

# Sustainability Driven: Key Performance Indicators for the Tire Sector *2019-2023*



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# Executive Summary



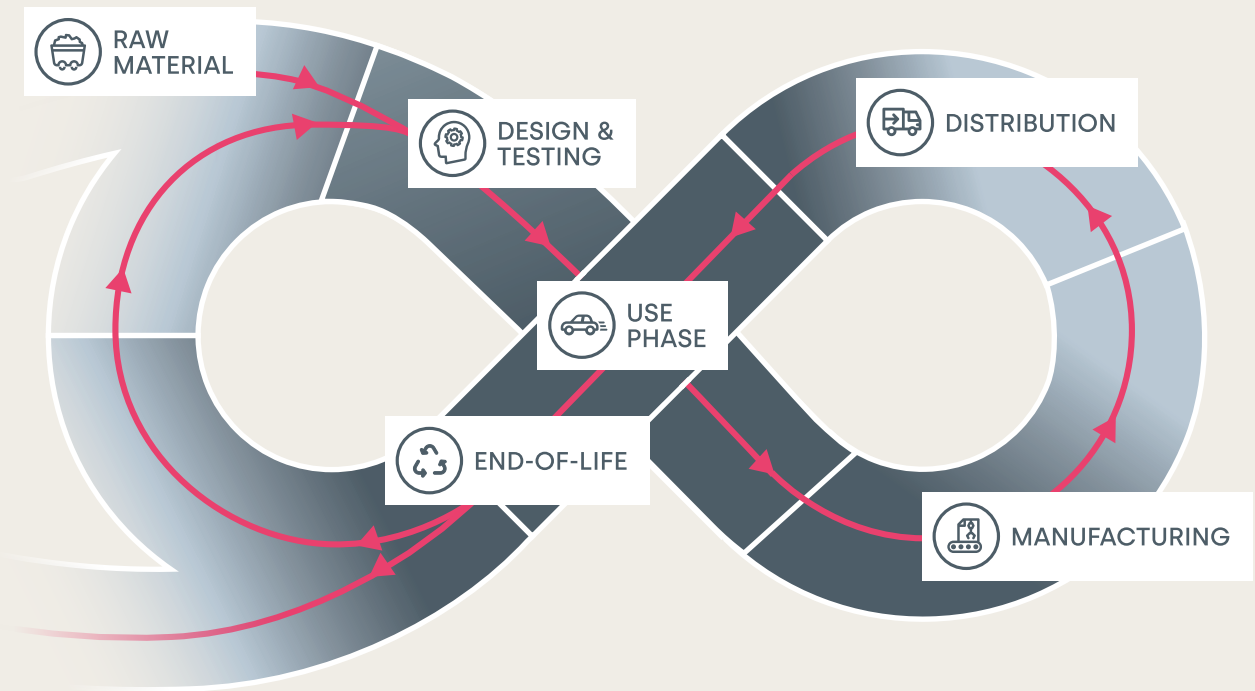
01.

# Executive Summary

Since 2005, the Tire Industry Project (TIP) has served as the primary global forum for leading tire companies to engage on Environmental, Social, and Governance (ESG) topics. This voluntary, CEO-led initiative brings together

ten global tire manufacturers that represent over 65% of the global tire manufacturing capacity. TIP's mission is to anticipate, understand, and address significant sustainability topics relevant to the tire industry and its value chain (Figure 1).

Figure 1: The tire sector value chain



At the heart of transportation systems worldwide, tires form the critical interface between vehicles and roads, ensuring safe and efficient mobility. In addition to helping move people, tires underpin various industries, facilitating the movement of goods and materials essential for economic activities ranging from logistics to agriculture and construction. Because of tires' key role in mobility, advancements in tire technology also help contribute to greater sustainability for the entire industry.

In 2021, the World Business Council for Sustainable Development (WBCSD), TIP members, and external stakeholders developed the "Sustainability Driven: Accelerating Impact with the Tire Sector Sustainable Development Goals (SDG) Roadmap" a foundational document for the sector's contribution towards the United Nation's (UN) SDGs.

The SDG Roadmap introduces seven impact pathways for the tire industry, each one corresponding to high-impact opportunities to maximize the tire industry's sustainability.

The pathways are:

1. Natural rubber sustainability
2. Responsible sourcing
3. Operations
4. Employees
5. Tire and Road Wear Particles (TRWP)
6. Sustainable mobility and digital solutions
7. Low-carbon, circular solutions and end-of-life tires (ELT).

As with the previous edition, this iteration of the annual TIP KPI Report aims to reflect on TIP members' progress towards the SDG Roadmap goals. To illustrate the progress made, examples of initiatives from members were selected across the entire tire value chain, in addition to the disclosure of quantitative KPIs.

In 2023, TIP members continued to advance significantly, for example by reducing their CO<sub>2</sub> emissions to record-low levels that coincided with



an 18% year-over-year drop and an almost 40% reduction compared to 2019.

At the same time, CO<sub>2</sub> intensity, which represents emissions relative to the production output, decreased by 12.5% year-over-year and by 32.5% compared to 2019.

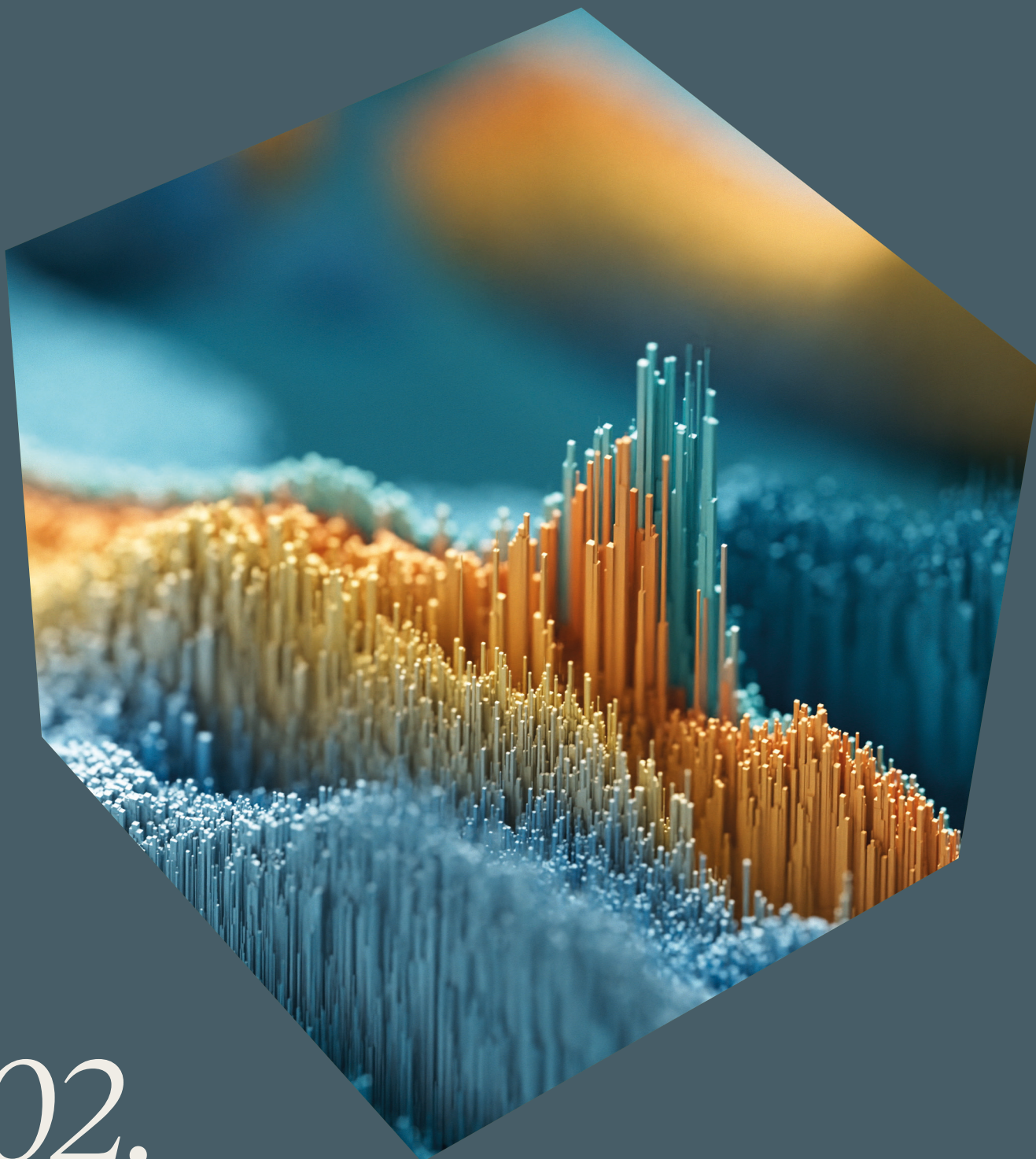
Progress was also observed in water withdrawals from water-stressed areas, which decreased by 8% year-over-year, and in women's representation on member's boards, which increased by 3% compared to 2022, reflecting the industry's efforts to promote Diversity and Inclusion. Meanwhile, the high rate of adoption of responsible sourcing policies among TIP members remained at 90% in 2023.

This report aims to enhance transparency in the tire sector, to encourage industry companies to adopt best practices, innovate, and invest in sustainable solutions. All TIP members are committed to the highest level of transparency when it comes to sustainability data reporting and have worked to improve their data collection efforts over time to reflect broader improvements in sustainability reporting.

Any discrepancies between the data reported in this and previous editions of the TIP KPI report are therefore a reflection of TIP members' commitment to increased transparency and adherence to the latest measurement and reporting standards.



# Industry Context and Macrotrends



02.

## 02. Industry Context and Macrotrends

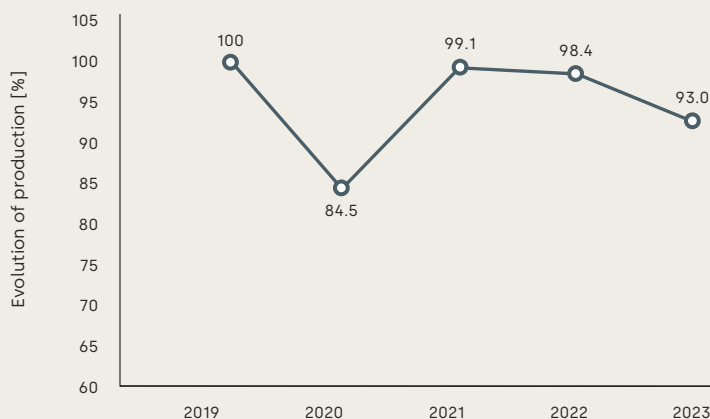
In 2023, tire manufacturers navigated a complex landscape marked by unexpected changes in costs and intricate logistical issues, due to increased complexities within their respective supply chains. Geopolitical tensions and conflicts continued to impact supply chains, causing raw material shortages, price spikes, and elevated energy costs, that rippled through global manufacturing. Additionally, adverse weather conditions in natural rubber-producing countries such as the Ivory Coast, Thailand, and Indonesia adversely influenced the price of rubber. Consequently, output data on TIP members' production levels indicates a 5.5% decrease in production in 2023 compared to 2022 levels (Figure 2).

Against this backdrop, the requirement for enhanced transparency on corporate sustainability performance was codified in many jurisdictions, a signal to corporations from

different industries that sustainability needs to remain a top priority. New laws and regulations came into force in 2023, including the European Union's Corporate Sustainability Reporting Directive (CSRD) and Critical Raw Materials Act, India's Business Responsibility and Sustainability Report (BRSR), and the Brazilian Corporate Sustainability Index (ISE). These laws and regulations mandate the disclosure of KPIs such as those associated with greenhouse gas emissions, waste management, and material sourcing.

In response to the sustainability imperative, TIP members increased their investments in renewable energy and accelerated the use of renewable materials such as natural rubber, as well as their use of recyclable materials in 2023. In addition, they continued to innovate to enhance the performance, durability, and fuel efficiency associated with tires.

Figure 2: Evolution of production levels of TIP members from 2019-2023, as a % of 2019 levels










# KPI Performance Summary



03.



### 03. KPI Performance Summary

SDG target contribution	Theme	Impact Pathway (IP)	KPI	Performance		Unit
				2022	2023	
<ul style="list-style-type: none"> <li>■ 4.5</li> <li>■ 8.4</li> <li>■ 12.2</li> </ul>	<b>Supply chain</b> 	<b>IP1</b> Natural rubber sustainability	Members that disclose to the GPSNR*	100	100	%
<ul style="list-style-type: none"> <li>■ 8.4</li> <li>■ 12.2</li> <li>■ 12.6</li> </ul>	<b>Supply chain</b> 	<b>IP2</b> Responsible sourcing	Members with sustainable or responsible sourcing policies covering all materials	90	90	%
<ul style="list-style-type: none"> <li>■ 6.4</li> <li>■ 9.4</li> <li>■ 12.2</li> <li>■ 12.5</li> </ul>	<b>Operations</b> 	<b>IP3</b> Operations, incl. manufacturing	Energy consumption	167.1**	160.3	PJ NCV*
			Electricity from renewable sources	28.7**	52.4	%
			CO <sub>2</sub> emissions	11.2	9.2	Mt CO <sub>2</sub> e
			Members with validated SBTs*	30	70	%
			Total water withdrawals	101.4	95.5	Million m <sup>3</sup>
			Water withdrawals from water-stressed areas	18.6**	17.2	Million m <sup>3</sup>
			Waste generation	1.11	1.12	Mt
			ISO 14001 certification rate	98	97	%
<ul style="list-style-type: none"> <li>■ 5.5</li> <li>■ 10.3</li> <li>■ 10.4</li> </ul>	<b>Operations</b> 	<b>IP4</b> Employees	Sites with externally audited H&S* management system	63	70	%
			Women in total employees	14	15	%
			Women on Board of Directors	15**	18	%
			Members with public commitments to D&I*	100	100	%
<ul style="list-style-type: none"> <li>■ 12.4</li> <li>■ 12.6</li> </ul>	<b>Products &amp; Services</b> 	<b>IP5</b> Tire and Road Wear Particles (TRWP)	Cumulative number of TIP-sponsored publications on TRWP	20	24	Number
			Annual number of citations of TIP-sponsored TRWP publications	480**	513	Number
<ul style="list-style-type: none"> <li>■ 3.6</li> <li>■ 9.5</li> <li>■ 11.2</li> <li>■ 12.2</li> <li>■ 12.8</li> </ul>	<b>Products &amp; Services</b> 	<b>IP6</b> Sustainable mobility and digital solutions	Qualitative disclosure			
<ul style="list-style-type: none"> <li>■ 8.4</li> <li>■ 12.2</li> <li>■ 12.5</li> </ul>	<b>Products &amp; Services</b> 	<b>IP7</b> Low-carbon, circular solutions and end-of-life tires (ELT)	Qualitative disclosure			

\* GPSNR = Global Platform for Sustainable Natural Rubber;  
 PJ NCV = petajoule net caloric value;  
 SBTs = science-based targets;  
 H&S = health and safety;  
 D&I = diversity and inclusion

\*\* Historical data was updated by a few members using improved calculation techniques to ensure greater accuracy and reliability. These enhanced methodologies allow for a more precise assessment of past performance, correcting previous estimates.

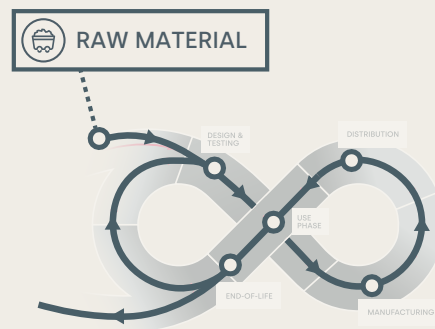
# Impact Pathway 1: *Supply Chain - Natural Rubber Sustainability*



04.

## 04. Impact Pathway 1

**Supply Chain - Natural Rubber Sustainability:**  
Accelerate and scale activities to achieve a fair, equitable and environmentally sound natural rubber value chain – including ensuring decent work and upholding human rights.



### Key achievements in 2023



**All TIP members** submitted disclosures to the Global Platform for Sustainable Natural Rubber (GPSNR) in line with mandatory reporting requirements.



**All TIP members** have committed to choosing sustainable natural rubber options, when given the choice, based on the GPSNR membership requirements.

#### TARGET 4-5

Eliminate all discrimination in education



#### TARGET 8-4

Improve resource efficiency in consumption and production



#### TARGET 12-2

Sustainable management and use of natural resources



For the purpose of understanding how TIP contributes to a sustainable natural rubber value chain, we refer to an organization of which all TIP members are part of the Global Platform for Sustainable Natural Rubber (GPSNR). This platform sets out to improve the socio-economic and environmental performance of the natural rubber value chain.

GPSNR membership requires annual mandatory reporting on the adherence to the platform's Policy Framework which was developed in 2021. The purpose of this framework is to promote sustainable purchasing policies among members through measures such as capacity building throughout the supply chain, promoting transparency, engaging smallholder farmers, and working with regulators.

In 2023, the GPSNR also announced the pilot testing of an assurance model that includes a verification framework to assist members with aligning to the GPSNR Policy Framework.



### Box 1: GPSNR assurance model under development

The GPSNR assurance model will focus on key themes such as due diligence, supply chain mapping, and risk assessment to verify the use of sustainable natural rubber during production. The assurance model involves detailed supply chain mapping to trace rubber origins and identify risks, complemented by rigorous due diligence to maintain ethical standards. Separate protocols have been developed to address

compliance verification (the Assurance Protocol) and non-conformities (the Remediation Protocol); both have gone through public consultations to ensure they reflect the needs and views of all relevant stakeholders. Additionally, guidelines for sustainability claims are being established to promote transparency and accountability among members.

### Box 2: Business examples - GPSNR and the Natural Rubber Value Chain

#### Goodyear

Goodyear does not own any rubber tree plantations but has taken actions as purchaser of natural rubber. The company's Natural Rubber Procurement Policy, which applies to Goodyear and its affiliates, aligns with the GPSNR Policy Framework, signaling Goodyear's strong natural rubber supply chain commitments across all aspects related to sustainability.

Through TIP, Goodyear has worked with other stakeholders to promote sustainability in the natural rubber supply chain. Goodyear, along with other TIP members, was among the founders of the GPSNR in 2018.

Goodyear prioritizes direct or indirect engagements within GPSNR Working Groups as a key measure to accelerate the move towards a more sustainable supply chain for natural rubber. In 2023, Goodyear leveraged the GPSNR capacity-building project to provide funding towards the training of 4,994 farmers in Indonesia to improve their agricultural practices. Among them, 45% were women and 21% were below 37 years old.

More information about this initiative is available [here](#).

#### Sumitomo

Aiming to become a company capable of contributing to the realization of a sustainable society, in September 2018 Sumitomo Rubber Industries co-founded the GPSNR. In August 2021, Sumitomo updated its Sustainable Natural Rubber Policy to reflect the policy framework approved by the GPSNR, with the aim of gearing up efforts to resolve matters in regions where natural rubber is produced, such as environmental issues caused by the destruction of forests and human rights issues in the working environment. As part of Sumitomo's efforts to identify key risks in the natural rubber supply chain, the company introduced RubberWay®, a natural rubber-specific environmental and social risk assessment tool, in July 2023.

The introduction of RubberWay® is expected to develop mitigation measures for high risks and contribute to sustainable natural rubber procurement.

More information about this initiative is available [here](#) and [here](#).



# Impact Pathway 2: *Supply Chain - Responsible Sourcing*







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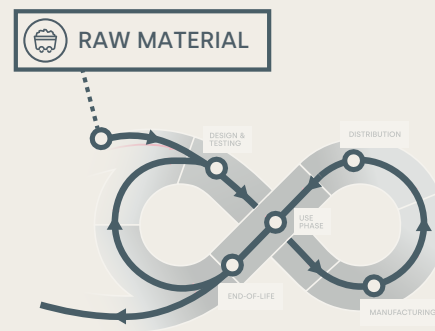
## 05. Impact Pathway 2

### Supply Chain - Responsible Sourcing:

Implement sustainable procurement practices and establish Environmental, Social, and Governance (ESG) responsibilities throughout the supply chain, including the promotion of transparency and traceability.

#### Key achievements in 2023

-  **90%** of members had adopted a responsible sourcing policy (RSP)
-  **70%** of members were using timebound targets in their policies
-  **60%** were embedding policies into contracts with suppliers
-  **30%** were using third parties to audit the fulfilment of policies



#### TARGET 8-4

Improve resource efficiency in consumption and production



#### TARGET 12-2

Sustainable management and use of natural resources



#### TARGET 12-6

Encourage companies to adopt sustainable practices and sustainability reporting



Tires are composed of a complex mix of materials, including natural rubber, synthetic rubbers, fillers, thermoplastic polymers, and manufacturing aids, each contributing to tire performance. Ensuring each of these components is responsibly sourced is essential for creating a sustainable supply chain for tires.

TIP members are committed to building a sustainable supply chain, a process that often consists of a multi-stage journey, and transparently reporting on progress under the Impact Pathway. The first step on this journey typically involves understanding the landscape and defining a policy to guide its sourcing approach, while setting time-bound targets to ensure measurable progression. The company must then engage with suppliers to establish collaborative approaches to achieving the targets and ensure requirements are embedded into supplier contracts. Over time, the company will follow up with suppliers to measure progress and conduct audits to ensure the fulfillment of agreements.

To track TIP members' progress, several KPIs that assess their performance in each stage of implementation were analyzed. These KPIs monitor

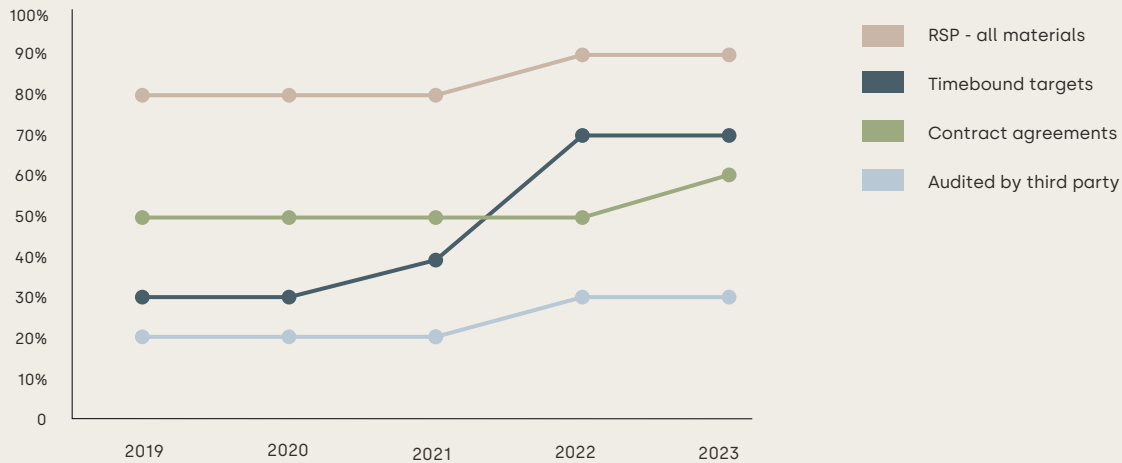
progress for all materials, while allowing for a focus on specific materials if necessary.

TIP members are committed to continuous improvement and strive to achieve high scores across all KPIs. Notably, members have focused on:

- Timebound targets within responsible sourcing policies, which seven out of ten members have developed; and
- Aligning their procurement contracts with their responsible sourcing policies, which six TIP members had done as of 2023, up from five the year before. This measure is important because it reflects the mainstreaming of sustainability commitments in organizational practices and influences procurement activities directly.

In addition, independent verification of suppliers' adherence to responsible sourcing policies can ensure the credibility and effectiveness of their sustainable sourcing efforts. The number of TIP members using this tool remains modest at 30% but has slightly increased from 20% in 2021 (Figure 3).

**Figure 3: TIP member performance for policies considering responsible sourcing for all materials, 2019-2023**

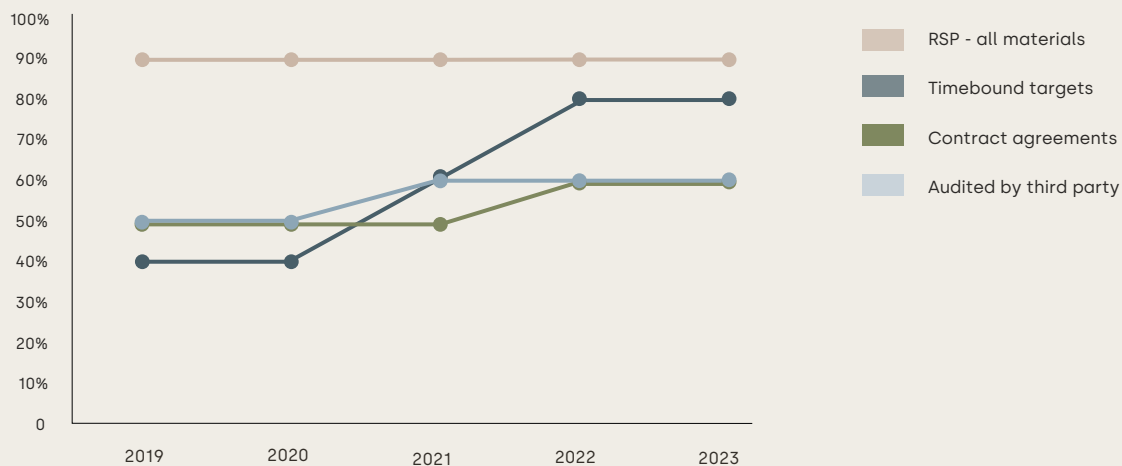


In relation to specific materials covered by the responsible sourcing policies, natural rubber, which was covered in the previous chapter, is the material prioritized by all TIP members with such policies. Additionally, various members have also established policies regarding the use of and avoidance of conflict materials.

More TIP members have timebound targets to ensure responsible supply of specific materials

compared to all materials (eight as opposed to seven); more members audit adherence to these policies using third party audits (six versus three) – see Figures 3 and 4 for comparison. This aligns with the increased scrutiny and reporting obligations of current and future regulations.

**Figure 4: TIP member performance on specific materials, 2019-2023**



### Box 3: Business examples – Responsible sourcing policies

#### Michelin

Of all the purchasing categories, natural rubber warrants the most attention to both its environmental and its societal impacts. This is because 90% of the world's production comes from Asia, and over 85% of the volumes are sourced from smallholders, usually on farms of less than four hectares. Given how complex and fragmented natural rubber's supply chain is, a dedicated approach has been devised.

Michelin is conducting several projects to transform the natural rubber industry towards sustainability.

With the RIVER project, a public-private partnership brings together the French Ministry of the Economy and Finance, the Sri Lankan Ministry of Plantations, Ksapa, an NGO coordinating this initiative on the ground, and Michelin's Sri Lankan subsidiary. The project aims to train 6,000 farmers and their families in agricultural techniques, soft skills, and environmentally friendly farming practices to secure improved livelihoods. In addition to in-person training, it leverages a digital training tool to enhance learning and measure impact.

Smallholders make up much of the natural rubber supply chain, and it is essential that they can secure decent livelihoods while farming rubber in an environmentally and socially responsible way. It is also part of Michelin's approach to its duty of care, where risks throughout its supply chain are assessed and mitigated.

More information about this initiative is available [here](#) (pages 273 to 282) and [here](#).

#### Pirelli

Training, capacity building and understanding of the rules and principles relating to responsible management plays a key role in Pirelli's partnership with its suppliers.

In 2023, Pirelli activated a training course on Business and Human Rights, dedicated to 100% of the group's raw materials suppliers. The course aimed at providing the essential information enabling suppliers to understand, act and mitigate risks related to Human Rights. Rationalizing the requirements of the international regulations and guidelines of which Pirelli calls for application such as the International Labour Organization (ILO) international regulations, the Organization for Economic Co-operation and Development (OECD) Guidelines on the duty of vigilance, and the United Nations Guiding Principles on Business and Human Rights. Within Pirelli's decarbonization strategy, capacity building was also activated in 2023 to support suppliers in the identification of CO<sub>2</sub> emission reduction actions. This capacity building also allowed Pirelli to obtain primary data covering 91% of indirect Scope 3 upstream emissions. In 2021, Pirelli moved to a natural rubber specific field, producing the first tire with FSC®-certified Natural Rubber. Since then, the company has worked with its natural rubber suppliers to further extend certification in the supplier base announcing in 2023 the use of 100% FSC®-certified Natural Rubber in all Pirelli tires dedicated to FIA Formula One World Championship for the following season.

More information about this initiative is available [here](#) (pages 142, 186) and [here](#).





# Impact Pathway 3: *Operations - Manufacturing*



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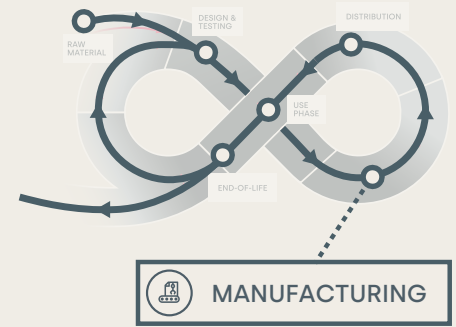
## 06. Impact Pathway 3

### Operations - Manufacturing:

Develop pathways to decarbonize operations, reduce emissions and ensure the sustainable use of natural resources

Sustainable operations are important both to environmental stewardship and to the business viability of the tire manufacturing industry. Sustainable practices, such as the promotion of a circular economy, the use of renewable energy, and energy-efficient manufacturing are crucial for minimizing the environmental impact of production.

By implementing these practices, tire manufacturers not only comply with increasingly stringent environmental regulations, but also meet growing consumer demand for environmentally responsible products. Thus, sustainability is becoming an integral part of tire companies' business models.



<p><b>TARGET 6-4</b> Increase water-use efficiency and ensure freshwater supplies</p>	
<p><b>TARGET 9-4</b> Upgrade all industries and infrastructures for sustainability</p>	
<p><b>TARGET 12-2</b> Sustainable management and use of natural resources</p>	
<p><b>TARGET 12-5</b> Substantially reduce waste generation</p>	

### Key achievements in 2023



**4%** year-over-year reduction in absolute energy consumption



**6%** year-over-year reduction in water withdrawals



**51%** year-over-year increase in purchased renewable electricity



**8%** year-over-year reduction in total water withdrawals from water-stressed areas



**18%** year-over-year reduction in absolute CO<sub>2</sub> emissions



**94%** of generated waste sent to recovery, up from 93% in 2022



**70%** of TIP members have validated Science Based Targets (SBTs) (an **113%** increase from 2022)

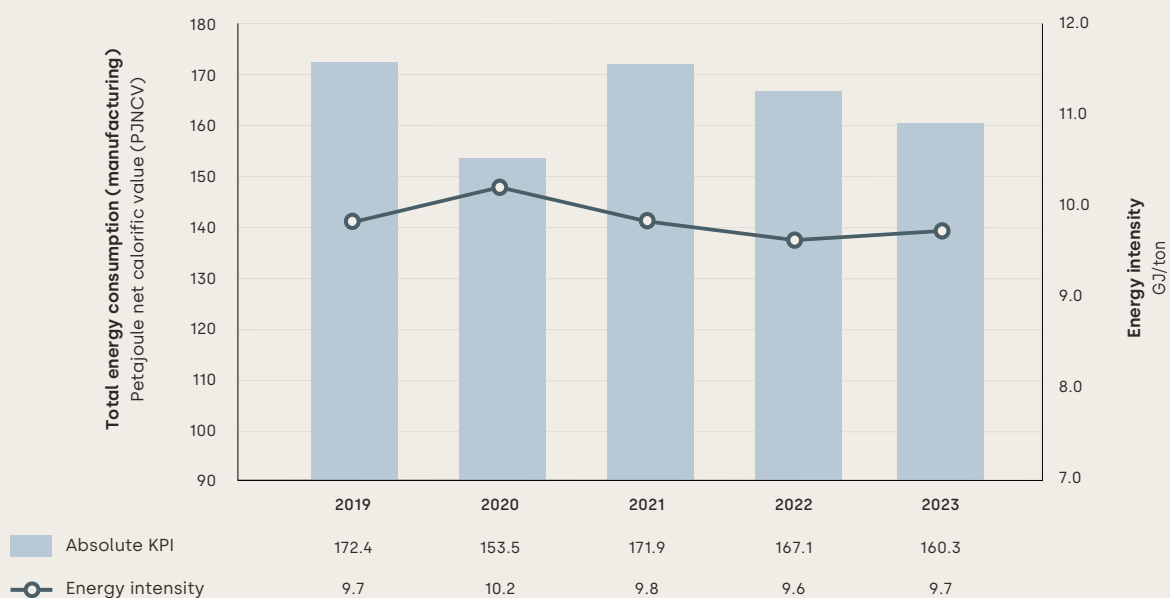


## 6.1 Energy consumption, energy mix & electricity derived from renewable resources

The tire production process is energy intensive, involving multiple stages such as mixing, milling, building, and curing. By reducing manufacturing-related energy consumption, TIP members could both decrease their carbon footprint, and enhance their operational efficiency.

In 2023, TIP members made significant adjustments to further incorporate cleaner manufacturing practices and thus improve the sustainability of their operations. The most salient measures were the purchase of energy attribute certificates (EACs) and the installation of solar panels at manufacturing facilities to support the shift to renewable energy. In addition, some members mentioned efforts to incorporate hydrogen as an alternative fuel.

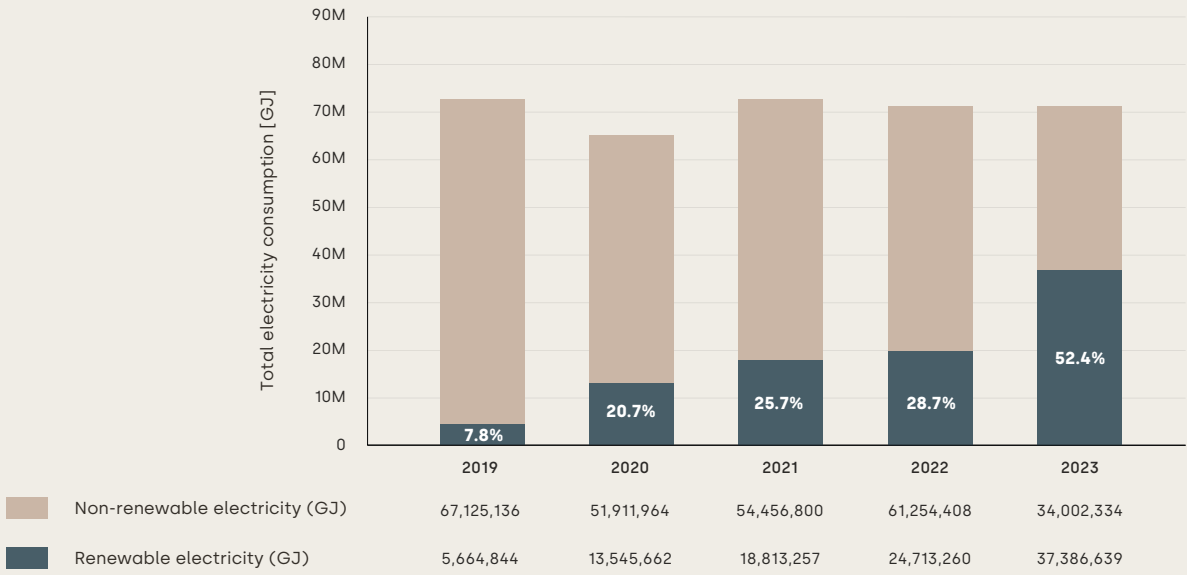
Figure 5: TIP members' total energy consumption and energy intensity, 2019-2023



As seen in Figure 5, energy intensity has remained largely stable since 2019, apart from a spike in 2020 related to a drop in production output due to COVID-19. Meanwhile, absolute energy consumption has been decreasing since 2021,

due in part to the members' increased uptake of energy-saving measures, technological upgrades, and a general shift towards more sustainable production practices and in part to a contraction in production volumes.

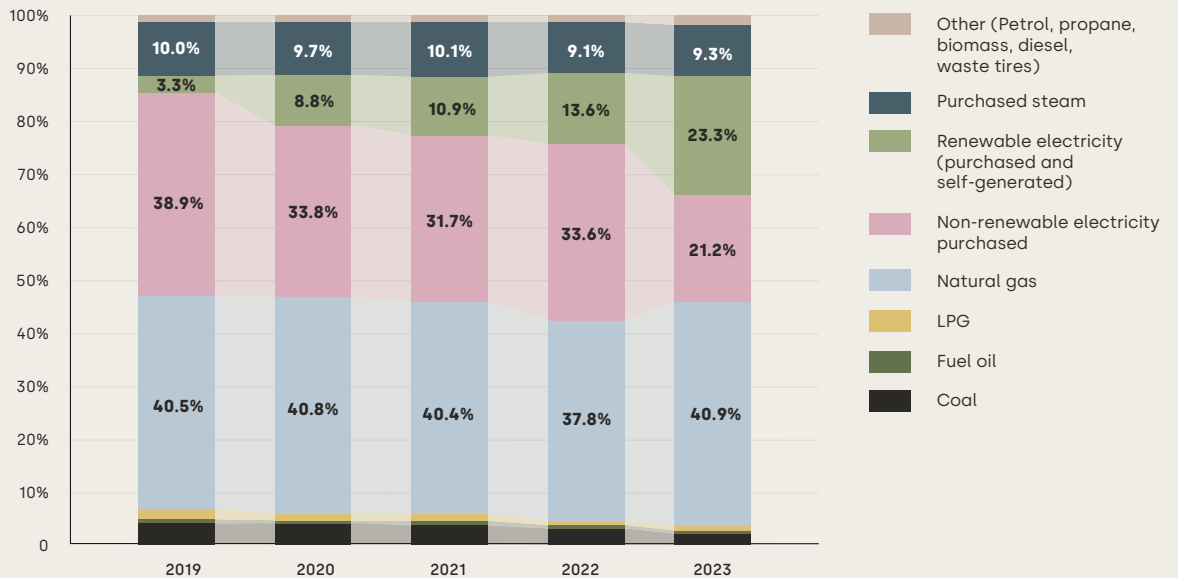
**Figure 6: TIP members' electricity consumption derived from renewable sources (GJ), 2019-2023**



As evidenced in Figure 6, there was a 27% year-over-year decrease in total non-renewable electricity purchased in 2023, while total renewable electricity purchased and self-generated increased by 51% compared to 2022.

These significant shifts in overall purchase patterns resulted in the proportion changes outlined in Figure 7: increased representation of natural gas and the "other" category, which encompasses increased usage of biomass.

**Figure 7: TIP members' energy mix, 2019-2023**



Overall, a positive trend can be observed in the energy mix of TIP members over time, as shown in Figure 7. The proportion of renewable electricity increased from less than 4% in 2019 to almost a quarter of the total energy mix in 2023.

It is worth noting that historical data, specifically the 2022 non-renewable electricity consumption

data, was updated by a few members using improved calculation techniques to ensure greater accuracy and reliability. These enhanced methodologies allow for a more precise assessment of past performance, correcting previous estimates.

## Box 4: Business examples - Energy efficiency and energy mix

### Continental

Continental is continuously investing in innovative, energy-efficient, and low-emission production methods. Thanks to 160 energy-saving projects, Continental Tires reduced its annual energy requirements by around 150 gigawatt hours in 2023.

This was achieved, for example, through the increased use of renewable energies and thermal insulation. 150 gigawatt hours equates to powering about 12,500 family homes for a year, with an average consumption of 12,000 kilowatt hours per year.

The ambition of Continental Tires by 2030 is to reduce its energy consumption by 20 percent versus 2018. Continental is aiming to achieve climate-neutral production by 2040 at the latest.

Since the end of 2020, the company has purchased 100% renewable electricity for all its sites worldwide. For this purpose, guarantees of origin are obtained in accordance with the criteria of the global RE100 Initiative.

More information about this initiative is available [here](#) and [here](#).

### Michelin

Michelin's environmental policy aims to control pollution risks and reduce the Group's environmental footprint. To reduce Michelin's CO<sub>2</sub> emissions, actions have been undertaken in two main areas:

- Consuming less (energy savings)
- Consuming better (energy transition).

By 2050, the Group's ambition related to its facilities is to achieve net zero CO<sub>2</sub> emissions. To attain this target, Michelin will follow the below hierarchy of levers:

- Avoid: Challenge needs, acculturate
  - Reduce
  - Reuse
  - Recycle
  - Renew: Emission factors.
- Energy efficiency

The Group's 2030 targets are the following:

- Halving the Group's CO<sub>2</sub> emissions from facilities compared to 2010
- Eliminating thermal energy generated from coal, both on site and purchased from others
- Improving the energy efficiency of plants by 37% vs 2010.

At the end of 2023, around 90% of Michelin's industrial sites had drawn up their 2030 roadmap.

More information about this initiative is available [here](#) and [here](#).

### Goodyear

Goodyear's energy optimization program focuses on five areas:

- Energy management
- Energy efficiency
- Renewable energy
- Fuel switching, and
- Technology development.

Strategic actions are being undertaken in each of the five areas to reduce emissions, improve energy efficiency, and increase renewable energy use.

In 2023, Goodyear developed a renewable electricity roadmap, which includes:

- Onsite renewable energy
- Power purchase agreements (PPAs)
- Green tariffs, and
- Energy attribute certificates (EACs).

The company has already implemented onsite renewable energy, green tariffs and EACs. Its long-term plan is to utilize corporate PPAs. This will ensure Goodyear can maintain its decarbonization and add new power generation to the grid.

In addition to its EMEA region operating with 100% renewable electricity, Goodyear has several other facilities procuring and generating renewable electricity.

At the end of 2023, Goodyear was using 37% renewable electricity globally through procurement and onsite generation. The company is also on target to reach 100% renewable electricity in all its global manufacturing facilities by 2030.

More information about this initiative is available [here](#).

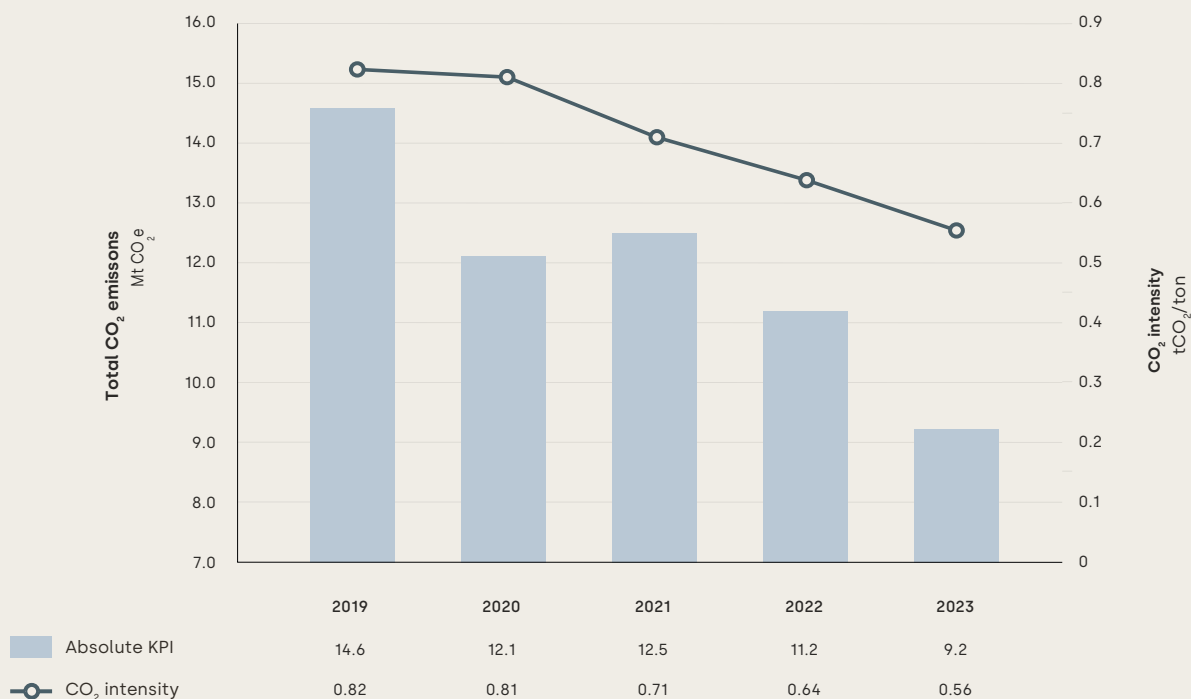
## 6.2 CO<sub>2</sub> emissions and decarbonization commitments

Throughout 2023, TIP members continued to demonstrate progress in reducing CO<sub>2</sub> emissions, notably due to an increase in renewable energy consumption and energy efficiency.

The year marked a record-low CO<sub>2</sub> generation

level of 9.2MtCO<sub>2</sub>e, corresponding to an 18% decrease vs 2022 and an approximately 40% drop since 2019. The emissions intensity has followed a similar trend, dropping to a record-low level of 0.56 tCO<sub>2</sub>e/t of output in 2023.

**Figure 8: TIP members' total CO<sub>2</sub> emissions and CO<sub>2</sub> intensity, 2019-2023**



In 2023, four additional members secured validation of their greenhouse gas emission reduction targets (Figure 9) from the Science Based Target Initiative (SBTi), bringing the total ratio of TIP members with validated SBTs to 70%. Members who were awaiting validation following COVID-19 delays have now had their targets approved.

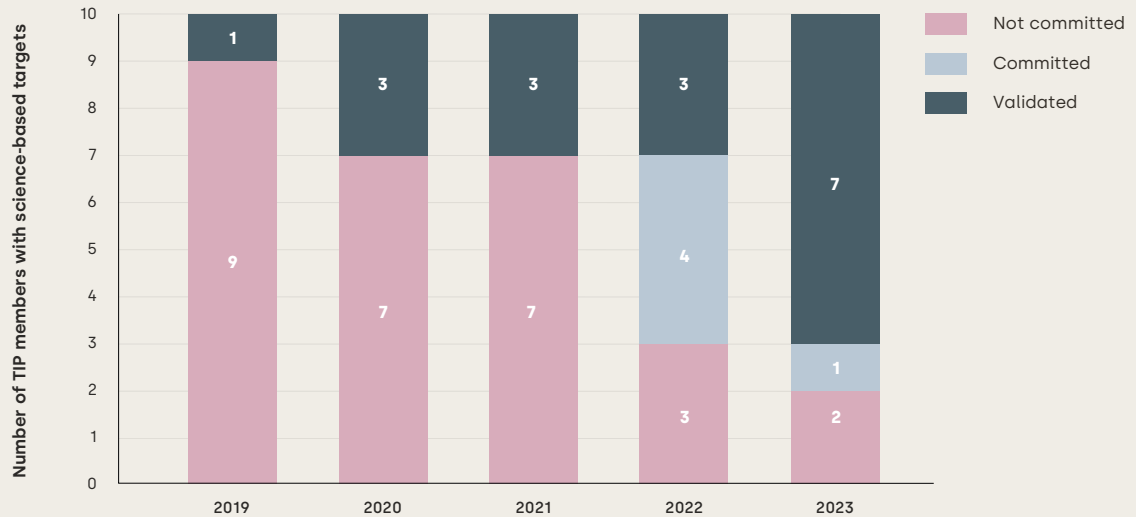
The importance of SBTi validation lies in its rigorous assessment process, which ensures that corporate climate targets are ambitious, credible, and aligned with the Paris Agreement. This initiative not only helps support the achievement of the SDGs, but also highlights the tire industry's collective focus on mitigating the significant environmental impact of its manufacturing operations.

Despite the original scope of this Impact Pathway on manufacturing operations, members continue to leverage decarbonization levers for process changes and efficiency advancements across the value chain, most notably via Impact Pathways 1, 2, 6, & 7.

TIP acknowledges this metric extends beyond operations, which will be taken into consideration in future reports.



Figure 9: TIP members and science-based targets, 2019-2023



Box 5: Business examples - CO<sub>2</sub>

Bridgestone

The company is working to establish its unique Sustainability Business Model by incorporating sustainability into the corporate strategy and Mid-Term Business Plan.

Bridgestone's Sustainability Business Model links the business with the realization of carbon neutrality and a circular economy across the entire value chain, from "produce and sell" and "use" of products to their "renewal" to raw materials.

Clear 2030 mid-term targets have been set for achieving carbon neutrality by 2050 and SBTi certification has been obtained.

In 2023, Bridgestone accelerated the introduction of renewable energy for purchased electricity and fuels, including biomass fuels. As a result, the renewable energy (electricity) ratio\* increased significantly to 69% in 2023 compared to 26% in 2022, and CO<sub>2</sub> emissions were reduced by 57% compared to 2011, exceeding the level of the 2030 reduction target.

More information about this initiative is available [here](#) and [here](#).

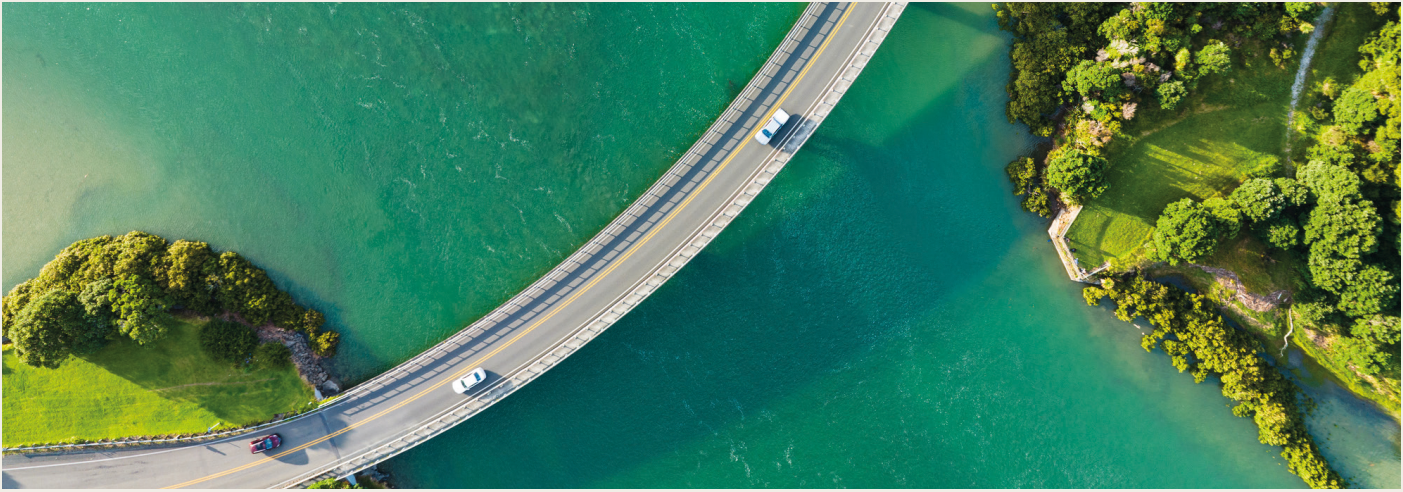
Kumho Tire

In July 2022, Kumho Tire joined the SBTi, committing to a Net Zero goal aligned with the 1.5°C scenario. The company has developed a renewable energy procurement plan and detailed Scope 3 reduction strategies, aiming to submit these for SBTi approval in 2026.

Kumho Tire's carbon neutrality target is to reduce emissions by approximately 30% by 2030 compared to 2022 levels, and to achieve net zero by 2045.

Additionally, the company has set a goal to achieve RE100 for all overseas sites by 2038 and for all sites by 2045. As part of this effort, some sites are already operating solar power facilities.





### 6.3 Water withdrawal, waste disposal and elimination, and ISO 14001 compliance

Water withdrawal is an important impact associated with tire manufacturing due to the water requirements in the production process. In 2021, members began reporting their water withdrawal from both stressed and non-stressed areas as responsible water use underscores the industry's commitment to sustainable resource management.

In 2023, total water withdrawals and water intensity decreased by 5.82% and 0.34%, respectively, compared to 2022 as shown in Figure 10. In addition, the amount of water withdrawal from stressed areas decreased by 7.53%.

TIP members are committed to further reducing water withdrawals, particularly from water-stressed areas, through the implementation of water stewardship policies and actions.

**Figure 10: TIP members' water withdrawals from water-stressed\* and non-water-stressed areas, 2019-2023**

\* One TIP member could only provide data on water withdrawals from water-stressed areas for 2021, hence reported values for 2019, 2020 and 2022 may be lower than actual figures.

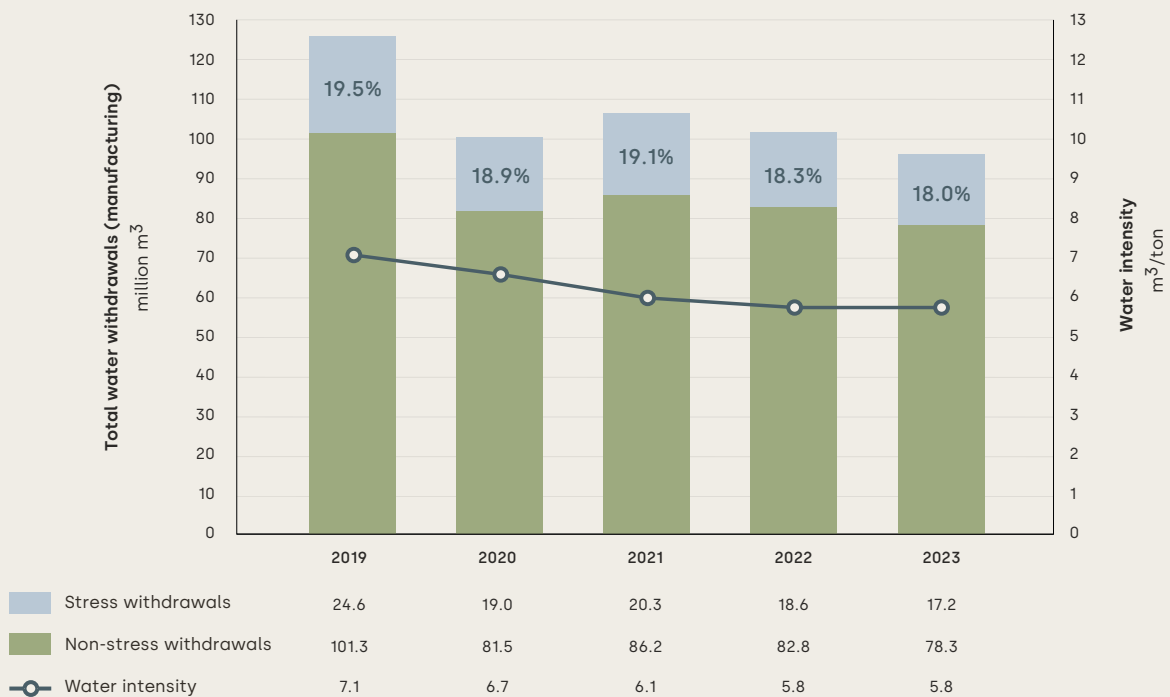
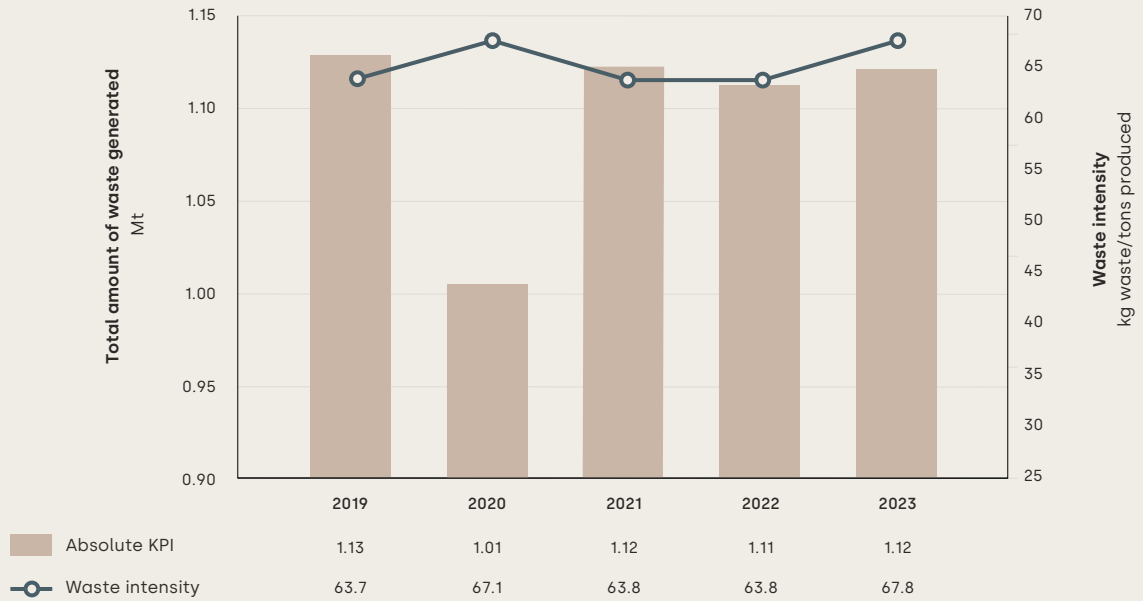




Figure 11 shows TIP members' absolute waste generation and waste intensity since 2019. The analysis indicates a marginal increase in waste

generation in 2023 over the previous year and a 6% increase in waste intensity.

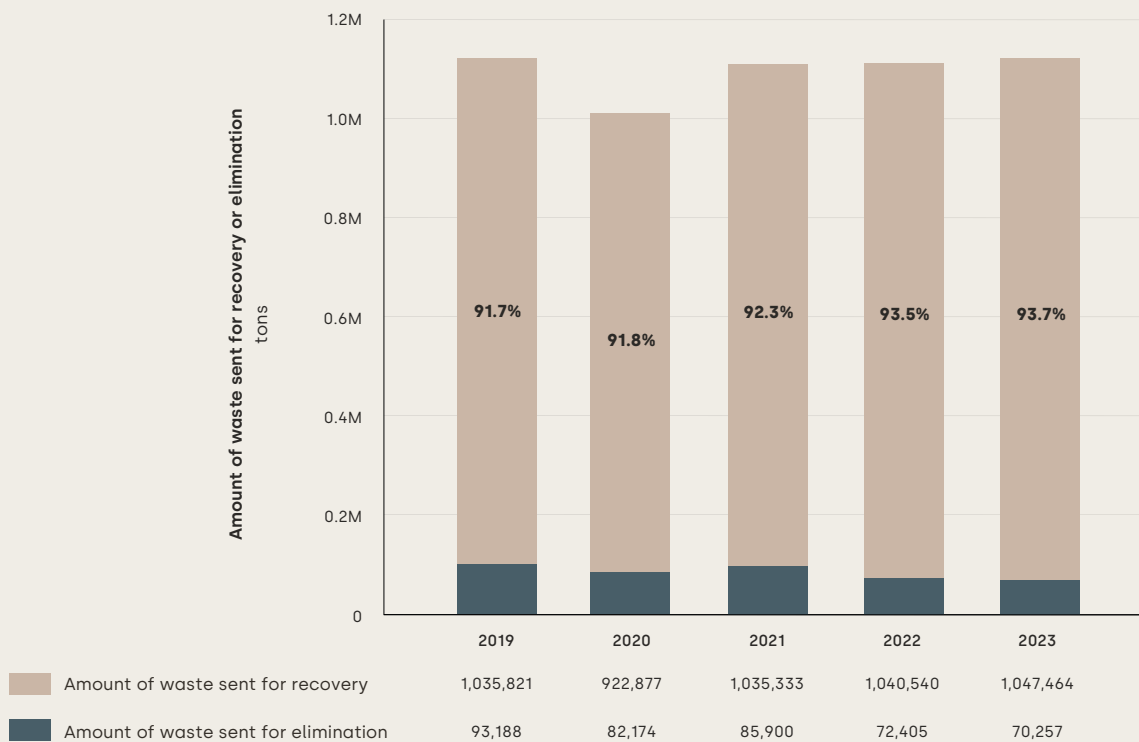
Figure 11: TIP members' total waste generated and waste intensity, 2019-2023



In 2023, TIP members sent the majority (94%) of waste generated to recovery operations, including reuse, recycling, composting,

or incineration with energy recovery. This was the same level as in 2022 and a record-high from when the data was first collected in 2014.

Figure 12: Breakdown of waste sent for disposal and recovery, 2019-2023

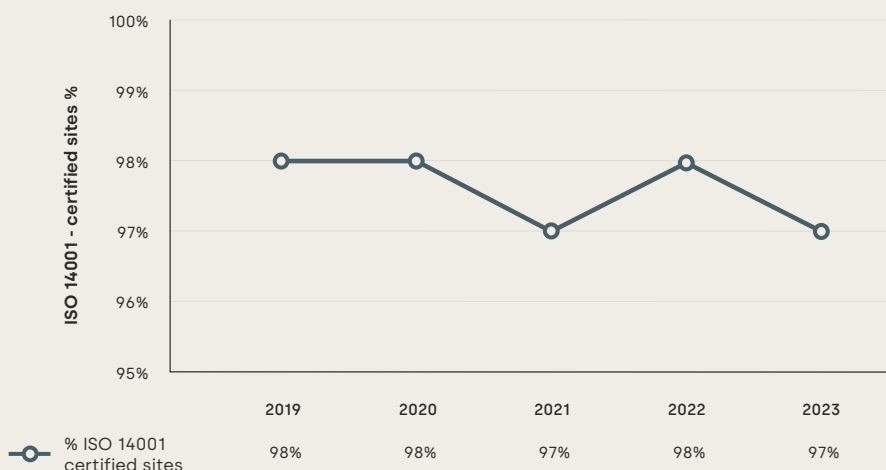


Adopting the ISO 14001 standard provides a structured framework for systematically managing environmental responsibilities. The International Organization for Standardization (ISO) helps companies enhance their environmental performance and minimize negative impacts. Moreover, the standard promotes continuous improvement, driving

sustainable practices and contributing to long-term environmental and economic benefits.

Figure 13 illustrates that TIP members operated a total of 241 manufacturing sites in 2023, of which 233 (97%) were ISO 14001-certified. This KPI has stayed largely stable in recent years demonstrating the members' commitment to operational excellence.

**Figure 13: Percentage of TIP member sites that are ISO 14001-certified, 2019-2023**



## Box 6: Business examples – Water, waste, ISO 14001

### Yokohama

In 2022, Yokohama conducted a comprehensive water risk assessment that combined local information with the World Resources Institute (WRI) Aqueduct water risk assessment tool to look at water volume and quality risks in different countries.

As a result of the assessment, the company invested in enhancing leakage protection and water recycling at two of its manufacturing sites in Japan – specifically Mie and Onomichi.

Global manufacturing sites have also implemented water-saving measures examples include:

- A closed-loop water system in India
- Rainwater collection for cooling and restroom use in Thailand and China
- The installation of water treatment facilities for wastewater quality across global manufacturing sites.

These efforts reflect the company's commitment to water conservation and risk management across its global operations.

More information about this initiative is available [here](#).

### Kumho Tire

Kumho Tire has established a water management system to respond to strengthened environmental laws and regulations, including South Korea's Water Environment Conservation Act, and to address water risks at each business site.

Kumho Tire has set and managed mid- and long-term targets to reduce water intensity and improve water usage, including water supply, sewage, and industrial water. In order to recycle wastewater into process water, the Gokseong Plant uses advanced treatment methods such as reverse osmosis to recycle it for boiler water, and the Gwangju Plant recycles wastewater that has gone through sedimentation tanks into cleaning water for air pollution prevention facilities in the plant, thus reducing wastewater generation.



# Impact Pathway 4: *Operations - Employees*

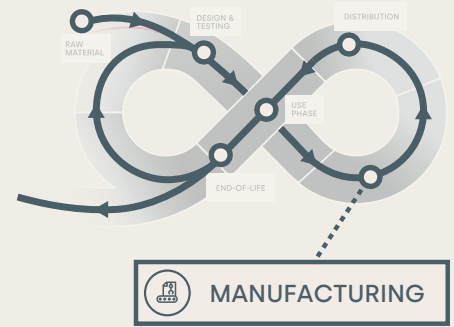


07.

## 07. Impact Pathway 4

### Operations - Employees:

Ensure safe and inclusive working environments and equal opportunities for all employees.



### Key achievements in 2023



**70%** of sites have implemented an externally audited health and safety management system.



**100%** of members have a public commitment to diversity and inclusion



**66%** of new board nominees were women.

#### TARGET 5-5

Ensure full participation in leadership and decision-making



#### TARGET 10-3

Ensure equal opportunities and end discrimination



#### TARGET 10-4

Adopt fiscal and social policies that promote equality



In 2023, TIP members' total workforce grew to 527,513 employees, a 2% increase since 2019. By implementing sound working practices and ensuring fair treatment for all employees, members help uplift communities, provide stable incomes, and foster economic growth.

Health and Safety (H&S) and Diversity and Inclusion (D&I) are priority topics for TIP. Ensuring the well-being of employees through rigorous health and safety standards is fundamental as it protects individuals and enhances the overall productivity and wellbeing of the workforce.

Fostering a diverse and inclusive work environment is crucial for innovation and fairness, reflecting the wide range of perspectives and backgrounds.

By prioritizing these areas, TIP members create workplaces that are not only safe and healthy but also equitable and welcoming, thereby positively contributing to the social fabric of the communities in which they operate.

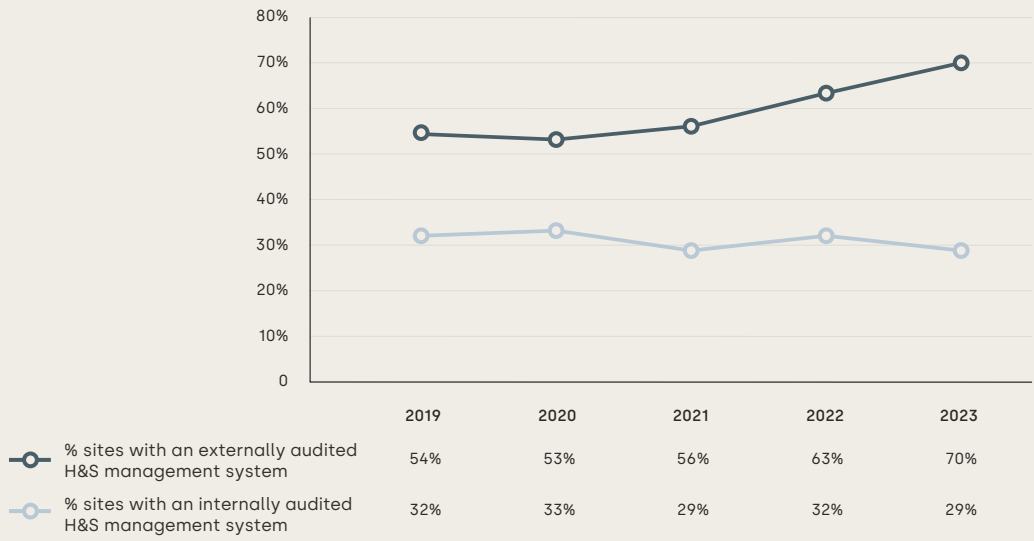
## 7.1 Safe working environments

In 2023, TIP members introduced a KPI to enable reporting on the rate of adoption of H&S management systems at site level. Consequently, two KPIs were developed to report sites that are (i) externally audited by a third party and (ii) only internally audited.

The adoption of externally audited systems has been on an upward trend since 2019, reaching 70% in 2023, up from 63% in 2022.

Of the 241 sites operated by TIP members, 99%, or 238, were audited either internally or externally in 2023.

Figure 14: Percentage of sites with an externally and internally audited health and safety system, 2019-2023



**Box 7: Business examples - Safe working environments**

**Continental**

Continental provides a safe, healthy, and ergonomic work environment for its employees. It values inclusion and diversity and strives to create a workplace where each individual feels valued and supported. The relentless pursuit of accident prevention and the goal of reducing the number of accidents to zero remains.

Through continuous advances in technology and the cultivation of a high level of safety awareness, Continental is committed to further reducing the accident rate across its global operations.

As a result of continuous efforts, Continental has significantly reduced the number of accidents (per million hours worked) from 2.5 in 2022 to 2.1 in 2023. Continental's Group Sector Tires has played a significant role in this achievement.

More information about this initiative is available [here](#) (page 38) and [here](#).

**Yokohama**

Yokohama carried out the following activities in FY2022 to promote H&S:

**1. Enhanced equipment safety**

Regular risk assessments are conducted for facilities and operations, with a focus on equipment safety. Monthly follow-ups track risk counts and improvement opportunities. Domestic plant directors perform top safety diagnoses. Efforts are made to enhance disaster prevention across the company and prevent similar incidents.

**2. Development of safety-conscious Human Resources**

Yokohama aims to train staff to identify risks and hazards and prevent them. Daily risk prediction training and proactive near-miss detection and improvement activities are part of the approach. Experiential training called "Taikan Dojo" is also provided. Supervisors engage in one-on-one communication to enhance workers' understanding and encourage proactivity around safety.

**3. Development of Standard Work Manuals**

Systematic and continuous work observations identify unsafe behaviors and sources of risk. Efforts are underway to develop comprehensive standard work manuals.

More information about this initiative is available [here](#).

## 7.2 Women's representation in TIP member companies

Prioritizing D&I in employment practices is a strategic action area for TIP members, as these efforts are essential for fostering innovation, enhancing employee engagement, and driving business success. With a diverse workforce encompassing various cultures and backgrounds, TIP members prioritize equal treatment for all employees.

TIP members are pursuing efforts to increase the number of women in all areas of the organization, from entry-level positions to the executive board. Leveraging the Global Reporting Initiative (GRI) reporting framework, we track:

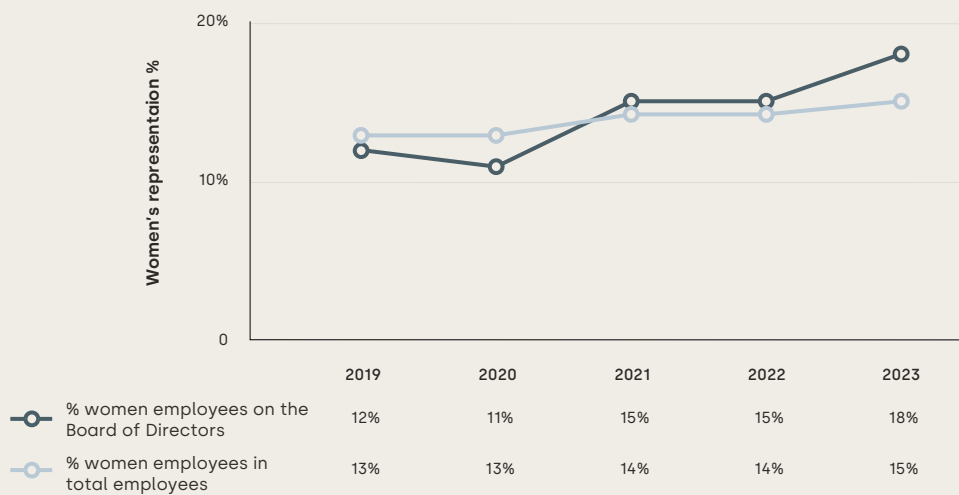
- Women's representation among total employees, and
- Women's representation on the Board of Directors.

In 2023, as part of the board member renewal cycle, six women were newly nominated to join the members' boards, representing 66% of the total new board nominees.

Regarding the total number of women employees, members continue to demonstrate gradual progress with a 1% increase, reflecting the initiative of TIP members to align with the SDG Roadmap and the objectives of SDG 5.



**Figure 15: Percentage of women representation on the Board of Directors and total employees, 2019-2023**



### 7.3 The percentage of TIP members with public commitments to diversity & inclusion

Since 2019, all ten TIP members have shared public commitments related to efforts and improvements in the Diversity & Inclusion areas. As part of their long-term vision, policies and practices will be implemented to promote equity in recruitment, career development, and daily interactions within the organizations.



#### Box 8: Business examples - Women's representation and diversity & inclusion

##### Toyo Tire

To promote the empowerment of all employees, Toyo Tire has established different types of personnel systems, a talent development plan, and career counselling support for each employee. Further, to promote understanding of diversity from various perspectives, Toyo Tire is enhancing theme-specific training covering topics such as LGBT, women's activities, harassment, and unconscious bias.

One notable project promoting diversity is the human resources empowerment committee run by Toyo Tire Japan Co., Ltd., which was established to promote the career advancement and empowerment of women employees in particular. It has since been extended to all employees, in recognition of the fact that the active participation and improved awareness of managers, supervisors, and male employees is also key to promoting women in the workplace.

The company has been proactive in reviewing job descriptions, responsibilities, and authority with the career advancement of women employees in mind. The number of women in management positions has increased as a result.

More information about this initiative is available [here](#).

##### Sumitomo

Sumitomo Rubber Group is firmly committed to advancing diversity and inclusion, a topic that is integral to their corporate philosophy. The group prioritizes honoring individual differences and aspires to cultivate an organizational culture where employees mutually inspire one another, guided by the strong dedication of President Yamamoto.

As part of the initiatives to promote women's empowerment, Sumitomo developed frameworks and programs, including the Mentoring System, aimed at bolstering women's career progression.

In 2023, the group introduced an executive management program tailored to aspiring women leaders earmarked for top management positions.

Beyond the focus on women's empowerment, the group is dedicated to fostering a culture of respect and has launched various educational programs to promote understanding of gender minorities.

Moreover, Sumitomo has created handbooks to promote understanding of the LGBTQ+ and Ally communities, driven by the voluntary participation of employees.

More information about this initiative is available [here](#) and [here](#).



# Impact Pathway 5: *Products and Services - Tire and Road Wear Particles*

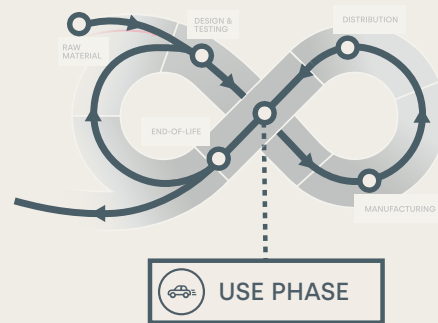


08.

## 08. Impact Pathway 5

### Products and Services - Tire and Road Wear

**Particles:** Further leverage multi-stakeholder efforts to achieve evidence-based solutions that address Tire and Road Wear Particles (TRWP).



### Key achievements in 2023



TIP-sponsored research papers were cited **513** times in 2023, demonstrating our ongoing impact in the scientific community

#### TARGET 12-4

Responsible management of chemicals and waste



#### TARGET 12-6

Encourage companies to adopt sustainable practices and sustainability reporting



Tires play a unique role in providing safe mobility as they are the only connection between the vehicle and the road. The friction between tires and the road surface, critical to vehicle safety and performance, generates what are defined as TRWP<sup>1</sup>. TRWP are a mix of roughly half tire tread material and half road-pavement material<sup>2</sup>. These particles can enter the environment, finding their way into the air, soil, and water bodies, potentially impacting biodiversity.

The whitepaper detailed in Box 9 highlights the need for collective efforts of an array of stakeholders, who together can accelerate and enhance the scientific understanding of potential pathways for mitigating TRWP.



### Box 9: White paper on TRWP Mitigation

Reaffirming the commitment to addressing TRWP, TIP has published a white paper on efforts to mitigate TRWP by supporting three main areas:

1. Conducting and supporting scientific research to identify and fill data gaps on the potential impacts of these particles and effective approaches to mitigation.
2. Accelerating science-based pilot projects on mitigation solutions and promoting best management practices.
3. Supporting and accelerating the efforts of others to advance mitigation solutions.

TIP aims to work closely with the research community, professional associations in the tire industry, the roadbuilding and vehicle manufacturing sectors, and local, state, national and regional authorities, civil society and policymakers. This collective effort leverages the unique strengths of stakeholders who, together, can accelerate and advance scientific understanding and potential pathways to mitigate TRWP.

For further information, please read the detailed whitepaper [here](#).

Interest from academia and research institutions has grown in parallel with TIP's research program, as evidenced by the recent acceleration in the number of scientific studies on TRWP highlighting the complexity of the topic.

TIP's commitment to producing scientific research and evidence is linked to the ambition to further

understand the complexities and impact of TRWP. To strengthen awareness and participation within the international scientific community, TIP's research is released to the public, granting free access to assessments and results, and witnessing a significant number of citations within the scientific ecosystem (Figure 17).

Figure 16: Annual and cumulative number of TIP-sponsored papers concerning TRWP published, 2019-2023

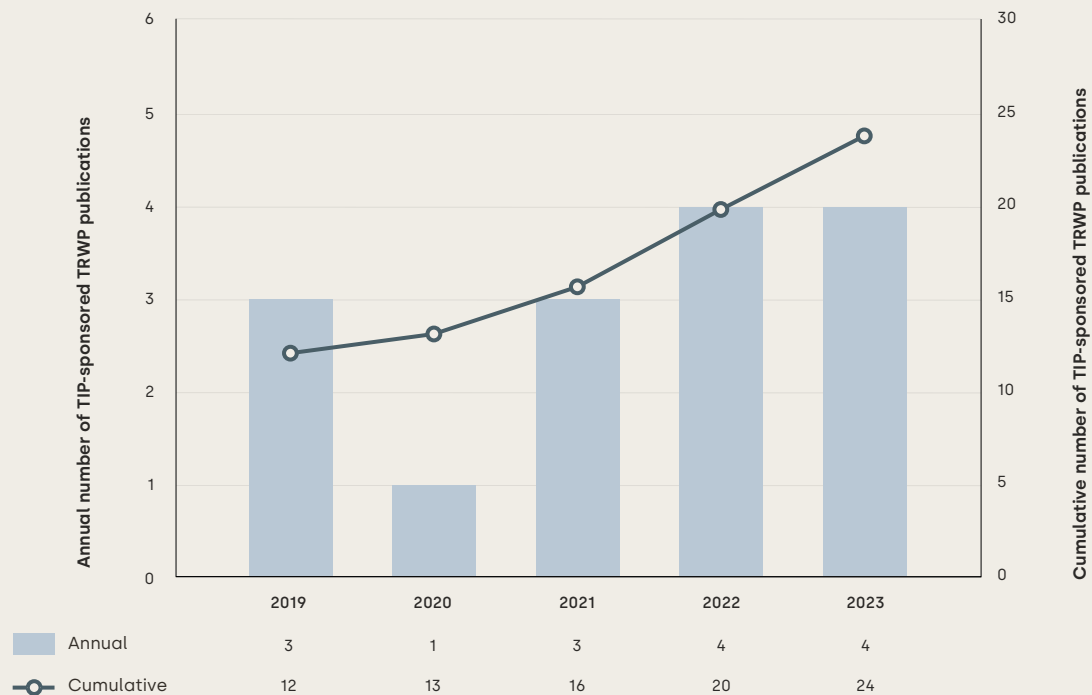
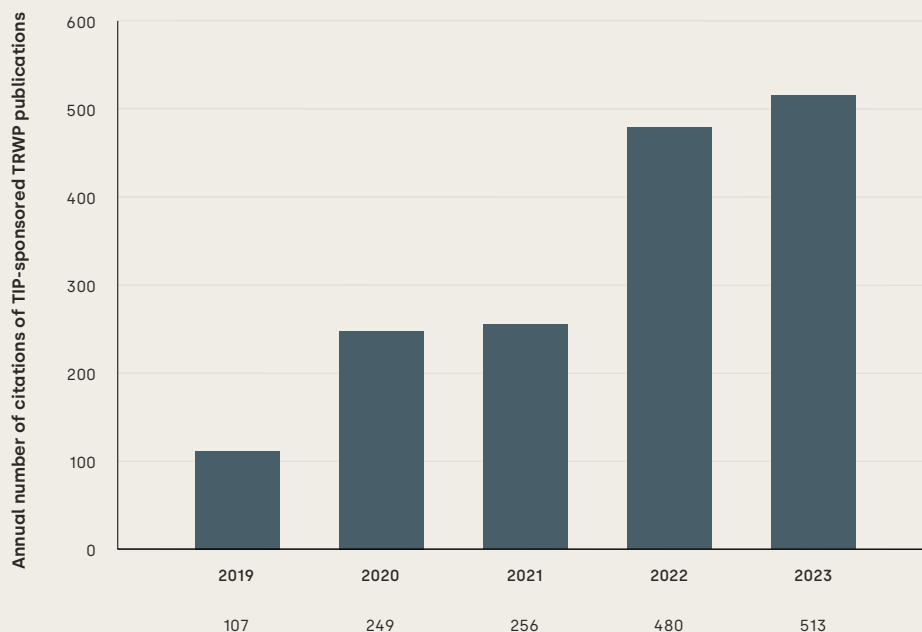


Figure 17: Annual number of citations of TIP-sponsored publications concerning TRWP, 2019-2023



### Box 10: Conference presentations in the field of TRWP

In 2023, TIP presented its study, "Exposure of the Aquatic Insect *Chironomus riparius* to Cryogenically Milled Tire Tread Leads to Bioaccumulation of Rubber Additives and Potential Trophic Transfer to Fish," at the International Conference on Chemistry and the Environment (ICCE).

SPOTLIGHT: Upcoming Tire Emissions Research Conference by TIP.

TIP is supporting the inaugural Tire Emissions Research Conference from December 4-6, 2024, at the Science Congress Center in Munich, Germany. Supported by TIP, this conference will bring together scientists, regulators, NGOs, and academics to discuss scientific research and actionable solutions surrounding tire emission generation, environmental impacts, and mitigation strategies. For more information and registration, visit the conference [website](#).



# Impact Pathway 6: *Products and Services – Sustainable Mobility and Digital Solutions*



09.

## 09. Impact Pathway 6

**Products and Services – Sustainable Mobility and Digital Solutions:** Accelerate the sustainable mobility transition by raising awareness of the impact of user behavior, designing connected and intelligent tires and providing innovative digital solutions.

Innovation linked to the mobility industry is contributing to a better understanding of tire emissions and to the assessment of actionable solutions.

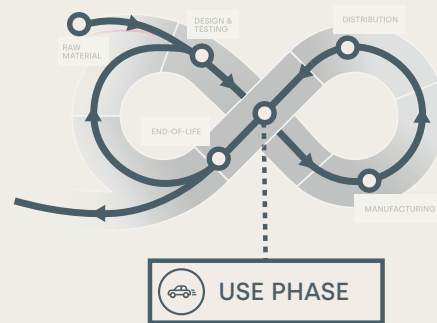
Examples include tire sensors providing drivers with real-time data on the optimal time for replacement through the monitoring of tread depth, pressure, and overall tire health – indirectly ensuring safety and maximizing tire life, as well as digital platforms offering insights into driving patterns that impact tire wear and fuel efficiency. Collectively, these advancements underscore the significant impact of user behavior on sustainability, promoting responsible use and maintenance of tires to support greener mobility.

At the other end of the value chain, driver behavior is also inherently linked to both social and environmental sustainability. Conscientious practices in tire maintenance and driving habits, can directly influence road safety, resource conservation, and the overall reduction of environmental impact. Members play a leading role in guiding and educating users on best practices, offering valuable insights and resources to promote proper tire maintenance and eco-friendly driving habits.

### 9.1 Intelligent and connected (IC) tires

IC tires are technologically advanced tires capable of generating data based on the environmental and use conditions they are subject to and transmitting real-time information to a variety of stakeholders. Data collection is enabled by sensors and other connectivity features, typically located in the tire's inner lining or valve. TIP members have recognized the potential for these innovations in achieving safer and more sustainable mobility, with each member offering distinct approaches to integrating them into their offerings.

IC tires represent a key technological development, enabling manufacturers to progress toward achieving SDG Targets 3.6, 9.5, 11.2, 12.2 and 12.8. The potential of IC tires to enhance sustainability and safety lies in their ability to facilitate multidirectional interactions between the user, the environment, and the tire itself (via vehicle or other mediums).



#### TARGET 3-6

Reduce road injuries and deaths



#### TARGET 9-5

Enhance research and upgrade industrial technologies



#### TARGET 11-2

Affordable and sustainable transport systems



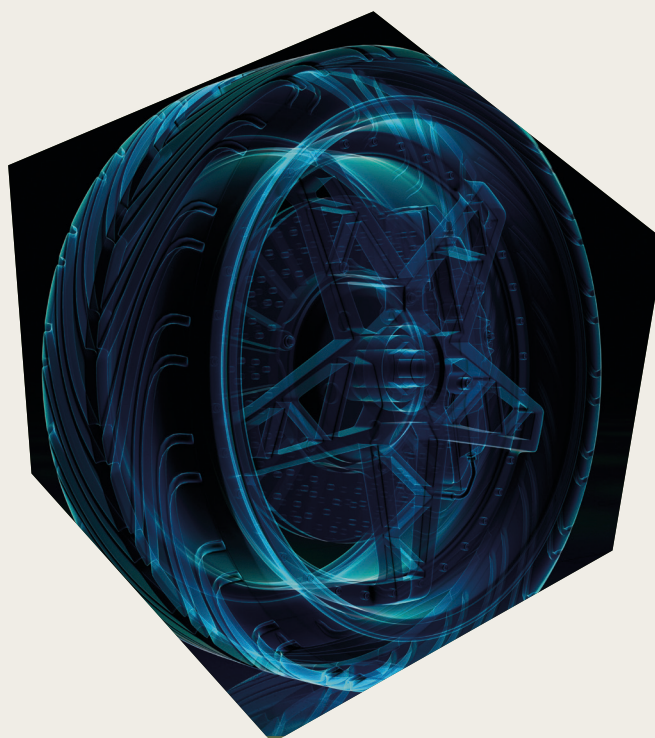
#### TARGET 12-2

Sustainable management and use of natural resources



#### TARGET 12-8

Promote universal understanding of sustainable lifestyles



## 9.2 Vendor and user awareness campaigns

In support of the UN Decade of Action for Road Safety 2021-2030, TIP members continue to collaborate with vendors and users to promote awareness and behavior change for safer mobility and reduced tire life-cycle impacts. Specifically, member efforts strive for progress towards SDG 3.6, which aims to cut road traffic deaths and injuries by 50% by 2030.

Examples of prominent industry campaigns include the United Kingdom's TyreSafety charity

that promotes an annual "Tyre safety month" public campaign, which is frequently picked up by a handful of large UK sellers, vehicle garages, and local authorities.

In the United States, the US Tire Manufacturers Association (USTMA) is composed of many TIP members who are key players and run the annual National Tire Safety Week. The campaign's goal is to educate users on care and maintenance to maximize safety.

Currently, there is no global platform for tire safety campaigns, highlighting the need for a unified communication platform to promote tire safety worldwide.

### *Box 11: Business examples - Intelligent & connected tires and awareness campaigns*

#### **Hankook**

For the past 17 years, Hankook has been fostering a culture of child traffic safety and raised awareness around the topic, aligned with the core business of mobility. Protecting children, who are vulnerable road users, is one of the greatest social responsibilities of a mobility company.

From June to December 2023, Hankook partnered with 'Yellow Bus', which operates 21 school buses that come equipped with 4-point safety belts akin to those in racing cars, ensuring safe transit. Additionally, Hankook Tire's truck-bus tires were fitted for stability in diverse conditions.

Furthermore, Hankook held traffic safety campaigns and taught pedestrian crossing rules at ten elementary schools in the Geumsan area, distributing 500 transparent umbrellas for accident prevention.

This effort aimed to elevate awareness, enhance school bus safety, and nurture a mature traffic culture.

More information about this initiative is available [here](#) (page 71).

#### **Pirelli**

Together with environmental protection, road safety is the key element of the Eco & Safety Performance strategy that inspires Pirelli's R&D, industrial and commercial choices. Pirelli's commitment to road safety embeds the promotion of road safety in the countries where the group operates. Among these initiatives in 2023, the partnership with the University of Milan Bicocca was strengthened and the circle of contacts with neighboring companies was widened to discuss the subject of mobility management and road safety in the area, involving representatives of the city administration. Pirelli Romania supported the country's largest Sustainable Mobility Forum, attended by over 250 political figures, from the Romanian Prime Minister to infrastructure and environment ministers who discussed issues and solutions for a sustainable future in the field of road safety.

More information about this initiative is available [here](#) (page 229).



# Impact Pathway 7: *Products and Services - Low-Carbon, Circular Solutions and End-of-Life Tires*



10.



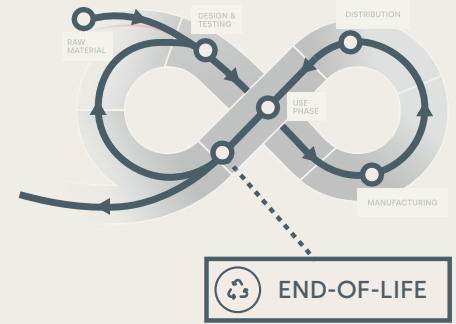
## 10. Impact Pathway 7

**Products and Services - Low-Carbon, Circular Solutions and End-of-Life Tires:** Advance innovation in product, service and business model design to enhance low-carbon and circular solutions while ensuring sustainable management of end-of-life tires (ELT) around the world.

Globally, an estimated 30 million metric tons of tires<sup>3</sup> reach the end of their useful lives every year. The management of ELT in environmentally sound and productive ways continues to be a high priority of TIP members.

Tires are a complex composite product made up of steel, rubber oil, and trace chemicals which makes separation and valorization challenging. Additionally, stockpiled tires can become breeding grounds for pests and pose fire risks, which release toxic fumes and pollutants when burned without appropriate filter systems.

However, ELT and their materials are an inexpensive, yet valuable, resource for the circular economy that can be used in a variety of applications. Examples of circular economy innovations include transforming old tires into shreds, granulates and powders for use in new products (e.g. rubber goods and rubberized asphalt), chemical treatment of ELT-derived materials to make material for new tires, and design of new tires to improve circularity.



### TARGET 8-4

Improve resource efficiency in consumption and production



### TARGET 12-2

Sustainable management and use of natural resources



### TARGET 12-5

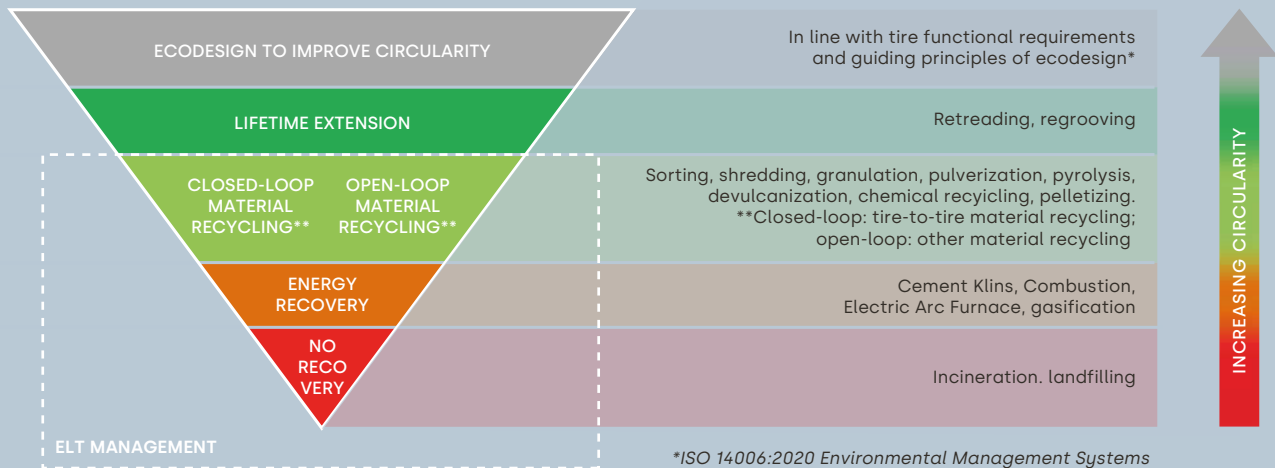
Substantially reduce waste generation



## Box 12: ELT Management Hierarchy - Work in progress

The ELT management hierarchy is developed using a circular economy framework, where the goal is to showcase how different recovery routes lead to different levels of circularity, in which lifetime extension is key.

It needs to be stated that the hierarchy does not represent the current state of management, but rather the ideal situation in a more circular tire economy.



The design of the hierarchy is inspired by the European Waste Framework Directive and consistent with the US EPA Waste Management Hierarchy. The ELT Management Hierarchy indicates which recovery routes keep materials in use and in what form. Color coding indicates outcomes of treatment processes, the higher and broader green levels represent the extension of the useful life of tires and their materials, orange level indicates processes leading to energy recovery, and the lowest and narrowest red level represents no recovery.

The above graph outlines the design, management and treatment processes corresponding to each level:

1. Eco-design to improve circularity – The process of designing a tire precedes ELT management and as such is a key enabler for achieving circularity goals, particularly longevity, long-lasting tire performances, reparability, and recyclability. Applying eco-design principles is a means to ensure that the functional features of a tire are met while reducing the environmental impact over the life cycle. Environmental objectives can include circularity features, energy efficiency, noise reduction, abrasion reduction, and others.
2. Lifetime extension – This involves repairing a tire when it is in its use-phase by regrooving the tread or replacing the tread with a new one. While retreading reduces the amount of material resources required per kilometer traveled, attention needs to be paid in the design phase to maintain other environmental features, notably low rolling resistance, which provides better energy efficiency. The life of a tire can also be extended through markets for second-hand tires.
3. Closed-loop and open-loop recycling - This level includes all the treatment processes in which materials are recovered from the ELT to be re-used. There is a distinction between open-loop and closed-loop applications. Open loop refers to the use of secondary raw materials recovered from ELT that are then used for a variety of non-tire applications. Closed loop refers to the use of ELT-derived secondary raw materials to make new tires. Both types of applications are needed as closed loop models are limited by the technical performance requirements for tires, including those for safety, that can be compromised by introducing recycled materials.
4. Energy recovery – These are processes that produce heat that can be captured and used to power other processes in place of fossil fuels. Such processes, while using the materials in ELT, mean that their useful life has ended. Energy recovery should be minimized to the greatest extent possible in the future as they do not support the circular economic models.
5. No recovery – Treatment processes that lead to neither material nor energy recovery. These processes involve waste disposal operations that should be minimized to the greatest extent possible as they do not support the circular economic models.

Circularity in the tire manufacturing industry is especially important for developing markets, where rapid economic growth and increasing vehicle use lead to higher tire consumption and waste generation. By adopting a circular economy approach, these markets can significantly reduce the environmental impact of tire disposal and resource extraction.

Implementing circularity principles starts with designing durable and recyclable tires following eco-design principles and establishing effective systems, to extend the useful life of tires through maintenance, repair and retreading. This approach not only conserves valuable raw materials and reduces waste but also stimulates local economies by creating new business opportunities and jobs in the recycling and remanufacturing sectors.

In addition to developing the ELT Management Hierarchy, TIP has made significant strides in external engagement on international policies to support circular economy models for ELT:

→ TIP has developed and is promoting a proposal to improve the existing customs codes used worldwide (i.e., Harmonized System codes) for rubber goods, including whole waste tires, tire-derived materials and retreaded and second-hand tires, to facilitate circular flows of ELT materials.

→ TIP is contributing to a major update of the Basel Convention Technical Guidelines for the Environmentally Sound Management of Used and Waste Pneumatic Tyres<sup>4</sup>, a document that sets guidelines for 191 countries. TIP's focus is on providing accurate and up-to-date information on tires and tire recycling and promoting circular economy principles. Update of the guidelines will require input from various stakeholders, including decision-makers who are not tire experts and who will need to determine the framing and definition of issues, decide what to include or exclude, and ultimately submit the guidelines for adoption by the Conference of the Parties (COP) during the 2025-2026 cycle.

In September 2023, TIP hosted an ELT regional workshop in New Delhi, India, where more than 80 participants were brought together to discuss key issues related to ELT management in light of the new extended producer responsibility (EPR) regulations in India.

Since 2023, TIP has extended its number of Tire Trade Associations (TTAs) affiliates and welcomed the Australian Tyre Industry Council (ATIC), the Automotive Tyre Manufacturers Association of India (ATMA), the British Tyre Manufacturer's Association (BTMA) and the Tire and Rubber Association of Canada (TRAC).



Box 13: Business examples - Low-carbon and circular tire solutions

**Toyo Tire**

In collaboration with the University of Toyama, Toyo Tire developed a catalyst that converts carbon dioxide into butadiene with high yield to synthesize butadiene rubber, a raw material for tires. The success in pioneering the synthesis of butadiene from carbon dioxide, one of the main drivers of climate change that causes serious adverse impacts on the global environment, will help minimize the greenhouse gas emissions from the production process.

Moving forward, Toyo Tire is undertaking development to gear up for mass production, with the aim of implementing the system by the end of the 2020s. In addition, the company is also carrying out R&D on replacing other tire raw materials with sustainable raw materials.

More information about this initiative is available [here](#).

**Bridgestone**

In 2012, the Bridgestone Group became the first company in the industry to announce a long-term vision of using 100% sustainable materials. To achieve this goal, the company is taking the following three actions:

1. Reduce raw material consumption
2. Recycle and use resources effectively
3. Expand and diversify renewable resources.

In 2022, the company launched the EVERTIRE INITIATIVE program, designed to shape a future in which tires are recycled to create new tires as they are returned to rubber and other raw materials through co-creation with various partners and recycled as EVER (always, forever, and everlasting) tires.

Specifically, Bridgestone and ENEOS Corporation launched a joint project aimed at the development of chemical recycling technologies that enable precise pyrolysis of used tires. The companies will maximize Bridgestone's precision pyrolysis technologies and ENEOS's technologies for refining tire derived oil.

More information about this initiative is available [here](#).

**Hankook**

Hankook has been steadily growing its 'Alphatread' brand presence since its acquisition of Reifen-Mueller in 2018, recognizing the contribution that the retreading business can make to the company's sustainability.

Retreaded tires preserve the original shape of the casing, cut off treads and other parts that are worn due to friction with the road surface, and replace them with new products to regenerate the function of the tire. Remanufacturing waste tires reduces waste caused by tire replacement and saves raw materials by keeping existing resources in use for longer.

In 2022, Hankook completed a hot-retreading plant to produce and supply retreaded tires locally and has also established a production base in the UK.

To provide cost-effective, safe and environmentally friendly solutions, Hankook is expanding its range of retreaded tires and investing in its production facilities.

More information about this initiative is available [here](#) (page 50).



# Conclusion



11.

## 11. Conclusion

For TIP members, it is crucial to measure and track progress against ESG KPIs to understand the tire industry's impact, benchmark performance across engaged companies, and identify key areas for improvement.
























TIP's annual KPI reporting now spans 15 years, providing an extensive dataset that offers a long-term perspective on industry progress and future directions. However, TIP members acknowledge that metrics may need to evolve to reflect the changing context, including new reporting topics, increasing industry ambitions, and mandatory requirements such as extending supply chain engagements beyond Tier 1 as required by the Corporate Sustainability Due Diligence Directive (CSDDD) & CSRD regulations.

This year, TIP continued to report on the range of KPIs across various stages of the value chain, aligning with numerous SDGs, as shown throughout the report, demonstrating a high level of commitment and achieving significant progress across most reported areas. Particularly noteworthy is the progress TIP members have made in addressing climate change by embracing renewable energy, as illustrated by the double-digit, year-on-year reduction in CO<sub>2</sub> emissions and their intensity (18% and 12.5%, respectively), and in the even higher decrease compared to 2019 (40% and 32.5% respectively).

It is clear that TIP members continue to demonstrate a commitment to advancing the SDG agenda. Going forward, TIP's work program will have the Roadmap at its core, including a commitment to produce a progress report by 2026 to reflect advancements towards the SDG Roadmap. TIP will continue engaging with its stakeholders to provide updates on progress and ensure the impact pathways remain relevant. Finally, new KPIs will continue to be explored with the support and collaboration of our Working Groups and Task Forces (Figure 18) to meet the SDG Roadmap and ensure reporting evolves in line with the industry's sustainability progress.



Figure 18: How TIP Working Groups and Task Forces work to address different social and environmental impacts, based on their correlation with the SDGs and the different Impact Pathways.

IMPACT OPPORTUNITY AREA							
	Supply chain		Operations		Products & Services		
Impact Opportunity Focus	<b>IP 1</b> Natural Rubber Sustainability	<b>IP 2</b> Responsible Sourcing	<b>IP 3</b> Operations, incl. Manufacturing	<b>IP 4</b> Employees	<b>IP 5</b> Tire and Road Wear Particles (TRWP)	<b>IP 6</b> Sustainable Mobility and Digital Solutions	<b>IP 7</b> Low-Carbon, Circular Solutions and End-of-Life Tires (ELT)
Relevant SDG targets as identified in the SDG Roadmap	4.5  8.4  12.2 	8.4  12.2  12.6 	6.4  9.4  12.2  12.5 	5.5  10.3  10.4 	12.4  12.6 	3.6  9.5  11.2  12.2  12.8 	8.4  12.2  12.5 
Work Structure					UN Plastic Treaty/International Legally Binding Instrument on Plastic Pollution (ILBI)		
					Tire and Road Wear Particles		End-of-Life Tires
					Emission Assessment, Transport and Fate Assessment and Impact Assessment		
	Sustainability Assessment Methods				Sustainability Assessment Methods		
	Key Performance Indicators						

## 12. Appendix

### Methodological note

dss+ collected the 2023 data presented in this report on behalf of the TIP. The reporting scope includes all the sites under TIP members' operational control – 241 sites in 2023. We did not perform any restatement of historical data in cases where companies closed sites, following the TIP Common Reporting Methodology. We consolidated the data at 100% for all entities under operational control (regardless of the financial consolidation rate). The reporting scope includes the following premises and activities: tire manufacturing sites and all related onsite activities (canteen, R&D, mixing, bladder production, reused tire processing, etc.), as well as standalone sites with mixing activities and those dedicated solely to motorsport tire production, newly added this year. We exclude other stand-alone sites (bladder production, steel cord, textile facilities, retread tire processing, HQ, offices, etc.). We however, include offices in scope for the waste indicator.

We collected data on an individual-company basis, which dss+ later aggregated. dss+ and TIP members carried out a series of data quality checks to ensure quality and consistency with previous reporting years. We amended historical data only if a member identified an error a posteriori. We used the aggregated data to produce the figures and tables included in this report. Due to The Goodyear Tire & Rubber Company's June 2021 acquisition of Cooper Tire, the consolidated results in this report for the historical period 2019-2021 are not always consistent with what we reported in the previous version of this report. This is due to updated historical data, following a data validation process as part of the integration of the two members.

The qualitative information reported is not exhaustive and the implementation of measures can vary both among and within companies.

### Indicator definitions

The indicators historically reported in this report are based on the TIP Common Methodology, a reporting document that defines the indicators, scope and calculation methodology. All TIP members defined, evaluated and agreed on the new indicators reported for the first time in this report. We provide a summary of the indicators used in this report below.

**Production** is calculated as the weight of intended products to be sold to end-users as an output of the production lines, as well as the weight of new materials integrated in

retread tires if this activity is in scope for the tire manufacturing plant.

#### **Global Platform for Sustainable Natural Rubber**

**(GPSNR):** The percentage of TIP members that submit the mandatory policy reporting to the GPSNR for the corresponding reporting year.

**Responsible sourcing policies:** This key performance indicator (KPI) complements the indicator on GPSNR by tracking TIP member approaches to responsibly sourcing all materials, not just natural rubber. The KPI tracks responsible sourcing policies (RSPs) at multiple levels by assessing which members have policies and how they are using and enforcing these policies. This indicator tracks both the RSPs covering all materials sourced and policies covering a specific material.

**Energy consumption:** The energy consumption from different sources (e.g., electricity, gas, renewable energies) is consolidated in net calorific value (NCV) and measured in gigajoules (GJ). The electricity and steam sold to external third parties are deducted. Fuel consumption related to off-site transportation (employees, products) is excluded. Contractual arrangements for the purchase of renewable electricity such as Energy Attribute Certificates and Power Purchase Agreements are counted under "renewable electricity."

**Energy intensity** is weighted by production and is calculated by dividing the total energy consumed (in GJ) by the total production (in tons) in the same year.

#### **Electricity derived from renewable energy**

is the electricity consumed using renewable sources, either self-generated or purchased (accompanied by energy attribute certificates or similar instruments), out of the total electricity consumed by TIP members. Only electricity consumption related to the tire manufacturing process and other facilities on the production sites is included in the scope.

**Sources of emissions factors:** Scope 1 emissions factors: 2006 Intergovernmental Panel on Climate Change (IPCC) guidelines for stationary combustion in the manufacturing industry. Scope 2 emissions factors associated with electricity purchases: International Energy Agency (IEA) Emissions Factors (2023). Data regarding electricity consumption was collected using the location-based method. This approach reflects the average emissions intensity of the grid, using a grid-average emissions factor.

**CO<sub>2</sub> emissions** are calculated by multiplying each energy source by its corresponding emissions factors (2006 IPCC guidelines for scope 1, IEA CO<sub>2</sub> emissions factors for scope 2). For residual emissions (i.e., emissions that remain after renewable certificates and contracts have been



removed from the calculation), national grid average emissions factors have been used as residual mix factors.

**CO<sub>2</sub> intensity** is weighted by production, which is calculated by dividing the total CO<sub>2</sub> emitted (in tons of CO<sub>2</sub> equivalent) by the total production (tons) during the same year.

**Science-based targets (SBTs):** This indicator calculates the percentage of TIP members who have: i) A validated science-based target for reducing their scope 1, 2 and 3 emissions that is consistent with 2 degrees of warming or less (well below 2 degrees or 1.5 degrees) or ii) have committed to developing a target by submitting a commitment letter to the Science Based Targets initiative (SBTi) between 1 January and 31 December of the reporting year. As per SBTi Recommendations, SBTs should cover all scope 1 and 2 emissions, and scope 3 emissions if the company's relevant scope 3 emissions are 40% or more of total scope 1, 2 and 3 emissions.

**Water withdrawals** represent the net amount of water entering the sites and withdrawn from any external source (pumping from natural resources, public networks, recycled water from external companies or from desalinization plants, etc.). All external sources of water withdrawals used for industrial, cooling and domestic use are taken into consideration, including the amount of water sold to off-site third parties or consumed by third-party companies onsite.

**Water withdrawals from water-stressed areas:** Total amount of water withdrawals at manufacturing plant level from areas with extremely high and high levels of water stress, as defined in the World Resources Institute (WRI) Aqueduct Water Risk Atlas, between 1 January and 31 December of the reporting year. Water withdrawals from areas with medium, low-medium (10-20%) and low (<10%) water stress are excluded.

**Water intensity** is weighted by production and is calculated by dividing the total water withdrawals by the total production (in tons) in the same year.

**ISO 14001:** The certification rate is calculated by dividing the total number of sites with ISO 14001 certification by the total number of sites. A site is recognized as being ISO 14001-certified during a given calendar year only if an external certificate is valid on 31 December of that year.

**Waste:** Waste is defined as all material generated unintentionally during production not resulting in a finished product onsite and legally considered as waste. Waste generated onsite by third parties (working within the physical perimeter of the facilities but not operated by a TIP company) is included in scope for this indicator. We consider the following as waste for the purposes of this report: office waste, Waste Electrical and Electronic Equipment (WEEE) from production sites and offices, sludges, defect tires never going back into the production chain, food waste resulting from canteens or restaurants on

site, and hazardous wastewater removed by a third party.

**Waste intensity** is weighted by production and is calculated by dividing the total amount of waste generated (in metric tons) by the total production (tons) in the same year.

**Health & Safety (H&S) management system:** Percentage of manufacturing sites covered by a health and safety management system (such as ISO 45001), that an external party has audited or certified, out of the total number of manufacturing sites, between 1 January and 31 December of the reporting year. It includes only manufacturing sites under the operational control of TIP members and only sites that have been successfully audited and verified to meet the standard in a given year. This indicator also discloses the percentage of TIP members who have internal auditing processes for H&S management systems.

**Women on the Board of Directors:** Percentage of women employees on the Board of Directors as of 31 December of the reporting year.

**Women in the total workforce:** Percentage of women employees in the total workforce (at group level) as of 31 December of the reporting year. It considers only employees as per GRI 405 definition. Non-employee workers (e.g., individual contractors) who are part of the company's workforce are excluded.

**Diversity & Inclusion (D&I) commitment:** Percentage of TIP members with a public commitment to D&I over total number of TIP members during the reporting year 1 January to 31 December. The D&I commitment should include a clear statement of the company's values regarding diversity and be clearly visible on the company's website and in its annual report. It should also recognize a range of diversity and inclusion needs, rather than focusing on just one area.

**Peer-reviewed research output on Tire and Road Wear Particles (TRWP):** This indicator tracks: i) peer-reviewed literature output sponsored by TIP published in qualifying journals, examining topics related to TRWP and materials and chemicals related to TRWP and nanomaterials; ii) number of citations in peer-reviewed journals of peer-reviewed literature sponsored by TIP.

# Endnotes

- <sup>1</sup> TIP (2024). Tire Industry Project Commitment to Addressing Tire and Road Wear Particles. <https://tireindustryproject.org/news/tire-industry-project-commitment-to-addressing-tire-and-road-wear-particles/>
- <sup>2</sup> Unice, K. M. et al. (2019). Characterizing export of land-based microplastics to the estuary - Part I: Application of integrated geospatial microplastic transport models to assess tire and road wear particles in the Seine watershed. Science of the Total Environment, 646, 1639-1649.
- <sup>3</sup> 29.1 million tons (metric) of ELT generated in the 45 countries in the studies scope of Global ELT Management – A global state of knowledge on regulation, management systems, impacts of recovery and technologies – December 2019. [https://tireindustryproject.org/wp-content/uploads/2023/08/Global\\_ELT\\_Management%E2%80%93A\\_global\\_state\\_of\\_knowledge\\_on\\_regulation\\_management\\_systems\\_impacts\\_of\\_recovery\\_and\\_technologies\\_December\\_2019.pdf](https://tireindustryproject.org/wp-content/uploads/2023/08/Global_ELT_Management%E2%80%93A_global_state_of_knowledge_on_regulation_management_systems_impacts_of_recovery_and_technologies_December_2019.pdf)
- <sup>4</sup> Technical guidelines for the environmentally sound management of used and waste pneumatic tyres. <https://www.basel.int/Implementation/Wastetyres/Technicalguidelines/tabid/9423/Default.aspx>

# Acknowledgements

## *Disclaimer*

This publication has been developed in the name of the World Business Council for Sustainable Development (WBCSD) Tire Industry Project (TIP). Like other TIP publications, it is the result of collaborative efforts by representatives from TIP member companies and external experts. TIP member companies reviewed drafts, thereby ensuring that the document broadly represents the perspective of WBCSD TIP membership. Input and feedback from stakeholders were incorporated in a balanced way. This does not mean, however, that every member company or stakeholder agrees with every word. The report has been prepared for general informational purposes only and is not intended to be relied upon as accounting, tax, legal or other professional advice.

## *Contributors*

### **TIP Members**

Bridgestone, Continental, Goodyear, Hankook, Kumho Tire, Michelin, Pirelli, Sumitomo Rubber Industries, Toyo Tires, and Yokohama Rubber.

### **WBCSD TIP team**

Larisa Kryachkova, Tania Paratian, Neha Verma, Pasquale Monteleone, Kara Green, Yujin Ducatillon-Kim, Elisa Pesce.

### **dss<sup>+</sup>**

Federico Magalini, Georgia Young, Clemence Bethencourt.

## *About the Tire Industry Project*

Formed in 2005, the Tire Industry Project (TIP) is a voluntary CEO-driven initiative with a mission to anticipate, understand and address global environmental, social and governance issues relevant to the tire industry and its value chain. TIP acts by commissioning independent research of the highest standards, collaborating on sectoral solutions and engaging with external stakeholders. TIP currently brings together 10 leading tire companies that represent more than 65% of the world's tire manufacturing capacity.

TIP operates under the umbrella of the World Business Council for Sustainable Development (WBCSD).

## *About WBCSD*

The World Business Council for Sustainable Development (WBCSD) is a global community of over 225 of the world's leading businesses driving systems transformation for a better world in which 9+ billion people can live well, within planetary boundaries, by mid-century. Together, we transform the systems we work in to limit the impact of the climate crisis, restore nature and tackle inequality.

We accelerate value chain transformation across key sectors and reshape the financial system to reward sustainable leadership and action through a lower cost of capital. Through the exchange of best practices, improving performance, accessing education, forming partnerships, and shaping the policy agenda, we drive progress in businesses and sharpen the accountability of their performance.

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