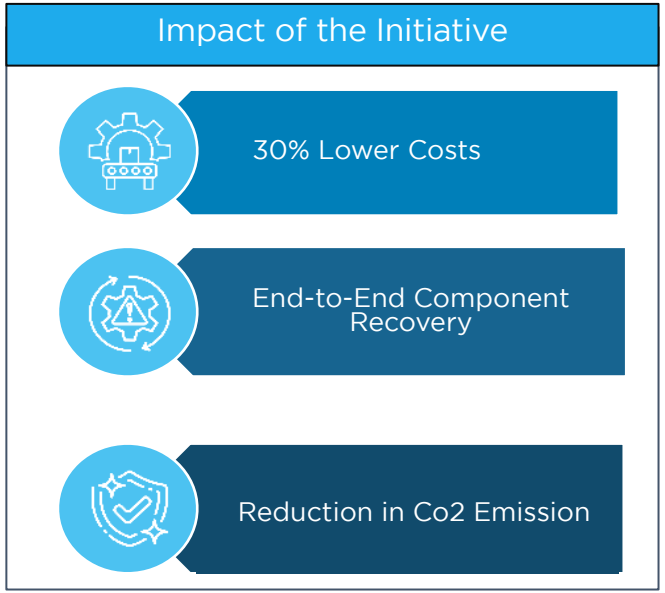
"R" Initiatives by companies for each of the three components are explained further.

Companies are able to close the CE Loop for these 3 Components through respective R programs.

Initiative #1 Bosch Exchange : Re-Use Strategy for Engine Control Units

This initiative provides two solutions for defective ECUs: Fix Price Repair for all defects at a fixed cost, or 1:1 Exchange with a remanufactured replacement ECU requiring no additional programming or hardware fixes





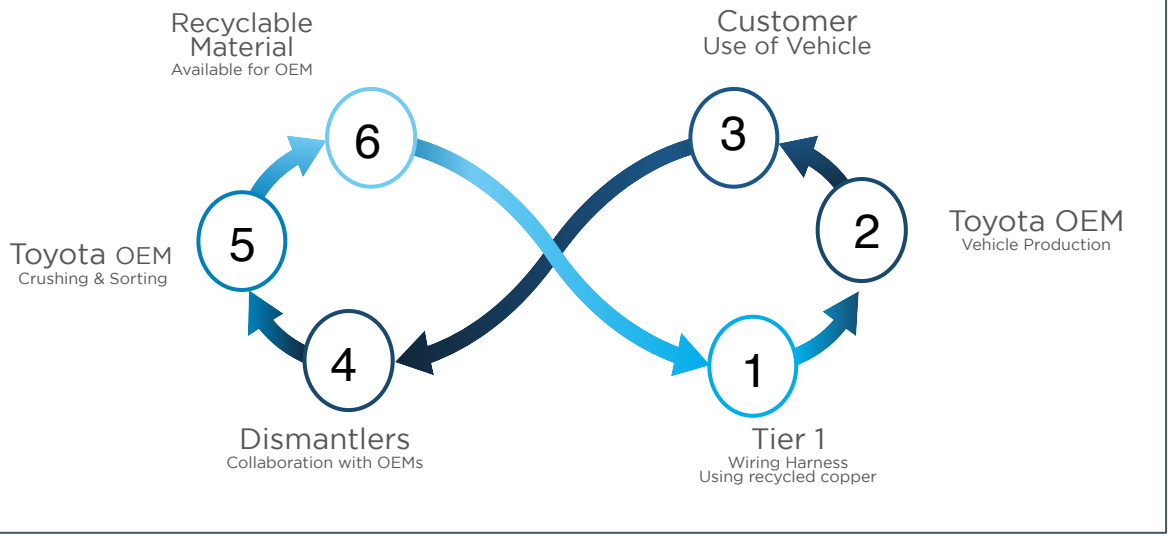
Some raw materials like Aluminium, Copper and Silicon Chips are being Recycled from below ECUs components

Microcontroller	Integrated Circuits	Resistors	Capacitors

Source

Initiative #2 Toyota's Copper Recycling Revolution Drives CE for Wire Harness

Overall Process of Recycling Copper from Wire Harness of an Automobile



Impact of the Initiative

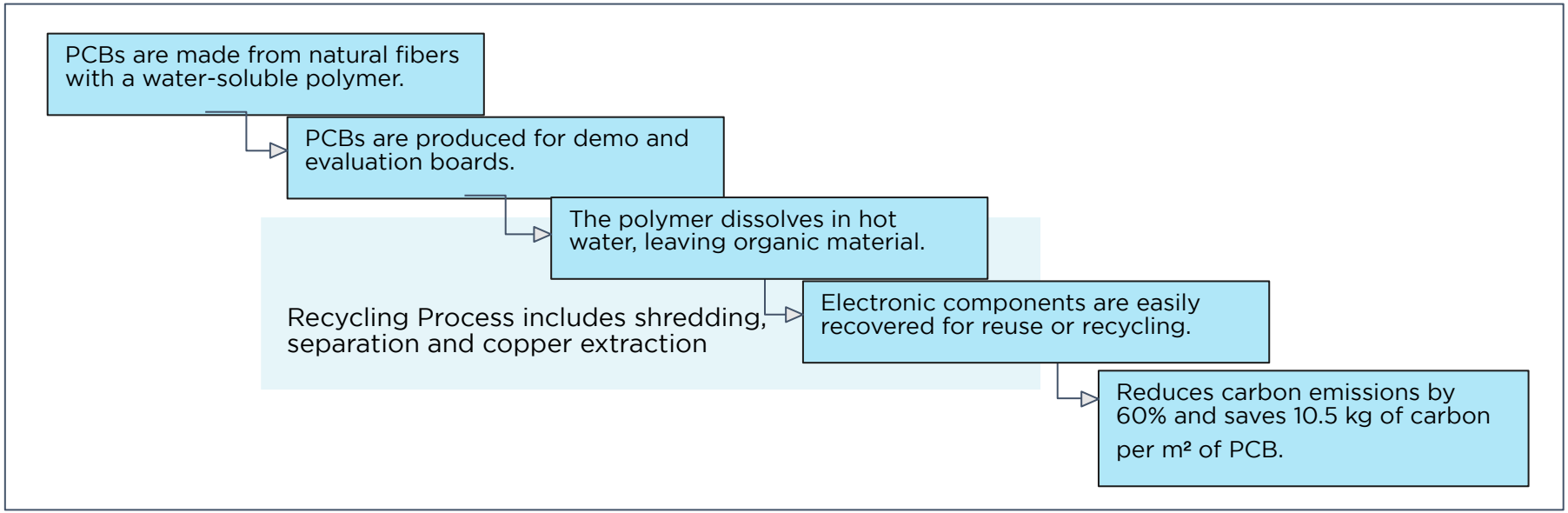
- Recycled copper achieves 99.96% purity making it suitable for reuse in vehicle production.
- Toyota recovers up to 500 tonnes of copper annually.
- Recycling copper reduces CO_2 emissions by approximately 65% compared to mining and refining virgin copper.

Toyota has developed a pioneering method to recycle copper from vehicle wiring harnesses, achieving a purity level of 99.96%.

Source

Initiative #3 Recycling Technique used by Infineon Technologies for PCBs

Infineon Technologies has initiated a significant move towards sustainability by adopting Soluboard®, a recyclable and biodegradable printed circuit board (PCB), this is a great example Automotive Industry is beginning to experiment.



Replacing traditional FR-4 PCB materials with Soluboard® can lead to a 60% reduction in carbon emissions,which equates to savings of 10.5 kg of carbon and 620 g of plastic per square meter of PCB.

Source

04 / Key Component

Electronics

Power Train

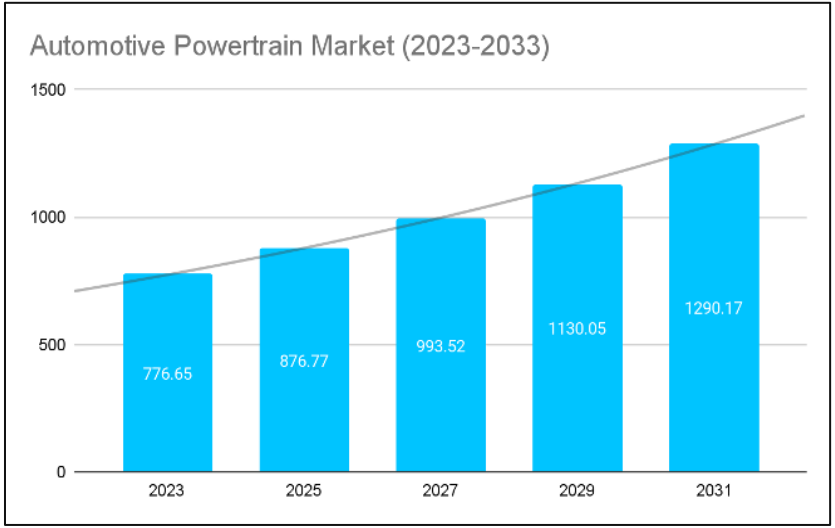
Battery

Plastics

Automotive Powertrain Industry at a glance

Need of Power Train Circularity

- 60% of the total vehicles in Europe will still be powered by ICE by 2040
- ICE powertrains account for 70-75% of a car's environmental footprint
- 80-90% of powertrain components (e.g., engines, transmissions) can be reused or remanufactured
- Adopting circular practices for powertrain can achieve up to 50% reduction in energy consumption during production.



Components inside a Powertrain and raw materials which can be recycled or remanufactured

Engine Block
75-80% Aluminum

Transmission System
65-75% Steel

Exhaust System
70-80% Steel and PGM

Electric Motor
50-60% Steel

Source

Automotive Power Trains: Major R Initiatives and their impact

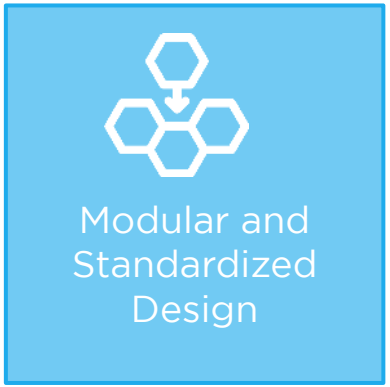
	Engine Block and Transmission System	Aluminum and Steel Raw Materials	Exhaust System Components	Platinum Group Metals
	Remanufacture	Recycle	Remanufacture	Recycle
INITIATIVE	• Extends life of the component by remanufacturing.	• Recycles 20 Million pound of Aluminium Scrap annually.	• Remanufacture exhaust components like DPF.	• BMW recycles catalytic converters, and recycles 90 % palladium.
IMPACT	• 80% Less Energy Consumed • 40% - 50% cost savings	• 95% reduction of GHG • 30% Material Cost Savings	• 75% lesser CO_2 emissions • 30% more cost-effective 3	• 90% energy saved • 40% material cost saving

Engine Block and Transmission System

Exhaust System

Circular economy initiatives in automotive powertrains deliver up to 90% energy savings and 50% cost reductions, driving sustainability and efficiency.

Robust Design of Powertrain is necessary for sustainable Automotive Industry



Designed as modular units to be easily disassembled and replaced

Using advanced metals boosts powertrain durability and ensures easy recycling

Digital twins monitor powertrain components in real time

↑ Scalability for remanufacturing	↓ Downtime and labour cost	↑ Material recovery efficiency	↓ Virgin material use and CO_2 emission	↑ Component life	↓ Repair cost

Adopt modular designs, standardization, and advanced technologies like digital twins, while prioritizing cost-effective, recyclable materials.

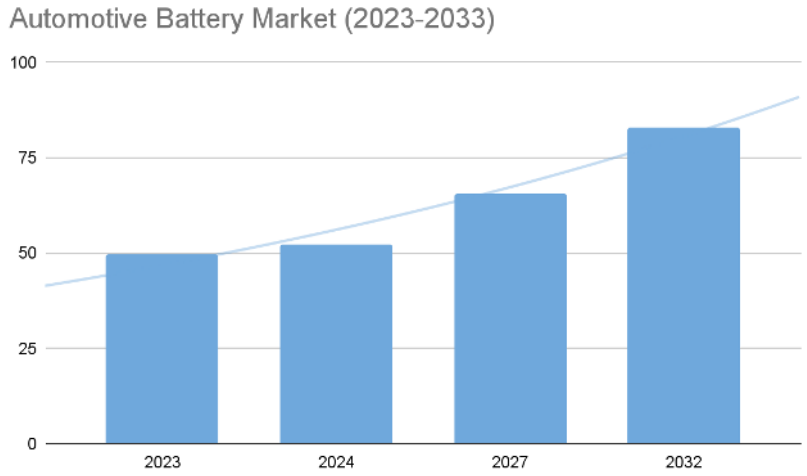
04 / Key Component

Electronics
Power Train
Battery
Plastics

Several factors are projected to drive the growth of the battery market in the future

- Rising EV adoption
- Advancements in battery technology
- Supportive government policies
- Increased investment in sustainable
- Localized production

Market Dominance: Asia Pacific



Source: https://www.fortunebusinessinsights.com/automotive-battery-market-106486

It is vital for us to introduce circularity in this sector as we move ahead.

REDWOOD MATERIALS TOYOTA CATL solid power inside EXIDE TECHNOLOGIES ASCEND ELEMENTS CYLIB tozero

However, several roadblocks are on the way....

Not designed with recyclability in mind - leading to difficult recovery, reuse and the usage of hazardous materials

Current technologies fail to recover critical materials & not uniformly scalable

Fragmented Supply Chain and inefficient collection

Inconsistent global policies

Limited secondary markets

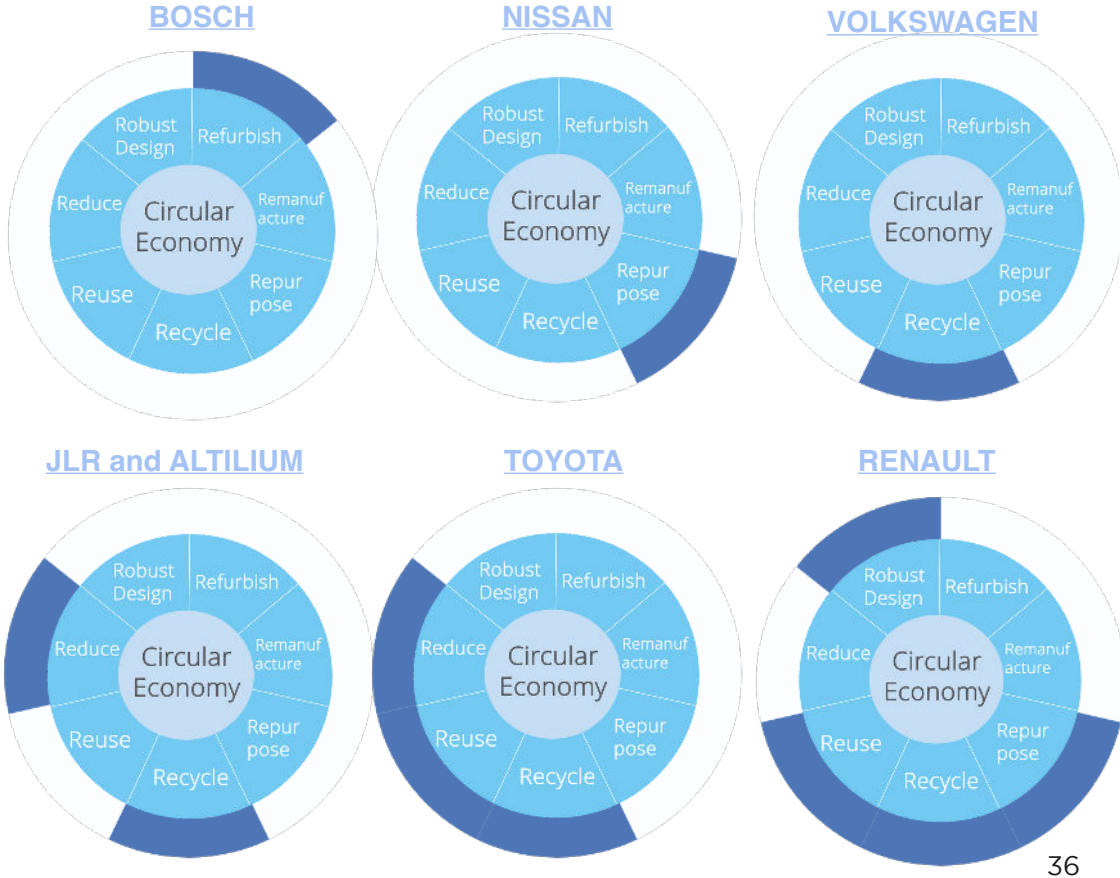
Technological Obsolescence

Source: https://www.fortunebusinessinsights.com/automotive-electronics-market-102840

Companies are creating economic value through different circular economy initiatives

Recalling the Circular Economy framework, composed by the 7-Rs

Is it possible to achieve full circularity by taking inspiration from existing successful initiatives?



These initiatives create the highest impact across the '*Rs*' of the CE value chain

RENAULT

Reuse: Second-Life applications: Renault repurposes used electric vehicle (EV) batteries for stationary energy storage systems.

Impact: Decreasing the need for manufacturing new batteries, leading to significant cost savings.

TOYOTA

Recycle: source Cathode Active Material (CAM) and Anode copper foil from recycling operations. This also feeds into domestic battery production.

Impact: Generates additional revenue streams from refurbished batteries and second-life applications.

BOSCH

Refurbished: Extend the life of automotive components through remanufacturing and second-life applications

Impact: Refurbished and second-life applications provide new revenue streams and expand customer access to sustainable solutions.

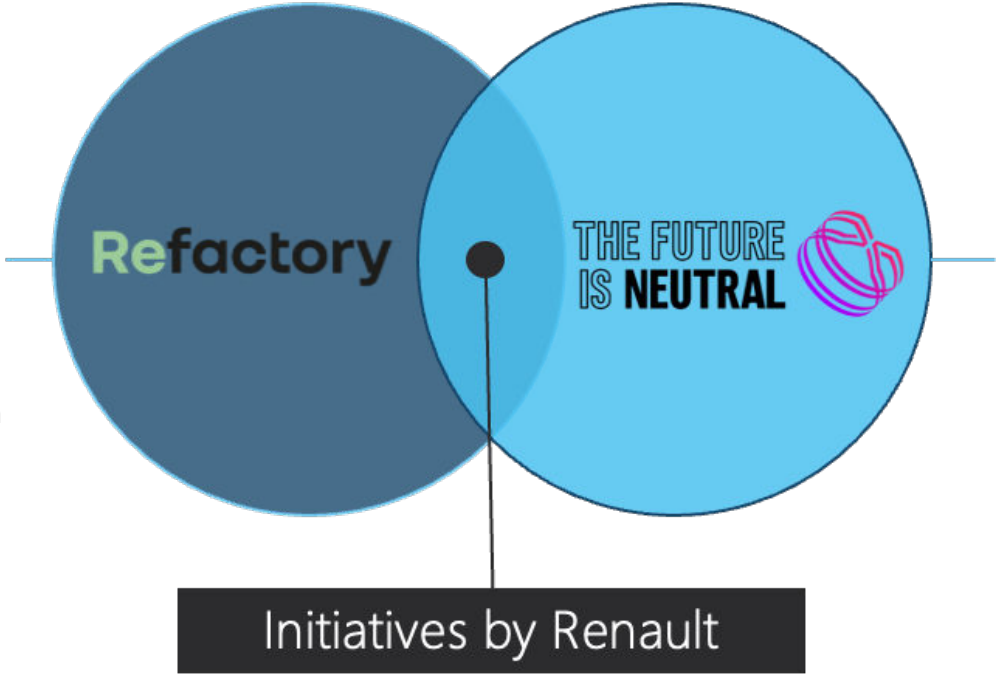
Renault source Toyota source Bosch source

Renault's initiatives are leading the change towards closing the loop in Europe

Designed to reduce waste, extend the life of vehicles and components and minimize environmental impact.

Focusing on:

- Vehicle Refurbishment
- Parts Remanufacturing
- Recycling for carbon neutrality by 2040



Aims to be the industrial and European leader in the closed-loop automotive circular economy.

Focusing on:

- Maintaining the value of parts and materials for as long as possible
- Enabling a much higher rate of recycled automotive materials

Source: The Future is Neutral

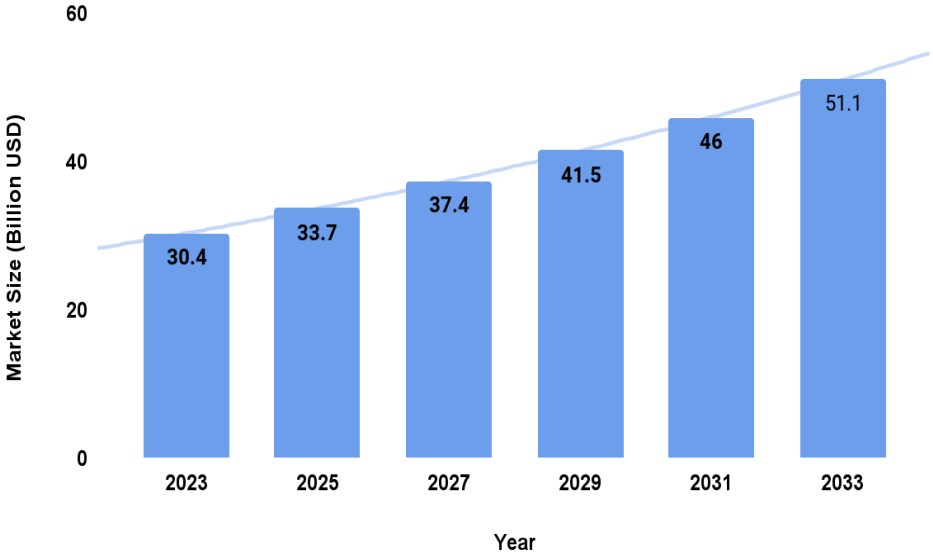
04 / Key Component

Electronics
Power Train
Battery
Plastics

Several factors cause the global automotive plastics to grow in the upcoming years

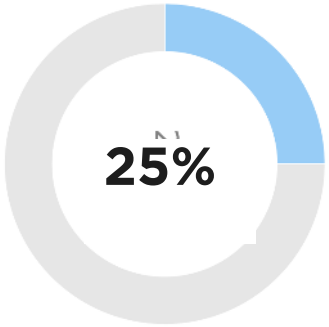
- Growing demand for lightweight vehicles to enhance fuel efficiency
- Advancements in sustainable and high-performance plastic materials
- Cost-effective production and design flexibility
- Increased use of plastics in interior and exterior

Automotive Plastics Market (2023-2033) - Source



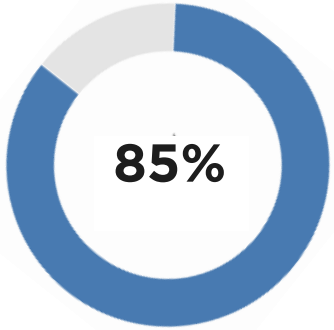
GAIA ECO RECYCLAGE AUTOMOBILE · Valeo · FORVIA Inspiring mobility · OP mobility · REDWOOD MATERIALS · STELLANTIS

But new regulations will force suppliers to invest in new processes in the next 10 years



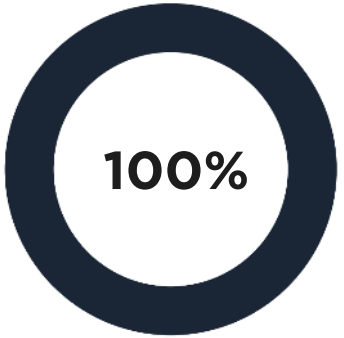
Recycled Content in Plastics by 2030

Minimum 25% recycled plastic in new vehicles. Encourages OEMs to revise supply chains for plastic parts.



Recyclability by Mass by 2025

Vehicles need to be reusable or recyclable to a minimum of 85 % by mass



Zero Waste to Landfill by 2035

OEMs and suppliers must adopt zero-waste processes to minimize environmental impact.

Sources

Plastics in the industry is not fully circular today, due to several loop breakages

Technological Barriers

Current recycling technologies struggle with processing complex automotive plastics and mixed-material components.

Quality Degradation

Recycled plastics often suffer from degradation in quality after multiple cycles, limiting their reuse in high-performance applications.

Design for Recycling (DfR)

Many automotive parts are not designed for easy disassembly and recycling, complicating the recycling process.

Collection & Sorting

Inefficient collection and sorting processes for end-of-life vehicles (ELVs) and plastic waste hinder the supply of recyclable materials.

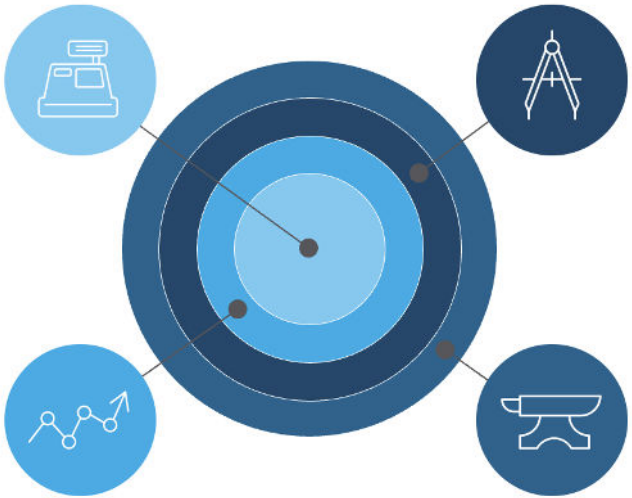
Lack of Standardization

The wide variety of plastics used in vehicles complicates recycling, increasing costs and reducing efficiency.

But players across different layers are building innovative and sustainable solutions

OP mobility
Focuses on recycled plastic components for automotive. Partnered with TotalEnergies to develop innovative recycled solutions.

Forvia
Focuses on sustainable and advanced automotive technologies. Demonstrated the use of ocean recycled plastics in automotive interiors and launched MATERI'ACT to achieve 70% recycled content in new plastics.

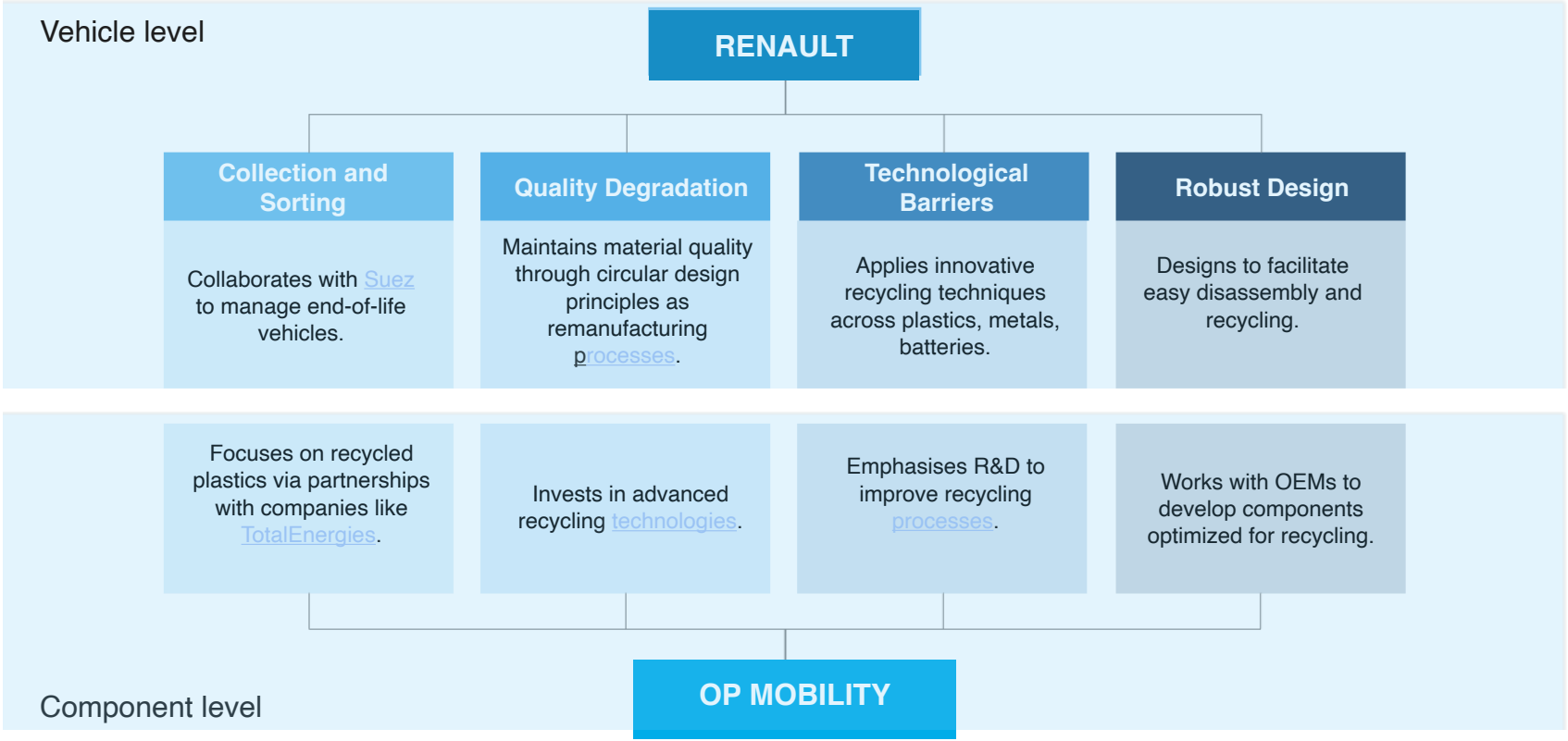


Valeo
a leading Tier 1 supplier, collaborates with OEMs, such as Stellantis, to develop remanufactured automotive parts utilizing recycled materials. They also launched an aftermarket sustainability program "I Care 4 the Planet"

Renault
in its GAIA site, created a hub for CE practices, focusing on dismantling, recycling, and remanufacturing end-of-life vehicles (ELVs) and components e.g. polypropylene for bumpers.

Other sources: *Circularity in the Automotive Industry, Deloitte (2023)*

Renault and OP mobility as benchmarks to grasp how players address breaks in the loop

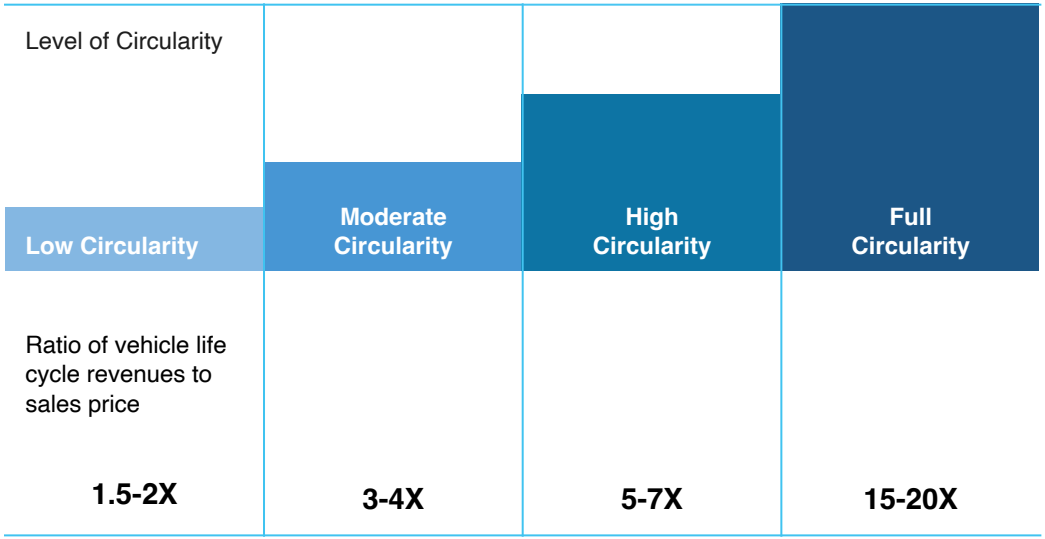


05 / Next steps

There’s a need to focus on 3 major pillars to explore the complete potential

Total automotive value chain revenues accrued over the life cycle of a vehicle relative to the sales price source

- Embracing new consumer trends
- Creating new revenue streams
- Facilitating EU suppliers to comply to regulations



Recommendations are built on the strengths of the industry, to combat threats and capitalise on the opportunities

Use existing infrastructure to enable quick, cost-effective implementation

- Existing Infrastructure
- Clear Industry Impact
- Incentives for Adoption
- Regulatory Alignment
- Consumer willingness to pay

Address collaboration challenges by standardizing materials and aligning OEM efforts.

- Initial Costs
- Coordination Hurdles
- Consumer Awareness
- Scalability Issues
- Lack of quality recycled products

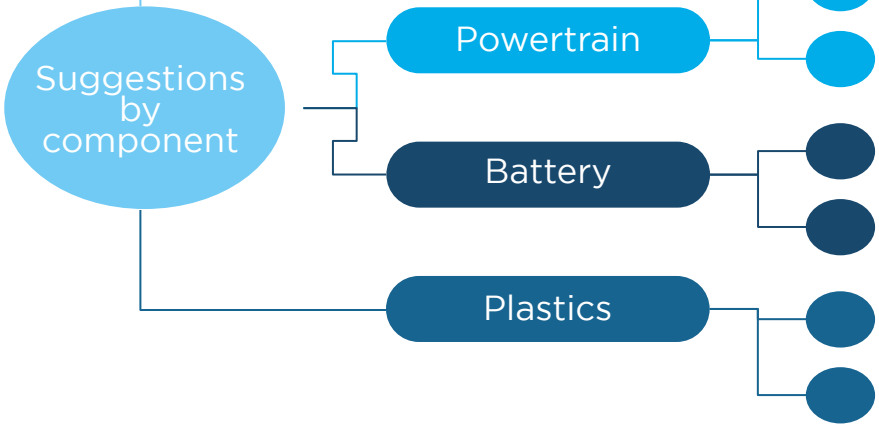
Meet growing consumer demand for sustainability with reduced VAT on refurbished parts.

- Market Leadership
- Cost Savings
- Consumer Demand
- Public-Private Partnerships
- Newer Business Models

Partner with recyclers and tech providers to bridge technological gaps and scale solutions.

- Regulatory Uncertainty
- Technological Gaps
- Market Resistance
- Supply Chain Disruptions
- Uncertainty of results

The various R's can be operationally implemented across various components



Robust Modular Designs for Manufacturing needs to be Implemented

Recycle smarter by adapting to innovation and leveraging the latest advancements

Reduce utilization by Implement blockchain to track powertrain components' lifecycle for traceability

Robust modular powertrain designs where components can be easily swapped, reused, or repurposed

Recover materials efficiently using traceability technologies at the formal source to monitor batteries

Robust design and standardization for retrofitting at the end of life of the batteries

Reuse materials by Partnering with local companies that produces plastics waste (eg. Ford with HP)

Recycling quality must be enhanced and by collaboration between Public authorities and recycling stakeholders to build consumer trust in recycled materials.

Case Study by component: Components on a leasing model to recover materials efficiently at the right source*

*The battery industry is taken into account

Drive Sustainability And Cost Efficiency
Will enable OEMs to recover high-value materials, reuse and recycle batteries efficiently .

30-40% Reduction in production cost by reusing materials and reducing reliance on newly mined raw materials

Unlock Recurring Revenue
Leasing will create consistent income streams for OEMs.

20-30% Additional revenue per battery life cycle can be generated due to the recurring nature and services

Affordable Ownership
Will Lower upfront cost for consumers, driving sales

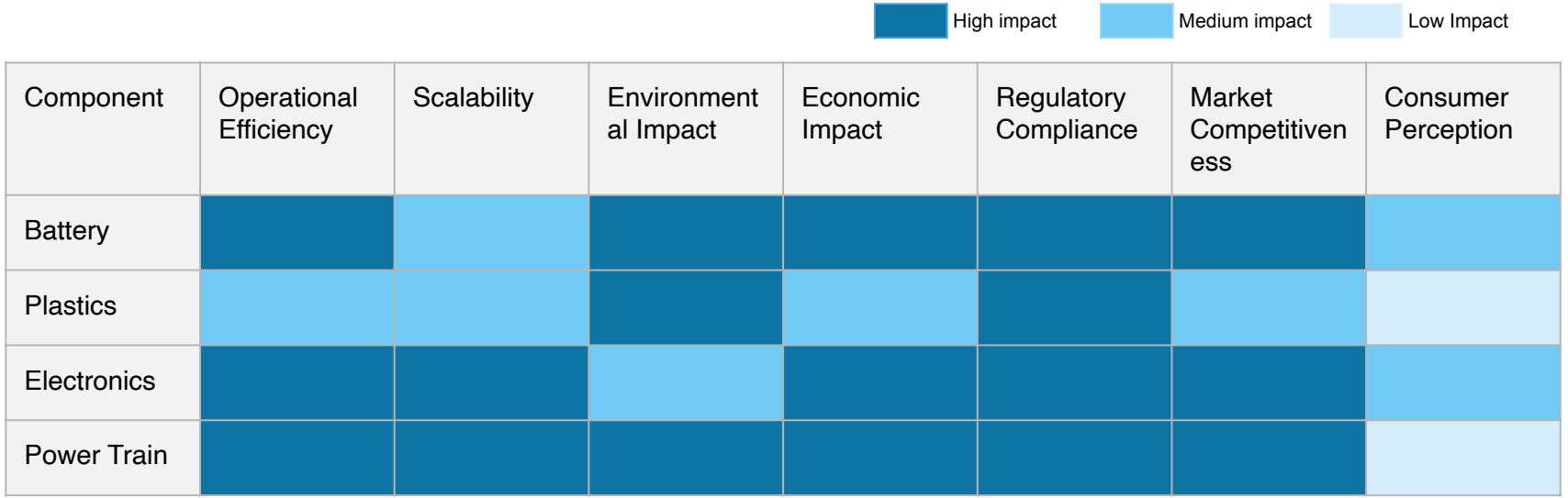
15-20% Reduction in upfront cost for consumers on purchase

Call To Action

- **Build** strong partnerships for material recovery.
- **Adopt** tracking tech to optimize performance.
- **Refine** leasing models with key metrics.
- **Educate** consumers on leasing benefits.
- **Standardize** battery design for reuse.

Source

Recommendations for each component impact Circular Economy key drivers differently



- Battery has strict regulatory compliance and potential cost savings from recycling and second-life applications also drive impact in environment and competitiveness
- Plastics has moderate impact due to challenges in achieving high-quality recycling and scalability, but with limited direct consumer influence
- Electronics has high impact for the increasing electronics content in cars, strong potential for operational efficiency (e.g. modular design) and regulations on hazardous material and recycling
- Powertrain has high impact due to its carbon footprint, potential for energy savings through remanufacturing but with limited direct consumer influence

Roadmap

Various elements at the value chain will make an impact at a different point in time

OEM & Tier 1

Increase the use of renewable and recycled materials, such as bio-based steel and aluminum.

Develop standardized components to enable efficient recycling and reuse.

Public Authorities

Push for regulatory measures to promote quality recycling and build consumer trust in recycled products.

Global Automotive

Transform authorized service centers into multi-use facilities for repair and refurbishing.

Join organizations advocating for circular economy practices.

OEM

Introduce business models for material recovery while focusing on robust designs and standardizing components to enhance recyclability.

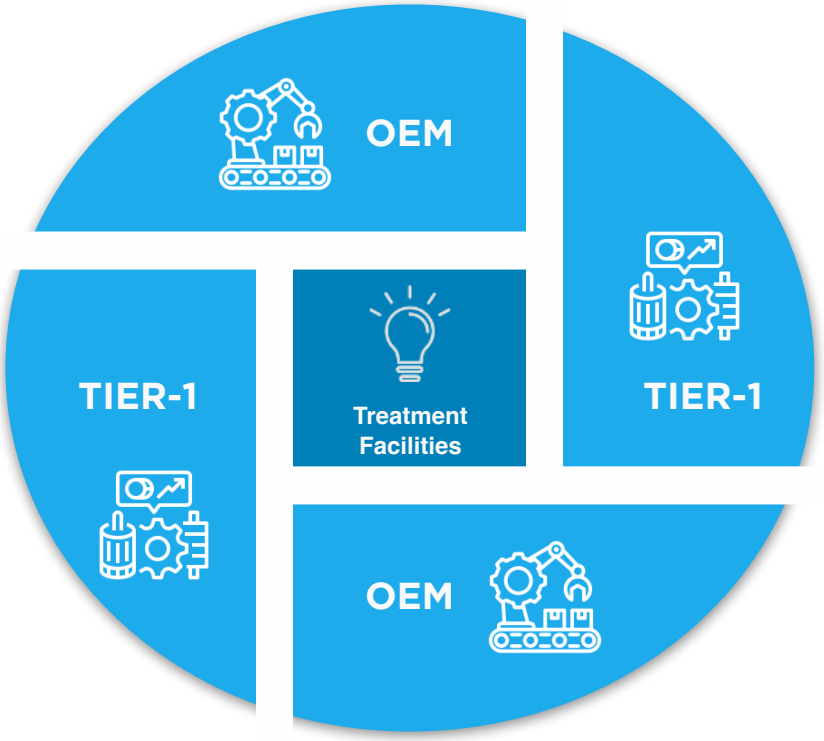
Public Authorities

Provide incentives like tax breaks, grants, or subsidies to drive the adoption of circular practices, improve recyclability, and innovate remanufacturing techniques.

OEM & Tier 1

Collaborate to create treatment facilities for material recovery by aligning designs and remanufacturing standards.

Case study: Strategic collaboration between OEM's and Tier1 for Recycling Ecosystems



Consumer Incentives

- Discounts on new vehicles for returning end-of-life vehicles.
- Lower prices for refurbished components
- Warranties similar to those for new parts, ensuring consumer confidence in recycled materials.

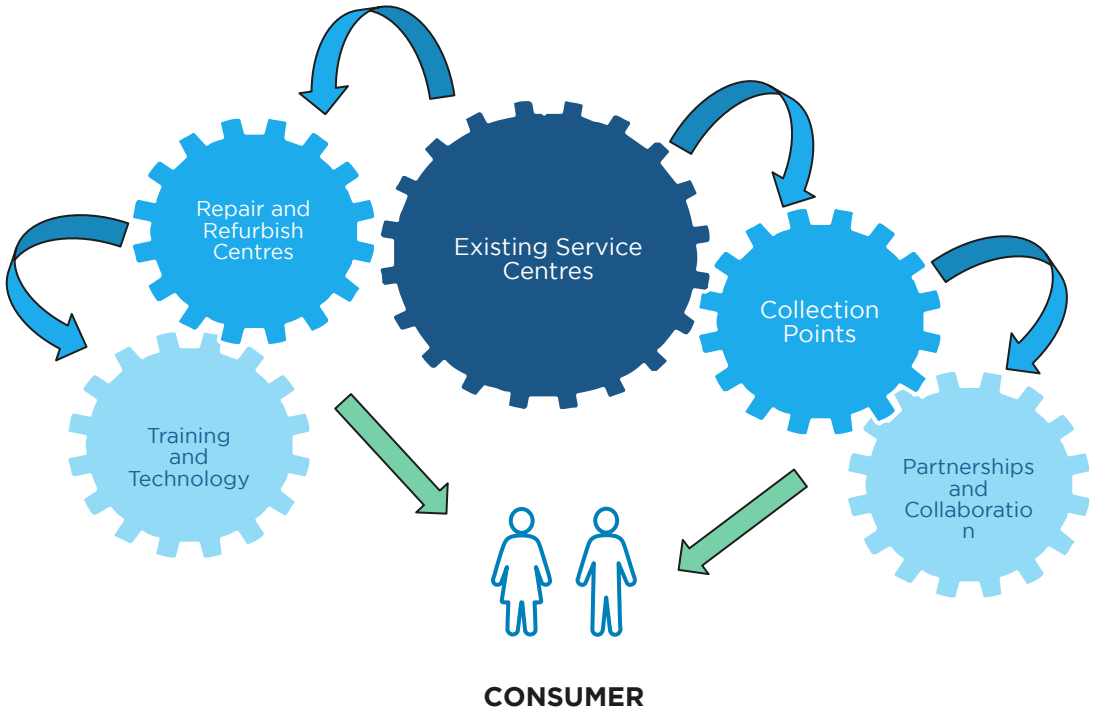
Case study: Repurposing Service Centers into Multi-Utility Recycling and Refurbishment

Collaborate with recyclers and technology providers to handle material recovery.

Equip service centers with tools and technologies for dismantling, sorting, and refurbishing components.

Use digital platforms to track the lifecycle of components and ensure traceability.

Build awareness and give consumers incentives to reach a partnered service centre



Market Insights

Key interviews

Interview insights from testimonials of the industry

"With only 15–17% of vehicle materials recycled, particularly plastics and copper, success hinges on increasing recycled components. Limited access to raw materials in Europe highlights the need to enhance recycling and reduce reliance on virgin resources."

Jean- Philippe Bahuaud - CEO of The Future is Neutral

"Achieving circularity in the automotive industry requires collaboration and shared incentives to drive collective progress and close the loop."

Catherine Leleu - Directrice Business Dev Refractory, The Future is Neutral

"Achieving circularity in the automotive industry demands collaboration and shared incentives to drive progress and close the loop."

CEO - Prominent Battery Solutions Organization

Key Takeaways

Prioritize Batteries: Localize black mass refining; innovate recyclable designs

Boost Material Recovery: Advance technologies for plastics, copper, and metals

Only 15–17% of vehicle materials are recycled.

Success depends on increasing recycled components.

Collaborate for Scale: Build joint ventures across sectors to accelerate circularity

Interview insights from testimonials of the industry

"Drive the circular economy by fostering collaboration among OEMs, suppliers, and policymakers, implementing incentives like lower VAT on recycled products, and addressing both IC vehicles and EV components for a sustainable automotive future."

Alain Nay - Directeur des pôles APV et Economie Circulaire @ Mobilians

"Though circular battery design involves initial costs, it offers long-term benefits such as lower lifecycle costs, sustainability, and resilience, with direct recycling preserving high-value components. The biggest challenge for small volumes lies in the handling of the batteries, which is why local recycling management is preferred. Optimizing the initial stages of the recycling process is crucial to ensure the final product's quality, allowing it to either re-enter the battery supply chain or be used for other purposes."

Anonymous- Ph.D Life Cycle Assessment Battery @ Automotive Company

"Renault prioritizes electrification and battery performance to extend life and enable second-life uses. Through 'Robust Design' and sustainable innovations, Renault reduces waste, enhances efficiency, and drives competitive differentiation."

Bruno R.S De Camargo - Ex-Engineering Lead @ Renault Group

Key Takeaways

Circular battery design reduces lifecycle costs and enhances sustainability

Boost Material Recovery: Direct recycling preserves high-value components

Focus on battery performance and second-life uses

Drives competitiveness through sustainable innovation.

Only 20 parts of the car is able to be remanufactured, refurbished, reused in France.

07

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