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# Mobility 360° – Sustainability for competitiveness

A perspective on sustainability in the automotive sector

September 2023





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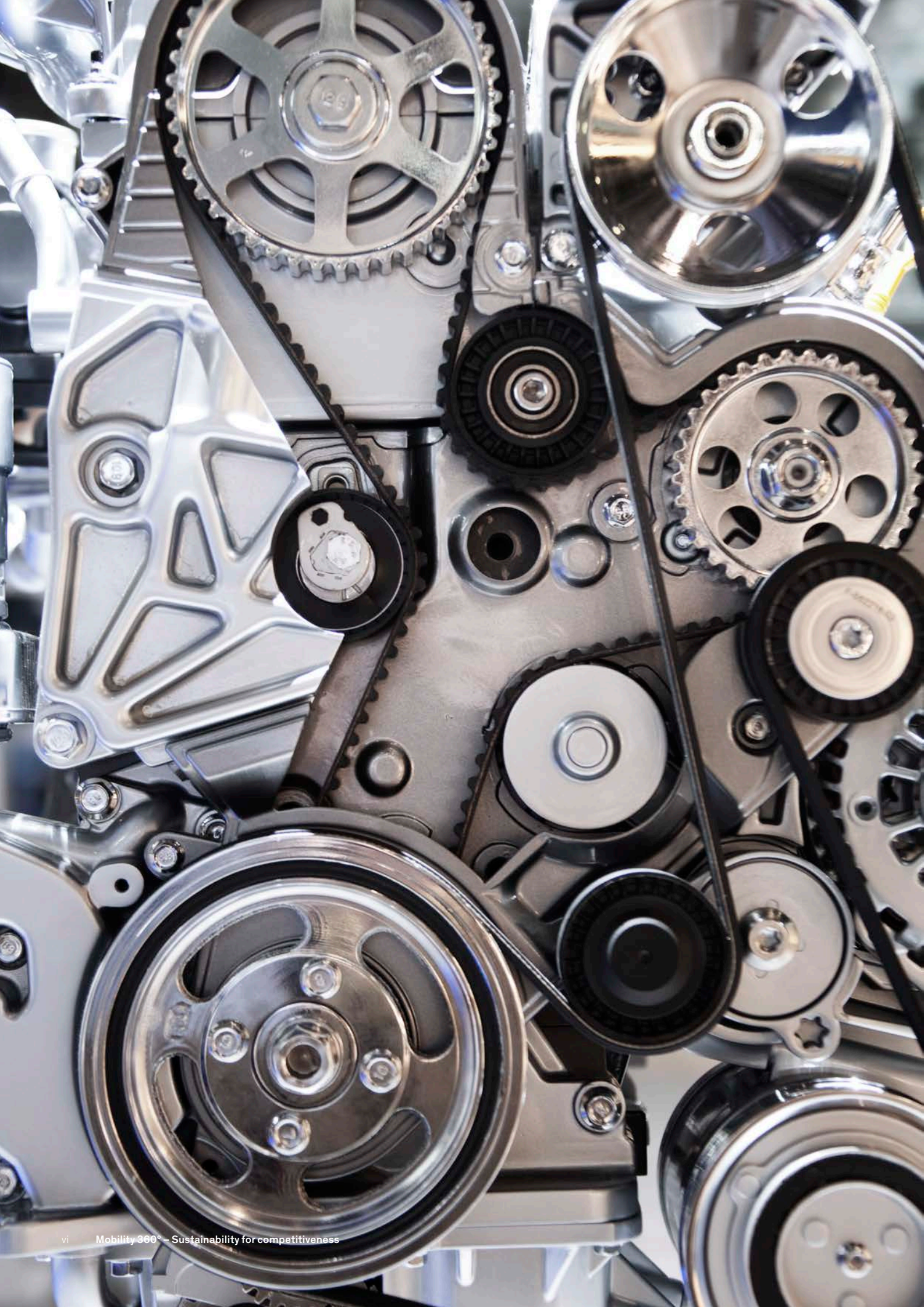
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# Executive summary

India is aspiring to achieve net zero by 2070. A pillar of India's economy, the automotive and auto-ancillaries industry contributes 2.1 percent of national GDP, and basis its manufacturing volumes, is also responsible for around 1.4 percent of India's overall greenhouse-gas (GHG) emissions.<sup>1</sup> Raising the bar on sustainability as an industry could help the sector not just make a difference to India's net-zero journey, but also help companies generate growth and value.

## The growing importance of sustainability

As climate change concerns intensify around the world, customers, regulators and investors are demanding more sustainable practices from the automotive and auto-ancillary industry. Regulatory policies are growing (from around 100 policies in the early 2000s to around 900 today) to hasten the pace towards net zero. For example, SEBI's Business Responsibility and Sustainability Reporting (BRSR) format requires all listed companies in India to disclose various ESG metrics. As governments around the globe introduce new sustainability policies, Indian automotive suppliers may strive to be future-ready from a compliance standpoint to be able to serve these markets. Investment money is moving fast towards sustainability, with sustainability-led funds growing in India at a CAGR of 120 percent between 2019 and 2021, and investments exceeding INR 10,000 crore locked in just in the first half of 2023.

With this growing thrust on sustainability all around the world, companies worldwide and in India are also prioritizing the topic. Over 180 Indian companies have adopted decarbonization targets verified by the Science Based Targets initiative.<sup>2</sup> Their efforts focus heavily on controlling their Scope 1 and 2 emissions, while encouraging their suppliers to bring down Scope 3 upstream emissions.

## An imperative and an opportunity

Sustainability is not an imperative alone, it could also make good business sense. As automotive and auto-ancillary companies consider the path forward, they could limit themselves to "playing defence" (minimum compliance) or could choose to "play offence" – going beyond compliance to actively create value for their business, especially by tapping new business opportunities (e.g., remanufacturing, refurbishment, and repair, etc.), cultivating sustainability qualification-led growth (e.g., compliant companies could have a higher number of RfQ successes), and attaining sustainability-led cost reduction (e.g., decarbonization and recycling are likely to help reduce costs). These initiatives could help them raise their valuation by 20 to 30 percent across EBITDA and multiples.

## The path ahead: Energy decarbonization and material circularity

The path to sustainability has two important themes for automotive suppliers – energy decarbonization and material circularity.

**Energy decarbonization:** Companies could pursue the energy transition by seeking scalable, cost-efficient alternatives to their highest-emission energy sources. Even by 2030, grid power could be predominantly coal-based (at around 57 percent), making it important for suppliers to find an accelerated path to decarbonization.<sup>3</sup>

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<sup>1</sup> Science Based Targets initiative, companies' ESG/Sustainability reports on Scope 1-3, 2022

<sup>2</sup> Science Based Targets initiative

<sup>3</sup> *Decarbonising India: Charting a pathway for sustainable growth*, McKinsey & Company, 27 October 2022

The different alternatives available vary in technical feasibility, and companies could use the solution sets outlined in Chapter 3 of this report to identify the options that work best for them – beginning with implementing rooftop solar and installing VFDs, and group captives, which have effectively reduced GHG emissions and operating costs for various companies in India.

**Material circularity:** This could increase top line by 10 to 20 percent, reduce costs by 5 to 10 percent, cut down virgin-material use by 20 to 40 percent, and decrease carbon emissions by 50 to 70 percent. The four loops – recycle, refurbish, resell/rent and repair – extend the period that materials remain within the system, cutting emissions and costs. The market opportunity for automotive component circularity by FY30 could be USD 3.8 to 5 billion, across three themes – material recirculation, circular product design and repair, care and refurbishment services.

Promoting material circularity in India could call for overcoming the many barriers that complicate circularity – insufficiently organized recyclers, higher costs, low recovery rates (for e-waste and reusable parts), and demand for recycled products as well as hard-to-recycle components. This could change over time, with supportive policy and regulatory support (e.g., Vehicle Scrappage Policy, 2022), improved recycling economics, and advancements in recycling technologies. More and more companies working towards circularity could inspire cooperation and competition. And finally, material circularity through recycled materials could also boost local availability, reducing supply-chain risk.

## Stakeholders as enablers

Mitigating the impact of industrial processes to protect the environment and operate with a high sustainability quotient in India is likely to be a team effort among all stakeholders.

OEMs could support suppliers in their sustainability journey by setting up timely decarbonization targets and helping them create a roadmap towards net zero. OEMs could also provide targeted support such as access to renewable energy, support on material circularity, etc. The government could explore further strengthening reporting regulations and implementing more policies or subsidies to promote a circular economy. Automotive industry bodies could develop scalable sustainability frameworks, foster capability building and collaboration for innovation, and recognize suppliers who lead the way on sustainability metrics. And private entities such as financial institutions, energy providers and private-equity firms could create a conducive environment for these transitions.

**Auto component manufacturers or suppliers** could be at the forefront of this transformation by prioritizing sustainability, investing in energy transition initiatives and working closely with OEMs to drive circularity and invest in green business. The right strategic approach, supported by frameworks to address the most feasible drivers for change, could help make a difference by embedding sustainability in industrial practices and also unlocking significant value.





# 1. The growing importance of sustainability

India has declared its commitment to attaining net zero by 2070, and there is momentum to keep pace with global leaders determined to tackle the sustainability agenda.<sup>4</sup> The automotive and auto-ancillaries industry is a pillar of India's economy. It contributes USD 70 billion, or 2.1 percent of the GDP and provides employment to 5 million people – 1.1 percent of the nation's total labour force.<sup>5</sup> The industry is responsible for around 4.5 percent of India's merchandise exports – a significant portion of the country's manufacturing output.<sup>6</sup>

In proportion with this scale, the sector's Scope 1 and 2, and Scope 3 upstream emissions contribute to around 1.4 percent (45 million metric tons of CO<sub>2</sub> equivalent, or CO<sub>2</sub>e) of India's overall annual greenhouse-gas (GHG) emissions.<sup>7</sup> Tailpipe emissions constitute 7 to 8 percent of India's overall emissions.<sup>8</sup> Embedding sustainability priorities across the value chain could help the sector not just make a difference to India's net-zero journey, but also help companies generate growth and value.

## A global thrust on sustainability

As climate change concerns impact countries around the world, regulators, customers, investors and even employees in recent years have grown more insistent in demanding that automotive and auto-ancillary companies run sustainable operations.

- **Rapidly evolving customer expectations prompting decarbonization commitments:** Both original equipment manufacturers (OEMs) and, in turn, their suppliers, have responded to customers' high expectations on sustainability by raising the bar on their decarbonization aspirations. Overall commitments have grown eightfold since 2020.<sup>9</sup>
- **Tighter regulations:** Regulatory frameworks and policies are growing increasingly stringent, with the number of ESG-related policy instruments globally growing 47 percent between 2019 and 2022.<sup>10</sup>
- **Increasing investor activism:** With ESG investing gaining traction globally, the total sustainable funds flow saw 94 percent CAGR between 2018 and 2021.<sup>11</sup>
- **Evolving employee preferences:** As awareness of environmental concerns has grown, employees want to believe that their organization is working towards decarbonization – 64 percent of employees express a stronger inclination towards working for companies with well-defined environmental policies.<sup>12</sup>

These expectations prompt urgency to achieve net zero. Meeting them could be the core challenge for the global automotive industry over the next decade. Both OEMs and governments are taking initiatives to overcome this challenge.

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<sup>4</sup> Climate Action Tracker, accessed July 2023

<sup>5</sup> 'Annual Industry performance review', press release by ACMA, 7 August 2023; IMF: World Economic Outlook (WEO) Database, October 2021, International Labour Organization 2022

<sup>6</sup> 'Annual Industry performance review', press release by ACMA, 7 August 2023; United Nations Conference on Trade and Development

<sup>7</sup> 'Annual Industry performance review', press release by ACMA, 7 August 2023; Ministry of Statistics and Programme Implementation, India, UNFCCC – India's NDC (Nationally Determined Contribution) BUR-3 report 2021

<sup>8</sup> McKinsey India Decarbonization Scenario Explorer (DSE) analysis as published in *Decarbonising India: Charting a pathway for sustainable growth*, 27 October 2022

<sup>9</sup> Science Based Targets initiative, companies' ESG/Sustainability reports on Scope 1-3, 2022

<sup>10</sup> United Nations Principles for Responsible Investment, 2022

<sup>11</sup> Global Sustainable Fund Flows, Morningstar, Q2, 2023

<sup>12</sup> 'Future of the sustainable workplace', a Unily Census, 2020

## The role of OEMs

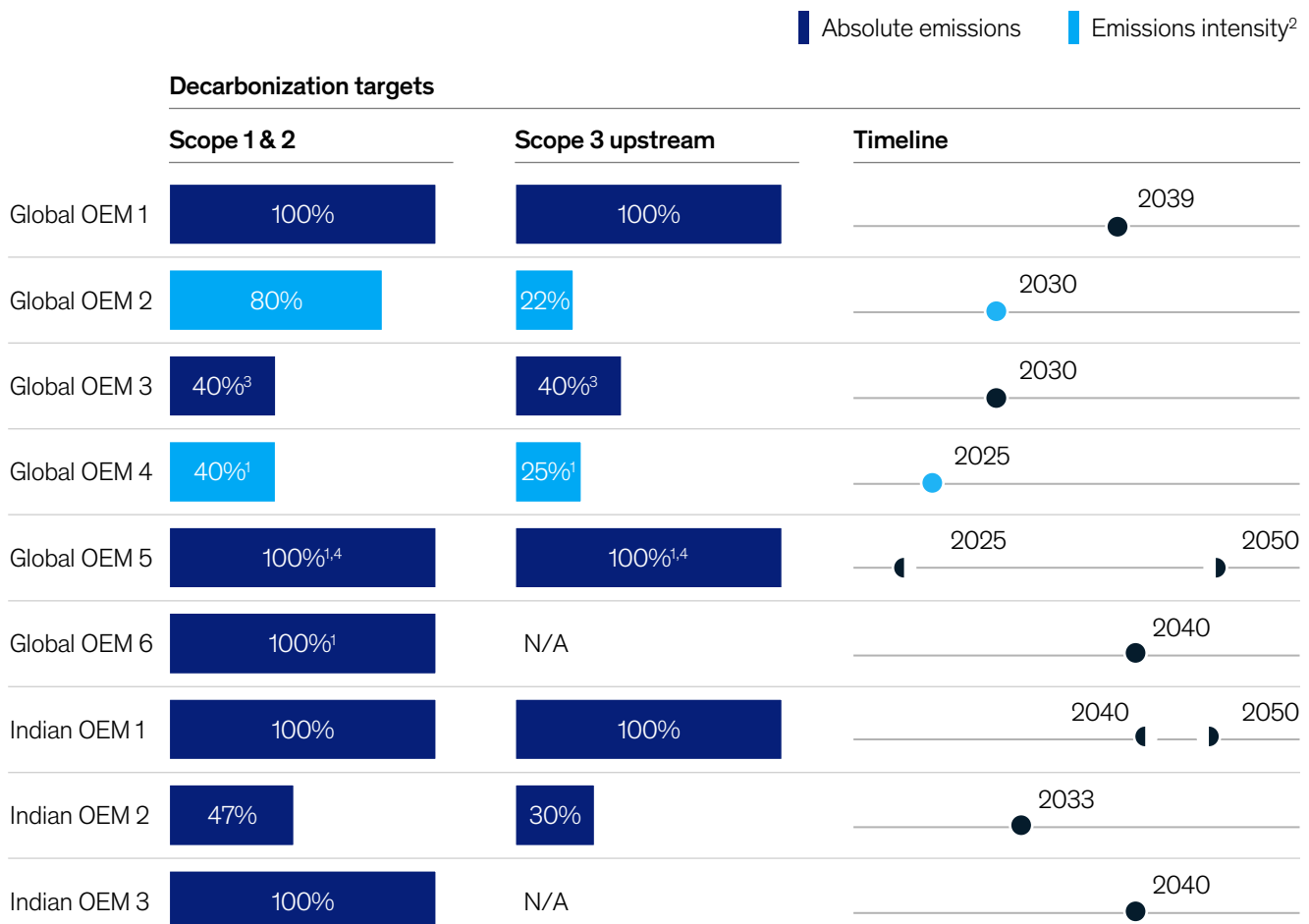
Across geographies, OEMs are setting upstream decarbonization targets, committing publicly to reduce emissions across Scope 1 and 2, and Scope 3 upstream emission,<sup>13</sup> with tight timelines (Exhibit 1).<sup>14</sup> In India, a few leading OEMs are at the forefront of the industry’s sustainability efforts, setting targets that, while less ambitious than their global counterparts, still demand concerted action. Achieving these targets is not in the hands of the OEMs alone but will require the intervention of suppliers, especially to reduce Scope 3 upstream emissions.

<sup>13</sup> Scope 1: Direct GHG emissions from sources owned or controlled by the company (e.g., facilities, fleet); Scope 2: GHG emissions indirectly resulting from the generation of electricity, heat, or steam purchased by the company (e.g., energy used to operate manufacturing plants); and Scope 3 Upstream: GHG emissions from sources not owned or directly controlled by the company, but related to its supply chain activities upstream (e.g., parts manufacturers, raw material procurement vendors)  
<sup>14</sup> OEMs’ sustainability reports; Company annual reports; Science Based Targets initiative

Exhibit 1

Non-exhaustive

**OEMs across geographies are setting upstream decarbonization targets, which can only be met through suppliers’ interventions, especially for Scope 3 upstream.**



<sup>1</sup> Not approved by Science Based Targets initiative

<sup>2</sup> Relative to different base years.

<sup>3</sup> Joint goal for all scopes.

<sup>4</sup> Only plants.

Scope 1: Direct GHG emissions from sources that are owned or controlled by the company (e.g., facilities, fleet, etc.).

Scope 2: GHG emissions indirectly from generation of electricity, heat or steam purchased by the company (e.g., energy used to operate manufacturing plants).

Scope 3 Upstream: GHG emissions from sources not owned or directly controlled by company but related to its supply chain activities (upstream).

Source: Company websites, company sustainability reports, Science Based Targets initiative, company sustainability report on scope 1-3

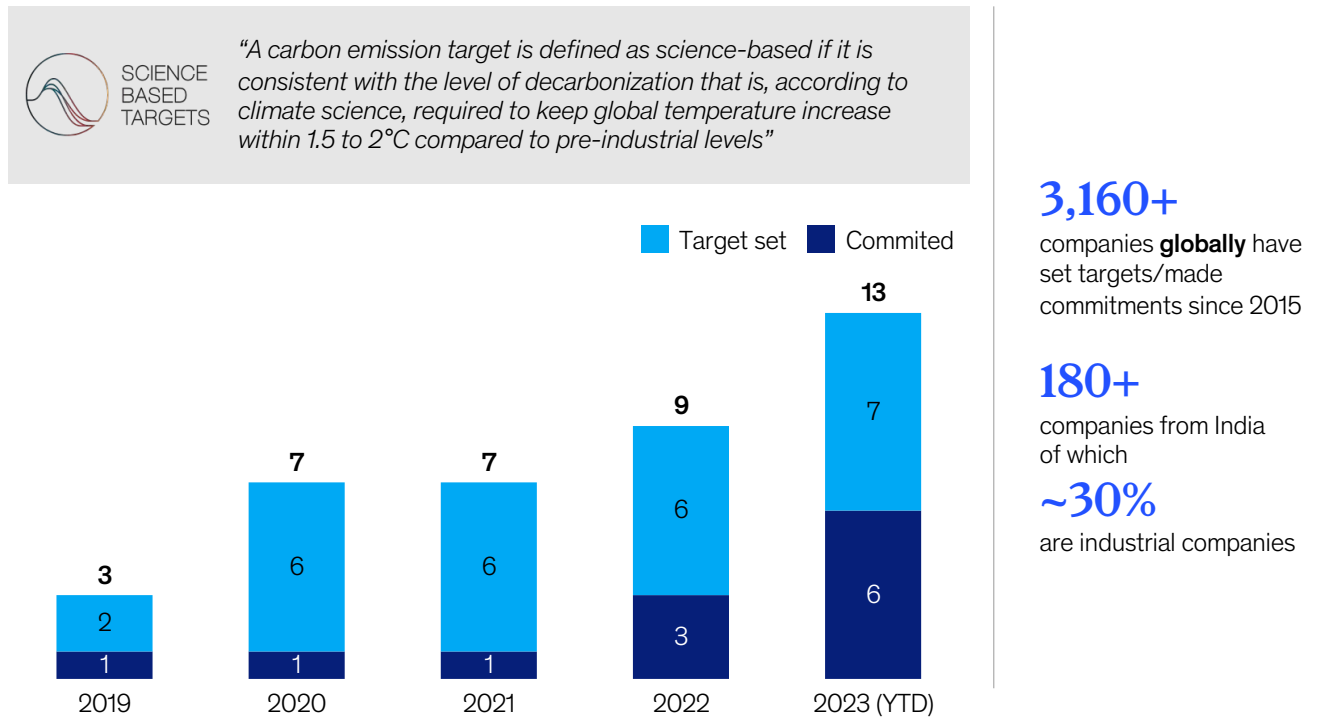
In India as well, automotive companies have made commitments toward decarbonization, including setting targets verified by the Science Based Targets initiative (Exhibit 2).<sup>15</sup> Since 2015, over 3,000 companies globally have set targets or made decarbonization commitments. Over 180 of these are from India.

Exhibit 2

## Automotive companies in India are making climate commitments, including setting targets verified by the Science Based Targets initiative.

As of August 2023

### Cumulative number of Indian automotive companies<sup>1</sup> engaging in the science-based targets initiative



<sup>1</sup> Automobiles and auto components sector

Source: Data retrieved in August 2023, cumulative numbers for targets published on the website of Science-Based Targets initiative, McKinsey

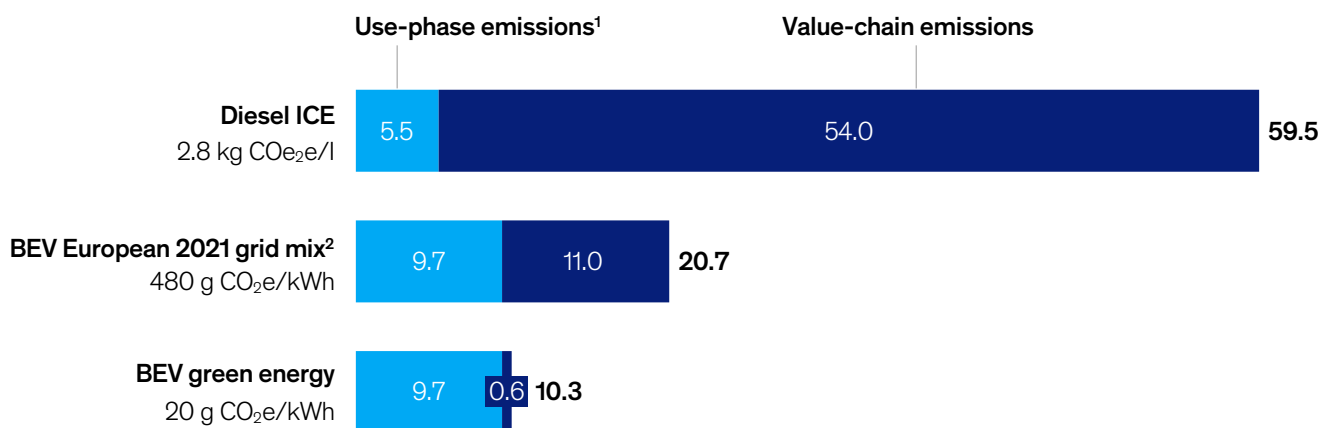
Both in India and the world, emissions across the value chain are emerging as the next frontier of action for OEMs. The phrase “value-chain emissions” encompasses the aggregate emissions accrued across the entire value chain during the end-to-end manufacturing process of a vehicle. “Use-phase emissions” are the outcome of vehicle usage over its entire on-road lifecycle.

Use-phase emission levels could drop as adoption rates for electric vehicles rise slowly but steadily over the next few decades. However, value-chain emissions could steeply rise with growing electrification (Exhibit 3), especially with the usage of materials that are typically known as high emitters, such as aluminium and battery-active materials.<sup>16</sup> To unlock the benefits of zero-emission vehicles (ZEV) and reduce carbon emission levels, it will be important to undertake decarbonization efforts across the value chain. This means breaking down emission targets at the component level, which results in OEMs cascading their Scope 3 upstream decarbonization targets to their suppliers.

<sup>15</sup> Science Based Targets initiative (SBTi)

<sup>16</sup> McKinsey Electric Vehicle Index: Europe cushions a global plunge in EV sale, 2020

**Value-chain emissions could rise with growing electrification and are emerging as a focus area for the automotive industry.**



<sup>1</sup> Use-phase emissions including fuel/electricity production, fuel consumption (real-world values), and maintenance; based on a lifecycle mileage of 243,000 km with 18 years vehicle lifetime for a lower medium-segment passenger car.

<sup>2</sup> Lifecycle GHG emissions of the vehicle's lifetime average electricity mix for a 2021 car, based on IEA's Stated Policy Scenario and Sustainable Development Scenario as well as renewable electricity mix of solar and wind energy.

Source: 'Mobility's net-zero transition: A look at opportunities and risks', McKinsey & Company, 25 April 2022

### The role of regulators

Over the last few years, governments around the world have rolled out a growing number of ESG policies and regulations (Exhibit 4). At the turn of the century, these numbered fewer than 100 regulations across the world, but now the count stands closer to 900.<sup>17</sup>

Some of these regulations have direct implications for Indian auto component manufacturers. For example, the Securities and Exchange Board of India (SEBI) has mandated the implementation of the Business Responsibility and Sustainability Reporting (BRSR) format,<sup>18</sup> which establishes links between the financial results of a business and its ESG performance. While at the outset (start of FY23), the top 1,000 listed entities in India (by market capitalization) were required to submit filings in accordance with the BRSR, by July 2023 this applied to all listed entities.

This move aligns with the KPIs outlined in the BRSR. It seeks disclosures from listed entities on their performance against the nine principles of the National Guidelines on Responsible Business Conduct, dividing reporting into essential and leadership indicators (voluntary to report).

While the responsibility for reporting lies with the listed companies, there could be repercussions for value-chain partners, too, if they fail to meet certain criteria. Failing to disclose essential BRSR outlined ESG KPIs or not being aligned with the sustainability policies of the listed company could have serious consequences, including the risk of losing business. These considerations could be an important determinant of business continuity, especially for small and medium-sized enterprises (SMEs) that supply to prominent public OEMs. Their customers could now expect greater transparency around ESG compliance, prompting them to pay more attention to tracking and disclosing their ESG metrics.

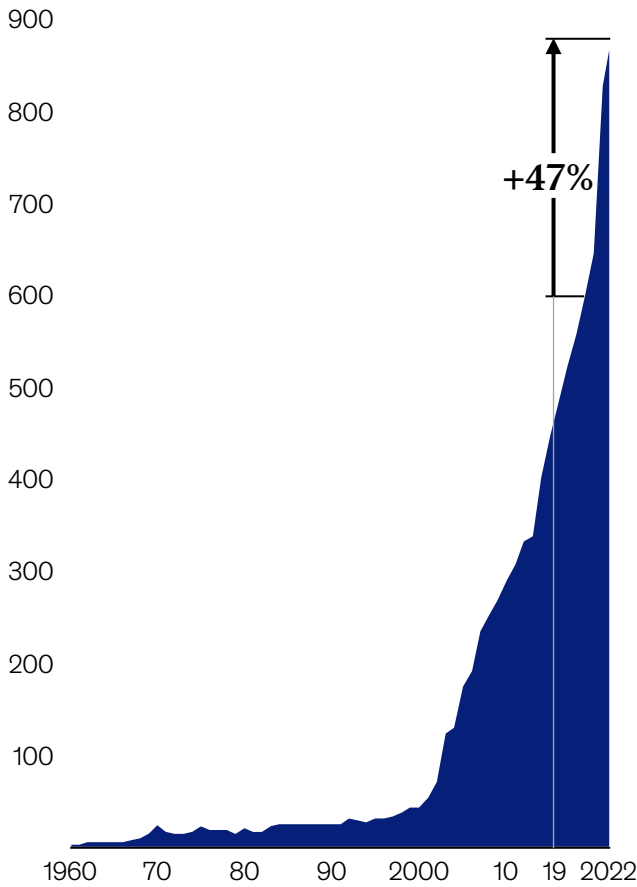
<sup>17</sup> Principles for Responsible Investment's regulation database: cumulative number of policy interventions by country

<sup>18</sup> 'Business responsibility and sustainability reporting BRSR core: Framework for assurance and ESG disclosures for value chain', circular published on the official website of Securities and Exchange Board of India, 12 July 2023







**The number of ESG policies and regulations is growing, including rapidly evolving reporting requirements in India.**

**ESG Sustainability-led finance policies/ regulations globally, Number**



**Examples of ESG reporting policies and regulations**

-  **SEBI-mandated top listed entities to file Business Responsibility and Sustainability Reports (BRSR)**, including disclosures and assurance for the value chain, aligned with BRSR KPIs
-  The introduction of **the Carbon Border Adjustment Mechanism (CBAM)** in the European Union (EU) could have a significant impact on businesses importing goods into the EU
-  Regulators in China are considering introducing **ESG reporting requirements** for all public companies listed in China, starting December 2023
-  The UK requires the disclosure **of climate-related risks and opportunities** in line with TCFD recommendations
-  Australia requires companies to publish annual statements outlining their actions to address modern slavery
-  The US requires all public companies to disclose **Scope 1, Scope 2 and material Scope 3 greenhouse-gas emissions, climate risks and their financial impact** on business and strategy

Source: Principles for Responsible Investment, ESG Regulation Database, Q1 2022 (latest available), <https://www.unpri.org/policy/regulation-database>

Governments across the globe are introducing policies and regulations in line with their goal to reduce GHG emissions. In the future, these regulations could have implications for the import into these regions of raw materials and products that pose the risk of carbon leakage. Indian automotive parts suppliers looking to export to these geographies could put robust systems in place to measure and report emissions and identify opportunities to enter new markets with low carbon-footprint products. This could help them to be future-ready in the face of potentially tighter regulations.

## The rise of sustainability-led investment

Globally, there has been a significant increase in sustainability-led investing. Fund flow saw a 94 percent CAGR between 2019 and 2021, translating to more than USD 600 billion in investments globally in 2021 (Exhibit 5).<sup>19</sup> India, too, is seeing a similar trend: sustainability-led funds experienced an even more substantial CAGR of 120 percent over the same period. Already, investments exceeding INR 10,000 crore have been locked in just in the first half of 2023.<sup>20</sup>

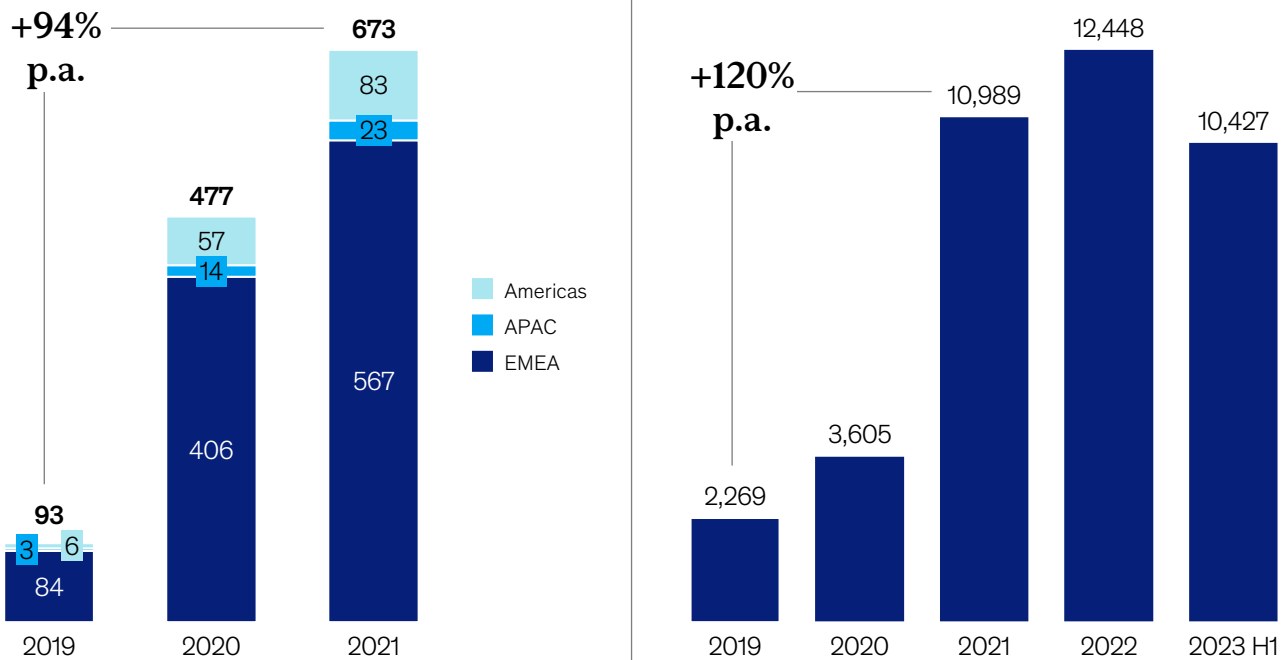
<sup>19</sup> Global Sustainable Investment Alliance, 2021

<sup>20</sup> Analysis of inputs taken from multiple sources, including, but not limited to Global Sustainable Investment Alliance, Morningstar, 2022; 'Sustainable Investment overall', Morningstar's label for sustainability funds

Exhibit 5

**ESG investing is gaining traction globally, with India also seeing increased awareness and interest in ESG funds.**

**Total sustainability-led fund flows<sup>1</sup> by region, USD billion** ➤ **Total sustainability-led funds in India, AUM INR crore**



<sup>1</sup>Sustainability-led funds based on Morningstar's label "Sustainable Investment overall" indicating an incorporation of a positive investment approach. Historic data can deviate due to reclassifications by Morningstar.  
Source: Analysis of inputs taken from multiple sources, including, but not limited to Global Sustainable Investment Alliance, Morningstar, 2022; 'Sustainable Investment overall', Morningstar's label for sustainability funds

## Indian OEMs' pursuit of sustainability

ACMA undertook a survey of Indian OEMs to understand how they are approaching sustainability matters and found that most have already started prioritizing the topic (Exhibit 6). Their efforts focus heavily on controlling their own Scope 1 and 2 emissions, while also nudging their suppliers on sustainability themes to bring down Scope 3 upstream emissions.<sup>21</sup>

Many OEMs are adopting targets, measuring and tracking key performance indicators and disclosing ESG information. While 100 percent disclosure on ESG reports is still some way off, the journey has now begun.

<sup>21</sup> ACMA-led survey of Indian OEMs, conducted in 2023

Exhibit 6

### Indian OEMs are steadily taking steps towards sustainability.



3/4

OEMs list sustainability among their top 5 business KPIs



2/4

OEMs are working with suppliers to change designs for circularity



3/4

OEMs disclose ESG information in their annual report/BRSR report



OEMs are already rolling out RFQs incorporating decarbonization targets

Indian OEMs are currently where EU players were **a few years ago**

**OEMs' demand for sustainable operations** may suddenly change as policies change

Indian **suppliers could kick off efforts to be better prepared** for these changes, to become preferred suppliers for OEMs in the future

Source: A survey of four automotive OEMs by ACMA, 2023



# 2. Sustainability: An imperative and an opportunity

Sustainability is not an imperative alone, it could also make good business sense. While there is increasing pressure from stakeholders to adopt and ramp up their sustainability agenda, Indian automotive and auto-ancillary companies could see this as an opportunity to capture value in a changing environment. As they consider the path forward, they could limit themselves to “playing defence” – just managing the bare minimum compliance necessary, or embrace new possibilities by “playing offence” – going beyond compliance to actively create value for their business.

With the global thrust on sustainability, voiced by all stakeholders, the challenge with playing defense is that companies could be staring at a growing cost of capital when they lose out on the benefits or subsidies available to companies doing more on sustainability. Over time, their market share could decline as customers take their business elsewhere, and they could be perpetually in reactive mode, trying to stay ahead of ESG regulatory and reputational risk.

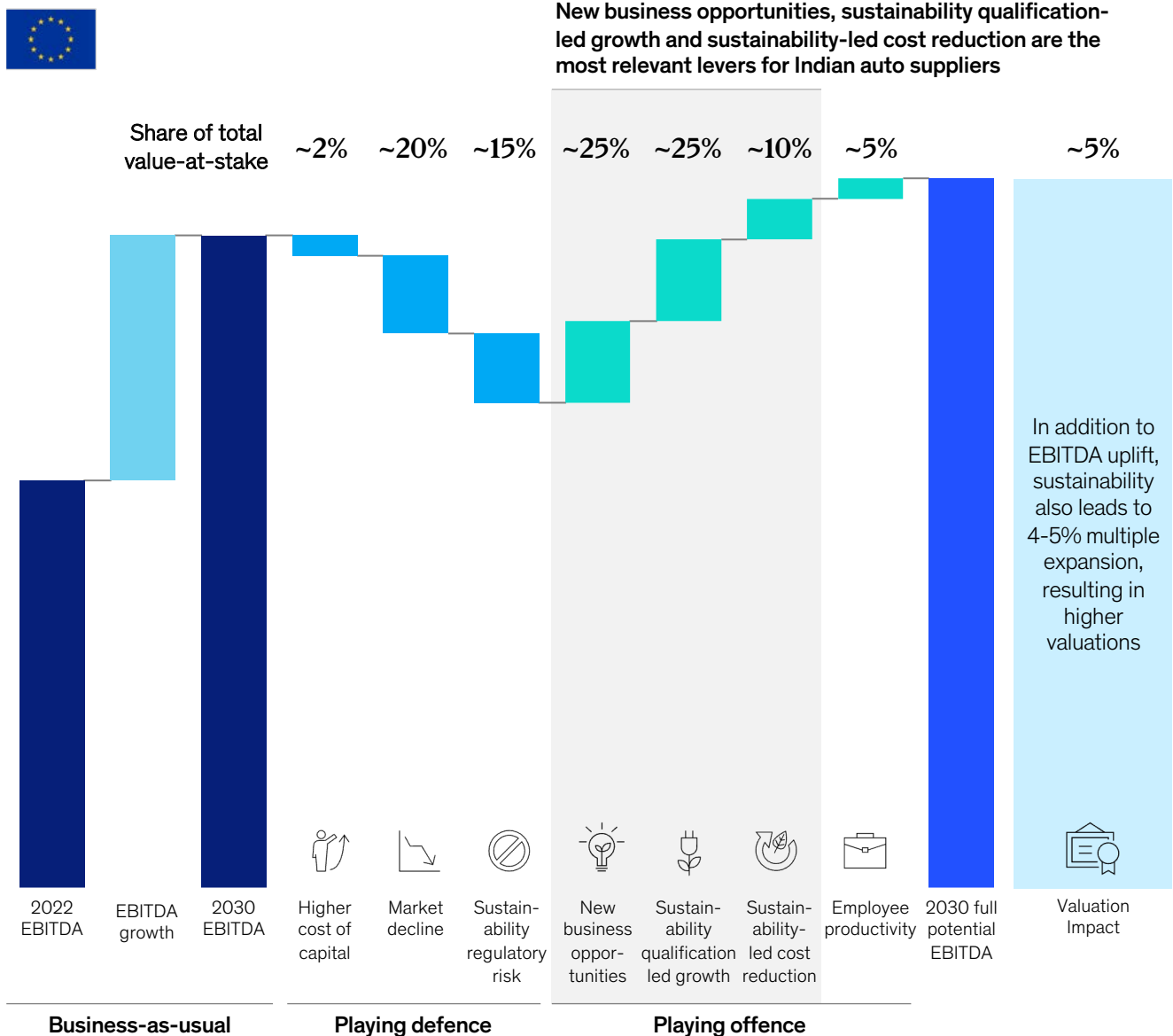
On the other hand, companies that choose to play offence could register a 20 to 30 percent rise in their valuation across EBITDA and multiple expansion, putting greater strategic distance between them and their competitors (Exhibit 7). The offence strategy rests on five broad drivers:

- **Going after new business opportunities:** Companies could build new green businesses by tapping into existing assets, capabilities and relationships.
- **Targeting sustainability qualification–led growth:** Offering green products that match customer expectations (e.g., green packaging) and requirements (e.g., carbon neutral steel) could lead companies to command a higher premium in the market.
- **Achieving sustainability-led cost reduction:** Thrifty, thoughtful use of resources such as energy, water, waste and raw materials could help improve resource efficiencies.
- **Improving employee productivity, well-being and morale:** Companies could implement a holistic strategy for employee engagement to cut down attrition, boost sales productivity, and control absenteeism as employees feel rejuvenated and inspired by their organization.
- **Growing valuation impact (equity):** A compelling sustainability story and credible strategy could drive up valuation and expand multiples.

The survey of Indian auto suppliers conducted by ACMA indicates that respondents find three of these themes most relevant – new business opportunities, sustainability qualification–led growth and sustainability-led cost reduction. Many suppliers in Europe, and a few in India, are already on this journey, and could offer inspiration as Indian companies explore their options.

## Playing offence – value-creation levers for sustainability.

Illustrative 2030 EBITDA, modelled with top-down assumptions for Automotive; resulting in 20-30% valuation uplift potential across EBITDA and multiple expansion



Source: McKinsey analysis, EBA climate stress testing pilot, MSCI, ESG VaS benchmark

### Creating new business opportunities

A leading non-Indian spare parts remanufacturer is showing the way. In recent years, it set up an R&D centre, broadened its product portfolio, and augmented production capacity. This phase of growth and innovation helped the company to cut down its emissions footprint while also driving top-line growth.

The manufacturer keeps a sharp focus on quality to ensure the refurbished parts meet the same standards as new products. It enforces stringent criteria for material acceptance, rigorous cleaning and testing for all units and components and completely replaces critical components.

With these initiatives, the company has unlocked double-digit CAGR in revenues over the past four to five years, while reducing both its carbon emissions and energy consumption by around 40 percent each.

## **Sustainability qualification–led growth**

Global OEMs are increasingly incorporating ESG commitments as part of their requirements in RFQs, across Scope 1, 2 and 3, through a variety of levers – ranging from the use of electricity and renewable fuels to raw materials recycling, steel smelting, etc. Suppliers who are ahead of the curve on compliance could see a higher number of RfQ successes and potentially higher business volumes, unlocking "sustainability qualification–led growth".

## **Sustainability-led cost reduction**

The path to sustainability can also help reduce costs. Some Indian auto component companies have already made significant strides to reduce waste and inefficiency as a means to cut costs.

An auto component supplier has taken initiatives to enhance productivity and cut costs, while also meeting its sustainability targets (net zero by 2040). Besides aiming to halve its Scope 1 and 2 emissions by 2030, and reduce Scope 3 upstream emissions related to the value chain by 35 percent, it also wants to source 20 percent of its energy from renewable sources.

To achieve these goals, the company has adopted renewable energy across two pivotal plants, which helped to cut CO<sub>2</sub>e emissions by 12 kilotons annually. It is also being more careful to recycle and reintegrate all water used in its operations through a closed-loop system. It is shifting to recyclable packaging for approximately 65 to 70 percent of product dispatches. In addition, it has begun to recycle a large part of its die-casting scrap.

Another Indian auto component supplier has set itself 2030 targets to reduce Scope 1 emissions by 10 percent, Scope 2 emissions by 30 to 40 percent, and cut down the use of non-recyclable materials by 20 percent.

Towards these targets, it has set up rooftop solar power sources and group captives, which could reduce GHG emissions by around 1,500 tCO<sub>2</sub> per year. The company is also cutting down waste disposal by around 75 percent, through zero water discharge. Dedicated measures for waste management have helped the company recycle 100 percent of its waste.

By responding proactively to the global thrust on sustainability from all stakeholders, Indian automotive and auto ancillary companies could not only bolster India's journey to net zero, they could also generate value for themselves and unlock greater growth.





# 3. The path ahead: Energy decarbonization and material circularity

The journey of automotive companies and their suppliers to reduce emissions calls for a focus on two big themes. First, a concerted effort towards energy decarbonization by mapping the greatest sources of emissions (electricity, steam, backup power, etc.) and finding scalable, cost-efficient alternatives to these. And second, a quest to attain material circularity – with sound decisions about material sourcing, product design, process selection, and associated logistics management to ensure an overall sustainable value chain for automotive companies.

## **Transitioning to cleaner energy sources<sup>22</sup>**

Across the value chain for auto-component production, manufacturing processes soak up 70 percent of all the energy consumed, and assembly processes take the remaining 30 percent. Drive parts, body and chassis production typically require more energy. Electricity is the primary source of energy for auto components manufacturers in India,<sup>23</sup> fulfilling around 90 percent of manufacturing energy needs, and 100 percent of assembly energy requirements. Heating covers the rest, for tasks such as painting, pre-treatment of iron in the body and chassis, steam required in seats manufacturing, etc.

As grid electricity is the primary emission source, a transition to renewables could be imperative over the next few years. Between 2019 and 2022, the share of thermal sources (including coal and other fossil fuels) remained a steady 74 percent of the total electricity generation mix.<sup>24</sup> As of 2022, solar and wind energy accounted for around 11 percent of the electricity mix, and other non-fossil sources constituted the remaining 15 percent. Electricity from thermal sources could remain the largest source (around 57 percent) of electricity generation in 2030, with solar and wind energy contributing around 27 percent.<sup>25</sup>

Multiple alternatives could enable the energy decarbonization across existing sources. For instance, for grid electricity, alternatives could include behind the meter (BTM) on-site or rooftop solar, captive, group captive or open access from renewable energy sources and energy efficiency improvements. For backup (primarily DG or diesel-generator electricity) options might lie in using gas gensets, DG hybridization with on-site battery storage or DG emission reduction retrofits. And in the case of steam boilers that are primarily coal based, companies could consider gas-based boilers, bio-mass based boilers/ bio-mass blending in existing coal boilers, and solar, hydrogen or electric boilers.

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<sup>22</sup> Unless otherwise specified, all details in this section are drawn from multiple expert interviews

<sup>23</sup> India Auto Components Sector Overview, 2020

<sup>24</sup> Data from the Central Electricity Authority of India (CEA) dashboard (RE generation)

<sup>25</sup> *Decarbonising India: Charting a pathway for sustainable growth*, McKinsey & Company, 27 October 2022

Companies may want to scrutinize these options before they invest. They could establish feasibility, ROI, timeline and ease of implementation by looking at eight important criteria for each of the options:

- Technology maturity/ viability as next best alternative in solution set
- Infrastructure availability (e.g., gas pipeline/central or state transmission utility connectivity)
- Policy/ regulatory challenges (e.g., open access regulations)
- Viable business case for customer vs current source (e.g., unit economics, demand profile)
- Risks (e.g., payment, off-take)
- Funding requirement (e.g., capital investment)
- Awareness of the solution
- Availability of skilled workforce to implement the solution

This framework leads to four possible solution sets (Exhibit 8), with varying degrees of economic and technical feasibility. An auto supplier in India, starting on the energy transition journey, could begin by implementing the solutions towards the top and then evolve towards the solutions at the bottom of the chart. This is because the solutions outlined at the top are the ones with viable unit economics today, which can be deployed at scale based on specific needs and management abilities. Solutions such as implementing rooftop solar or installing VFDs are proven to reduce GHG emissions and operating costs for various companies in India.

Moving from top to bottom, the maturity levels drop – these solutions could need additional policy tweaks, financial support and technology advancements to become more feasible.

**The emerging solution set for automotive component manufacturers suggests a phase-wise approach to achieve net-zero carbon footprint.**

X% % approximate reduction in costs

		Source of emission			
		Grid	DG backup	Boilers	Enablers
<b>Economic and technical feasibility of solutions</b> High i ii iii iv Low	<b>Viable unit economics today, need business model innovation/ risk management to serve at scale</b>	BTM- on-site/ rooftop solar 2-5% <sup>1</sup>		Efficiency improvements (e.g., condensate recovery) 3-5%	Creating awareness of the solutions Skilling workforce for proper operations of new solutions
	<b>Require policy tweaks and/ or improved infrastructure connectivity for business model innovation</b>	Efficiency improvements (e.g., VFD installation) 5-10% <sup>2</sup>			
		Third-party open-access RE 5-12% <sup>3</sup>		Usage of Bio-gas as replacement of PNG/FO in gas boiler	
		Merchant market sourcing (e.g., IEX) 5-10% <sup>4</sup>			
	<b>Require additional financial support to establish viable unit economics to drive adoption</b>	Captive and group captive 7-18% <sup>5</sup>	Attachments for DG sets (e.g., retrofits) Gas gensets for backup power DG hybridization with on-site battery storage for backup	PNG based boiler as replacement of FO boiler	
	<b>Solutions with tech under development</b>		Usage of syngas in DG sets	Usage of solar thermal boilers for steam generation Usage of hydrogen boilers for steam generation Usage of electric boilers for steam generation	

<sup>1</sup> Benefit constrained by space availability, assuming asset light (opex) model.

<sup>2</sup> 1-2 years payback period.

<sup>3</sup> CSS/AS charges involved, varies heavily by states.

<sup>4</sup> Limited by market spot rates & varies by states.

<sup>5</sup> Involves high capex investments (INR 25-30 L per MW for group captive & INR 1-1.2 Cr per MW for captive), varies by states.

Source: Expert interviews

Case example

### An Indian industrials company cut its electricity consumption from a distribution company by 70 percent.

To drive this transition, the industrials company deployed rooftop solar installations, established group captive arrangements, and traded on the India Energy Exchange (IEX). Through a comprehensive evaluation of these options, it determined an optimal blend of these strategies along with the appropriate proportion of power that could be feasibly shifted.

Besides a drop in carbon emissions, the company's spend on power sourcing has also dropped by 18 to 20 percent.

Case example

### A non-Indian automotive player has formed a consortium to negotiate better contracts for its suppliers.

The collaboration was the outcome of seamless coordination and communication across the value chain. Forming the consortium helped an individual company, and all its collaborators, to improve their negotiation power through a larger volume of electricity usage.

#### The challenge

The individual automotive supplier lacked sizable electricity usage to attract renewable energy developers to make a PPA

The underlying reasons:

- The market is institutionally not yet well-formed – it is at an early stage and driven mainly by large corporations
- The current price of PPA is ~40% higher than the grid price on average

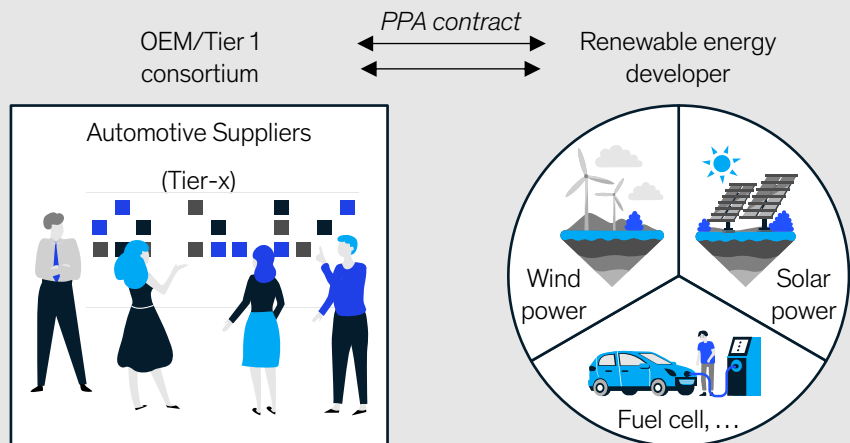
#### What the company did

- Identified the full list of nationwide renewable energy developers with which PPA contract is possible
- Tracked the recent trends of PPA consortium from both OEMs and large corporations from other industries
- Communicated with suppliers about the possibility and initial action plans of consortium model

#### The solution

Promoting PPA initiatives by forming a PPA consortium composed of OEM/Tier 1 suppliers

Fostering negotiation power by increasing the total amount of electricity usage



**Indian OEMs and Tier-1 suppliers could follow suit and forge similar partnerships to create leverage and drive further efficiencies in electricity sourcing costs across the value chain.**

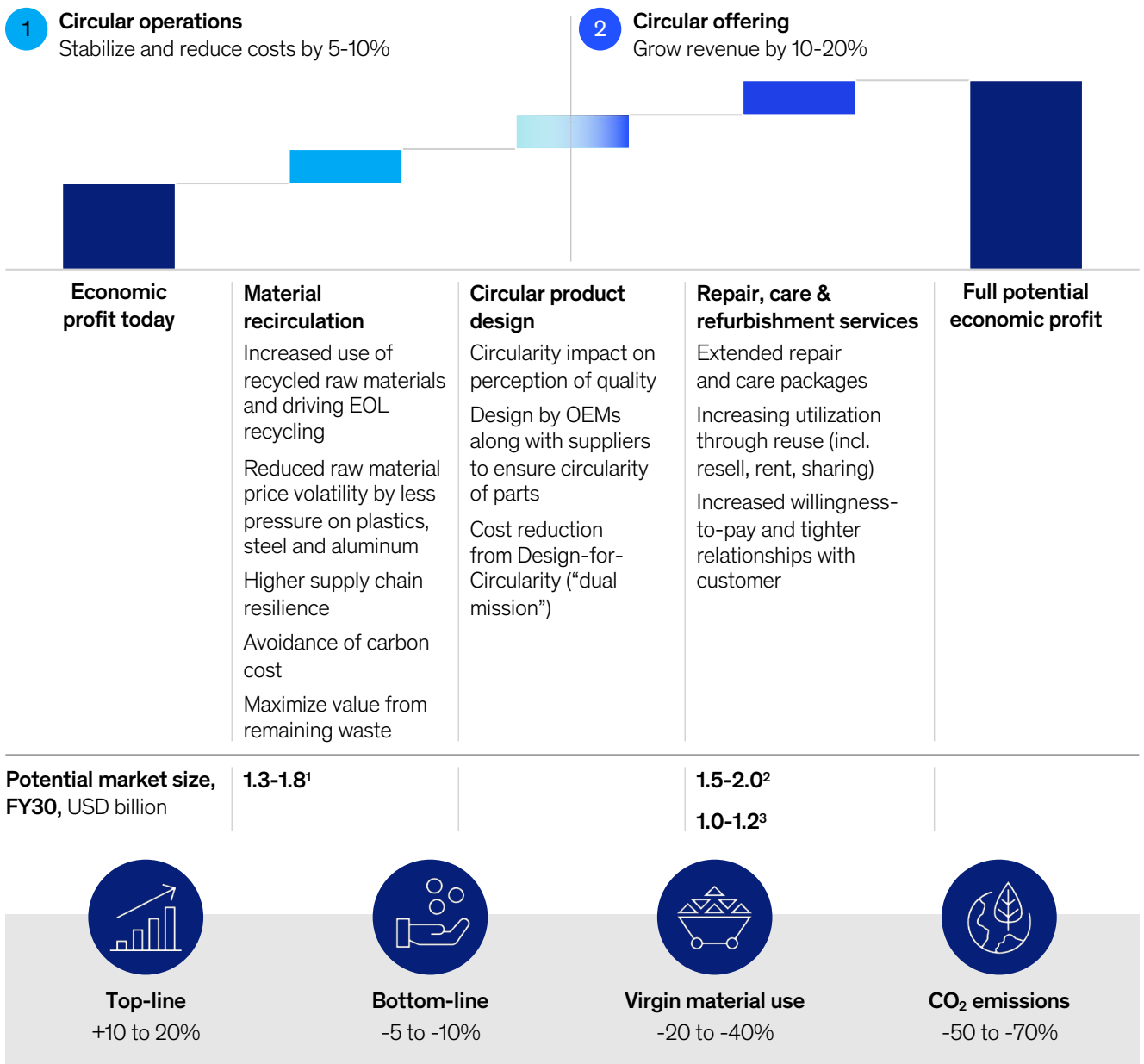
## Embedding material circularity

The concept of circularity spans the entire value chain, reducing the use of finite resources and increasing the utilization of materials through resource-sharing and shifting to inherently renewable feedstock. Material circularity refers to the efficient use of materials and keeping materials in use for a longer duration, through extended usage or through proper resource management at end-of-life. This is a cost-effective decarbonization lever for the automotive sector – it could increase top line by 10 to 20 percent, and reduce costs by 5 to 10 percent, cut down virgin material use by 20 to 40 percent, and decrease CO<sub>2</sub>e emissions by 50 to 70 percent (Exhibit 9).

Exhibit 9

### Circularity is positive for the top-line, bottom-line and the environment

#### Economic profit of illustrative company



<sup>1</sup>Based on estimated EPR targets expected for automotive circularity (20% by 2026-27 and 30% by 2029-30)

<sup>2</sup>Quality assured remanufactured components

<sup>3</sup>Refurbished components at discounted prices

Source: McKinsey analysis based on inputs from Material Economics, Press search, 'Automakers may need to use 20% recycled inputs', an article in the Economic Times, 2 August 2023

Four loops ensure materials remain within the system to maximize circularity (Exhibit 10). However, circularity is complex and has many challenges, particularly in India. It could require critical unlocks to operate as a profit centre rather than a cost centre (Exhibit 11).

Exhibit 10

## Four circularity loops keep products and materials within the system for as long as possible in a circular economy.

### Circular segments

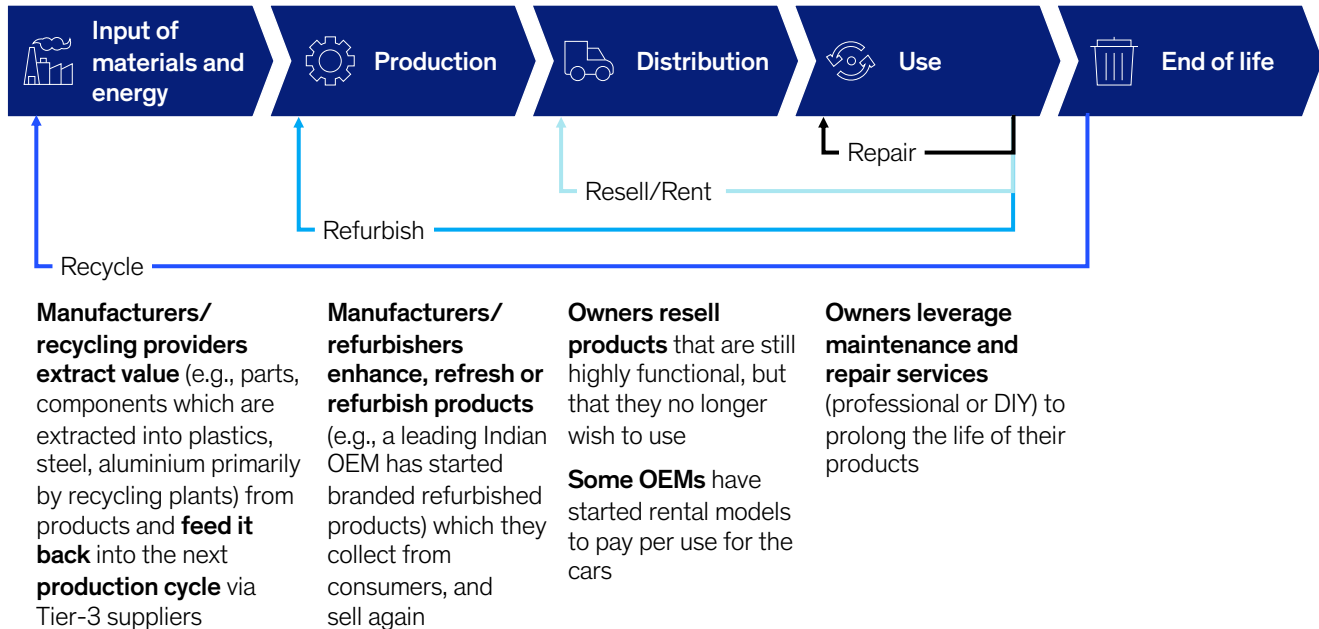


Exhibit 11

## Key unlocks could help overcome barriers to circularity in India, making it a profit centre rather than a cost centre.

Barriers for circularity	Key unlocks
<p><b>1 Unorganized recyclers to organized facility</b> transition for recycling from EOL Vehicles Individual CAPEX investments generate redundancy and low-capacity utilization</p>	Registration of authorized vehicle scrapping locations as part of Vehicle Scrapping Policy, 2022
<p><b>2 End-of-life vehicle collection:</b> High reverse logistics costs for degraded scrapped vehicles</p>	Product as a service; Consumer incentives in Vehicle Scrapping Policy, 2022 from government and OEMs
<p><b>3 Low recovery rates for e-waste, plastics:</b> Components like plastics and electronics from vehicles are usually landfilled</p>	Growth in organized recyclers and leveraging EPR on tyres, e-waste and plastics
<p><b>4 Reusable parts recovery:</b> Functional and reusable parts lost due to multiple stakeholders, unorganized recovery</p>	Product as a service to improve used parts collection (overcome vehicle ownership as status symbol) Reverse logistics from service centres to OES
<p><b>5 Demand for recycled raw materials:</b> Low demand for green steel, recycled aluminum, recycled plastics</p>	Growing Scope 3 commitments from automotive, construction leading to higher demand for recycled materials <b>Regulations:</b> EPR on automotive being planned, CBAM, <sup>1</sup> EPR on plastics, etc.
<p><b>6 Harder-to-recycle components:</b> Fused materials leading to lower recovery rates and recycling</p>	OEM and Tier 1, 2 suppliers' collaboration to redesign harder-to-recycle components for easier disassembly

<sup>1</sup>Cross-border adjustment mechanism

Source: Expert interviews; 'Automakers may need to use 20% recycled inputs from 2026-27, Economic Times, 2 August 2023

Despite existing barriers, strong market forces are encouraging the growth of circularity in the automotive sector in India:<sup>26</sup>

**Policy and regulatory support:** There has been an increased push towards circularity in India across sectors and materials, such as through the Vehicle Scrappage Policy, 2022, which will de-register unfit and polluting vehicles while driving recycling of scrap vehicles through registered Vehicle Scrappage Centres. In addition, Extended Producer Responsibility (EPR) guidelines have already been implemented across e-waste (including automotive batteries), tyres and rubber, and plastics. EPR guidelines for the automotive sector are also in the pipeline to hold producers accountable for ensuring environmentally sound dismantling and recycling practices for end-of-life vehicles.

**Cost and carbon emissions:** The business equation for shifting to recycled materials has improved over the last three to four years, due to the high and volatile prices for many primary materials. In addition, with the launch of carbon markets in India, the carbon price is expected to go up by 2030, to USD 30 to USD 50/tCO<sub>2</sub>e.<sup>27</sup>

- **Competition:** An increasing number of global OEMs have externally communicated circularity goals to strengthen their sustainability value proposition (thereby improving their capital market position and related multiples).
- **Value-chain pressure:** Cooperation between players along the value chain is increasingly important when solving for circularity and addressing the CO<sub>2</sub>e targets committed to across sectors. For instance, Scope 3 emission reduction targets in automotive make up 40 to 100 percent of CO<sub>2</sub>e reduction goals.<sup>28</sup>
- **Energy and supply security:** Recycled materials require significantly less energy than virgin production – around 85 percent less for steel, and around 80 percent less for aluminium. The local availability of recycled materials also helps reduce geopolitical risk.<sup>29</sup>
- **Technology advancements:** Recycling technologies, such as for batteries and material recovery, are advancing at a fast pace.

The potential market opportunity for automotive component circularity by FY30 could be USD 3.8 to 5 billion, across three themes – material recirculation, circular product design and repair, care and refurbishment services (Exhibit 12).<sup>30</sup> Of these, the themes of material recirculation and of repair, care and refurbishment have higher feasibility and impact potential, and these segments are treated in greater detail.

<sup>26</sup> Company websites; Material Economics; Preqin; Pitchbook; Press search

<sup>27</sup> 'Inevitable policy response 2021, Policy forecast: Preparing financial markets for climate-related policy and regulatory risks', published on the website of the United Nations Principles for Responsible Investment, March 2021






<sup>28</sup> Collated from the ESG and net-zero targets announced by companies on the website of Science Based Targets initiative

<sup>29</sup> *Decarbonising India: Charting a pathway for sustainable growth*, McKinsey & Company, 27 October 2022

<sup>30</sup> Expected EPR target of 30 percent recycled content to drive material recirculation; refurbishment and remanufactured component value sizing based on expert inputs and potential costs of refurbished / remanufactured components

## Automotive players could tap opportunities across 3 impact areas to embed circularity.

● Low feasibility ● High feasibility

Opportunity areas	Lever	Ideas	Feasibility <sup>1</sup>
<b>Material recirculation</b> (Increase share of recycled material)	<b>Sourcing recycled/-able materials</b> (open loop)	<ul style="list-style-type: none"> <li>• Increase recycle allowance</li> <li>• Offtake agreements</li> </ul>	
	<b>Recycling materials at end of life</b> (closed-loop)	<ul style="list-style-type: none"> <li>• Tyre recycling</li> <li>• Battery recycling</li> <li>• ELV recycling</li> </ul>	
<b>Circular product design</b> (Reduce materials per product produced)	<b>Optimizing design &amp; specifications</b> of product (optimize specs., design and material selection)	Collaboration between OEMs and Tier 1/ Tier 2 suppliers to: <ul style="list-style-type: none"> <li>• Design for disassembly – e.g., modular design vs fused</li> <li>• Design for recyclability</li> <li>• Redesign product with higher strength materials for longer usage life</li> <li>• Design for repair vs replace</li> </ul>	
<b>Repair, care &amp; refurbish services</b> (Increase useful service of each product produced)	<b>Increasing utilization through reuse</b> (incl. resell, rent, sharing)	<ul style="list-style-type: none"> <li>• Buyback options at end-of-life</li> <li>• Resell cars, used parts sale</li> <li>• Reuse in secondary applications (e.g., batteries)</li> </ul>	
	<b>Extending lifetime through repair &amp; refurbish</b>	<ul style="list-style-type: none"> <li>• Maximize repairable components</li> <li>• Refurbished parts</li> <li>• Refurbished cars</li> </ul>	

<sup>1</sup>Feasibility for Indian component manufacturers

### Material recirculation

Increasing the use of recycled raw materials in the supply chain and driving increased recycling of end-of-life materials and vehicles, done in collaboration across the value chain and partnerships with material recyclers could deliver an impact of USD 1.3 to 1.8 billion by FY30.<sup>31</sup>

This approach entails improved sourcing of recycled material and end-of-life recovery and recycling.

**Sourcing recycled materials:** Increasing the use of recycled content is feasible in sheets and raw materials in body chassis, air-conditioning (AC) compressors, electrical components, etc. Plastic components as well as the interiors for vehicles could be manufactured using recycled nylon, bottle-to-fibre recycled polyester and recycled fishing nets. Recycled rubber crumbs from EOL tires are already used to manufacture rubber mats as well as exterior components like splash guards, brake pads, etc. and could be scaled up further.

**Recycling materials at end-of-life:** Improving the recovery and recycling of end-of-life components and vehicles through partnerships with vehicle scrappage centres could boost the availability of recycled raw materials. Collaborating with service centres could help component manufacturers to recover end-of-life or defunct spare parts and recover more materials that are recyclable or can be refurbished.

<sup>31</sup> Expected EPR target of 30 percent recycled content in automotive industry by 2030 to lead to recycling business increase



Case example

## **A non-Indian Tier-1 auto component manufacturer applied a circularity strategy and internal carbon pricing to increase recycled content in its finished products.**

The company wanted to understand and manage its CO<sub>2</sub>e footprint from materials – so it assessed circularity potential across three dimensions - its supply chain, production and customers. It also conducted a product-lifecycle assessment to identify the largest sources of value leakage and CO<sub>2</sub>e impact and quantified each opportunity (EBIT, CO<sub>2</sub>, material usage, etc.) to develop the decarbonization strategy.

In addition, the company onboarded Tier 2 suppliers across many product categories, including electronics, heat exchanger, compressor, injection, magnetics, etc. It also

collaborated with a Tier-1 company's R&D team to cascade the recycling target for 2025 and 2030. Simultaneously, it worked with Tier-2 suppliers to define key components for recycling and proposed the optimal recycling rate.

Finally, it set up a technical committee between Tier-1 and Tier-2 suppliers for strong governance and end-to-end implementation.

The company improved EBIT by around 10 percent through cost savings, and its carbon emissions dropped by 20 percent.

## **Circular product design**

This theme entails embedding circularity at the design phase itself, keeping in mind the ability to disassemble products more easily, recycle with greater ease, and cut down costs through the optimal use of input materials.

## **Repair, care and refurbishment**

Repair, care and refurbishment services aim to increase the utilization of materials and extend usage life. Remanufacturing and refurbishing components and vehicles as well as promoting the right to repair versus replace are some key opportunities in this area. Remanufactured, quality-assured components could constitute a USD 1.5 to 2 billion market in India by FY30, while refurbished components could create a market opportunity of another USD 1 to 1.2 billion.<sup>32</sup>

**Extending lifetime through repair and refurbish:** The retrieval and remanufacturing of reparable parts from end-of-life vehicles such as engine components, transmission/steering, AC compressors and electrical components, drives circularity and creates new business opportunities.

Case example

## **A global OEM established a joint venture to remanufacture old vehicle parts.**

The OEM aims to substantially cut down supply-chain carbon emissions per vehicle by 2030 over 2019 levels, and reduce carbon emissions from production and sites. Collaborating closely with partners through a joint venture, the company is engaged in initiatives to promote closed-loop recycling, battery recycling and sustainability. The collaborators have set

up a plant where recycled steel is returned to the supplier and produced at the same quality. The company has also set up systems for end-of-life vehicle recovery at 2,500-plus recovery centres across 30 countries.

The company has received many recognitions and accolades from known global rating agencies.

These efforts show the potential of material circularity to help automotive companies and suppliers play a part in the thrust on decarbonization and sustainability. With a systematic approach towards the highest potential solutions, companies could unlock value while doing their bit for the environment.

<sup>32</sup> Based on expected costs of remanufactured components, as determined through expert inputs



# 4. Stakeholders as enablers

While sustainability is becoming mandatory for a licence to operate, implementing at scale requires further industry alignment, cross-value chain partnerships and collaboration with stakeholders across the government, industry bodies, private players, OEMs and component manufacturers. Each stakeholder can contribute to ensure the success of the overall transformation agenda.

**The government's** supportive role could extend to helping with the following:

- Further strengthening reporting regulations, such as BRSR format, while also introducing a range of incentives, tax benefits, and grants.
- Providing further support to help transform sustainable initiatives into profitable ventures.
- Strategically adding subsidies to promote circular-economy principles and catalyze green growth. This could also include setting up and scaling more circular-economy zones to maximize recovery and recycling while saving costs.

**Automotive industry bodies** could contribute in the following ways:

- Creating a scalable framework for the sustainability journey tailored for the automotive sector and collaborating with government entities and other policy makers to help develop sustainability guidelines on behalf of the sector.
- Driving targeted capability-building programs to help accelerate awareness and adoption of potential interventions, such as energy transition and material circularity.
- Facilitating collaborations with research institutions, recyclers, suppliers and OEMs to foster learning and innovation.
- Benchmarking sustainability KPIs and hosting certification programs for suppliers who lead the way on sustainability metrics.

**OEMs** could support domestic suppliers as well:

- Setting ambitious decarbonization targets for Scope 3 upstream and cascading them to Tier 1 and 2 suppliers while ensuring compliance through governance mechanisms.
- Assisting suppliers to adopt renewable energy options, driving efficiencies in power sourcing through the creation of PPA consortiums and providing training on industry best practices.
- Partnering with Tier 1 and 2 suppliers to design products for circularity.

**Suppliers** could be at the forefront of this transformation through a few strategic actions, such as:

- Moving sustainability closer to the top of their business priorities and establishing the infrastructure required to enable the sustainability agenda.
- Proactively investing in energy transition initiatives to move towards cleaner energy options and reducing GHG emissions.
- Working with OEMs to drive circularity and investing in green businesses (repair, remanufacturing and refurbishments, etc.).

**Private players** could contribute by creating a conducive environment for driving sustainability:

- **Financial institutions:** Incentivizing the adoption of sustainability projects by providing loans at preferential rates for such initiatives.
- **Energy providers:** Promoting the use of cleaner fuels (e.g., renewable solar and wind), offering energy-efficiency programs (e.g., VFD installation etc.), and providing low-cost opex-based solutions that may not require high upfront investments.
- **Financial institutions and private equity players:** Investing in R&D via startups, grants to innovate next-gen circularity solutions.

Mitigating the impact of industrial processes to protect the environment and operate with a high sustainability quotient is a team effort. The push for sustainability is not just an environmental imperative, it also makes business sense for automotive industry OEMs and suppliers. The right strategic approach, backed by frameworks to go after the greatest, most feasible drivers for change, could help make a difference, and embed sustainability across industrial practices.








*Mobility 360° – Sustainability for  
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