

Sustainability Driven: Key Performance Indicators for TIP members *2021-2025*



World Business
Council
for Sustainable
Development



Tire Industry
Project

About the Tire Industry Project (TIP)

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 (ESG) 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 60% of the world's tire manufacturing capacity.

TIP Members



Acronyms

AI – Artificial intelligence

CO₂e – Carbon dioxide equivalent

D&I – Diversity and inclusion

ELT – End-of-life Tire(s)

EPD – Environmental Product Declaration

ESG – Environmental, social, and governance

EUDR – European Union Deforestation Regulation

H&S – Health and Safety

GJ – Gigajoule

GPSNR – Global Platform for Sustainable Natural Rubber

IP – impact pathway(s)

KPI – Key performance indicator(s)

LCA – Life Cycle Assessment

M GJ – Million Giga Joules

M m³ – Million cubic meters

M tons – Million metric tons

NCV – Net calorific value

OCP – Open Call for Projects

PCR – Product Category Rules

PM2.5 – Particulate matter ≤ 2.5 micrometers

RSP – Responsible sourcing policy

SBTs – Science Based Targets

SDGs – Sustainable Development Goals

SIM – Shared Investment Mechanism

TIP – Tire Industry Project

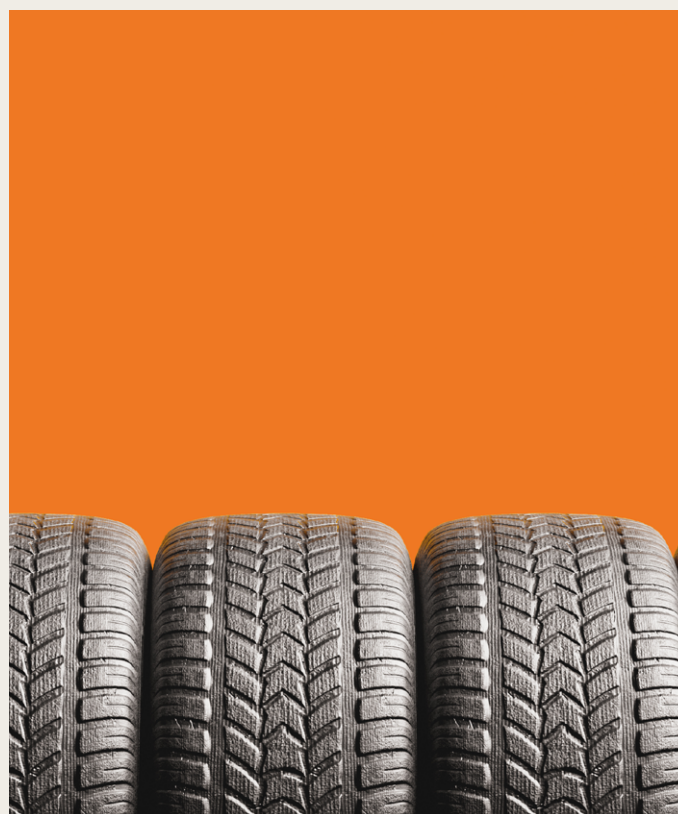
TRWP – Tire and Road Wear Particles

TTAs – Tire Trade Associations

WBCSD – World Business Council for Sustainable Development

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Executive Summary

This edition of the annual “Sustainability Driven: Key Performance Indicators for TIP members” report tracks members’ progress in 2025 against the goals and targets set out in the “[Sustainability Driven: Accelerating Impact with the Tire Sector Sustainable Development Goals \(SDG\) Roadmap](#)”. Developed in 2021 by World Business Council for Sustainable Development (WBCSD), TIP members, and stakeholders, the SDG roadmap defines seven impact pathways for tire industry sustainability. Structured along the impact pathways this report summarizes 2025 developments in environmental and social sustainability in the tire value chain in a clear, visual and concise format. The 2025 results indicate visible progress by TIP members across most KPIs, in comparison to last year as well as during the 2021-2025 timeframe, reflecting their continued commitment.

Key 2025 achievements by impact pathway



Impact Pathway 1

Natural Rubber Sustainability



Since 2022, all TIP members have continued to report annually on their efforts to procure responsibly sourced natural rubber to the Global Platform for Sustainable Natural Rubber (GPSNR). In 2025, the organization strengthened natural rubber sustainability through two key mechanisms: a risk-based assurance system providing independent verification of tire companies’ environmental and human rights commitments; and a fund, to which all TIP members contributed, that mobilized ~USD 3 million in its first year to support smallholder farmers with capacity building and equitable cost sharing.



Impact Pathway 2

Responsible Sourcing



In 2025, TIP members continued to strengthen responsible sourcing across all the materials they procure. Responsible sourcing policies covering all materials had been adopted by 90% of members in 2025, up from 80% in 2021; and 70% had embedded responsible sourcing requirements in supplier contracts, up from 50% in 2021. Time-bound targets to reduce environmental and social impacts were in place by 80% of members, up from 40% in 2021, while 40% used third-party audits to verify implementation, up from 20% in 2021.



Impact Pathway 3

Manufacturing



TIP members further reduced the environmental impact of their operations in 2025. CO₂e emissions intensity fell to 0.51 tons CO₂e per ton of output, down 29.2% versus 2021. The percentage of members holding validated science-based targets stood at 90% in 2025, up from 30% in 2021. Renewable electricity accounted for 60.5% of purchased electricity, up from 25.7% in 2021. Water withdrawals fell 18.4% versus 2021 with an average year on year reduction of 4.9%, to 87.2M m³, with withdrawals from water-stressed areas down 35.2% versus 2021 and 10.9% versus 2024. Meanwhile, waste generation remained constant at 1.11M tons, with waste intensity rising by 9.1% compared to 2021 and 4.2% compared to 2024 to 69.7 kg per ton of output.



Impact Pathway 4

Employees



TIP members continued to strengthen health, safety and workforce inclusion. In 2025, 60.2% of their sites had externally audited health and safety management systems, up from 55.6% in 2021. All members have maintained a diversity and inclusion policy since 2019. Female representation grew marginally to 15.9% of the workforce from 14.5% in 2021, while women's representation on boards of directors increased from 19.6% in 2021 to 25.3% in 2025.



Impact Pathway 5

Tire and Road Wear Particles (TRWP)

In 2025, TIP sponsored eight new peer-reviewed publications about TRWP, compared to the three published in 2021, bringing the cumulative total to 36. Citations of TIP-sponsored publications rose to 796 in 2025, more than three times the 262 recorded in 2021, reaching 2,826 cumulatively since 2021. Through its first Open Call for Projects, TIP committed nearly USD 2 million to five projects selected from 22 submissions, advancing independent research on TRWP. TIP also launched its first mitigation pilot in 2025, a multi-stakeholder initiative at the Valenton Wastewater Treatment Plant in Paris to measure the real-world efficacy of wastewater treatment in removing TRWP.



Impact Pathway 6

Sustainable Mobility and Digital Solutions

TIP members advanced innovation for sustainable mobility in 2025 through standardized environmental disclosure. In parallel, TIP facilitated the adoption of the updated tire Product Category Rules (PCR) by its members to improve the accuracy and credibility of lifecycle assessments and Environmental Product Declarations for tires (EPD).



Impact Pathway 7

Low-Carbon, Circular Solutions and End-of-life Tires (ELT)

Building on the 2025 ELT Management Hierarchy, TIP has developed the ELT Toolkit 2.0, a practical implementation guide for ELT management systems with maturity assessment tools, action-oriented recommendations and case studies. TIP has also launched the ELT Interactive Data Map, a global reference that enables comparability of ELT management data across countries and addresses a long-standing data gap.

KPI Impact Dashboard 2025: Performance Across TIP members' 7 IP



SUPPLY CHAIN

IP1 Natural rubber sustainability

KPI 1

Members that disclose to the GPSNR:



IP2 Responsible sourcing

KPI 2

Members with sustainable or responsible sourcing policies (RSP) covering all materials:



Members with time-bound targets for responsible sourcing:



- ▲ Positive KPI performance compared to 2024
- ▬ KPI remained constant year on year
- ▼ Negative KPI performance compared to 2024

Dashboard figures are rounded to whole percentage for presentation purpose



OPERATIONS

IP3 Operations, including manufacturing

KPI 3

Energy consumption:



KPI 4

Electricity consumption from renewable sources:



KPI 5

CO₂e emissions: 8.1M tons

KPI 6

Members with validated SBTs:



KPI 7

Total water withdrawals:



KPI 8

Water withdrawals from water-stressed areas:



KPI 9

Waste generation: 1.11M tons

KPI 10

ISO 14001 certification rate:



IP4 Employees

KPI 11

Sites with externally audited H&S management system:



KPI 12

Women in total workforce:



KPI 13

Women on Boards of Directors:



KPI 14

Members with public commitments to D&I:



PRODUCTS & SERVICES

IP5 Tire and Road Wear Particles (TRWP)

KPI 15

Cumulative number of TIP-sponsored publications on TRWP:



KPI 16

Annual number of citations of TIP-sponsored TRWP publications:

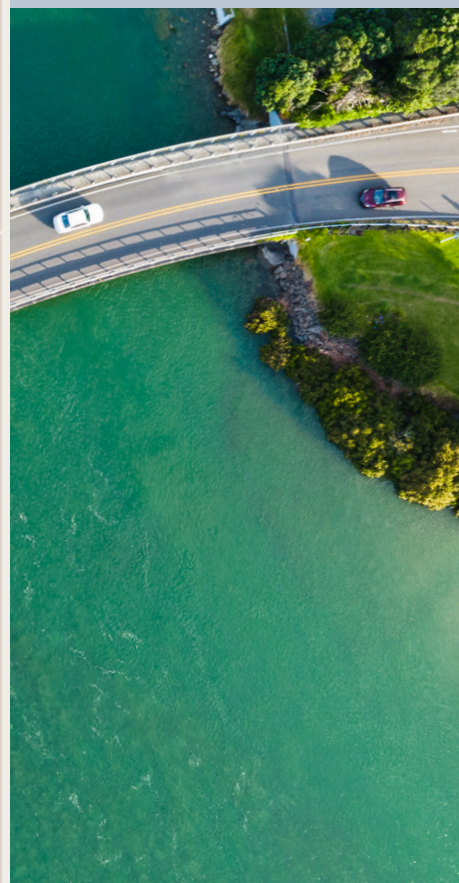
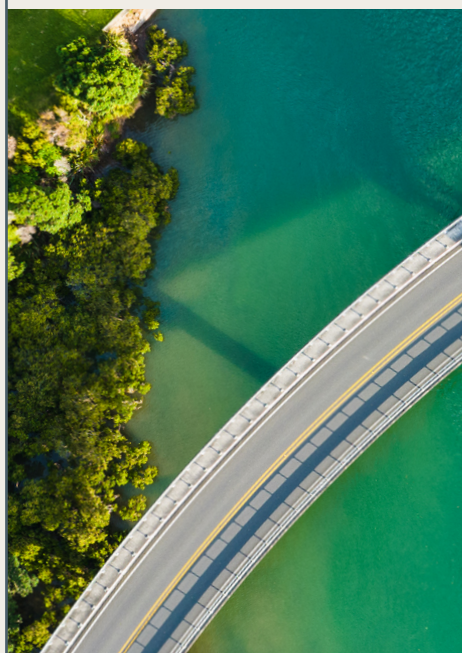


IP6 Sustainable mobility and digital solutions

Updated PCR advanced sustainable mobility disclosure

IP7 Low-carbon, circular solutions and ELT

TIP launched the ELT Management Hierarchy, ELT Toolkit 2.0 and ELT Interactive Data Map to address existing data gaps.





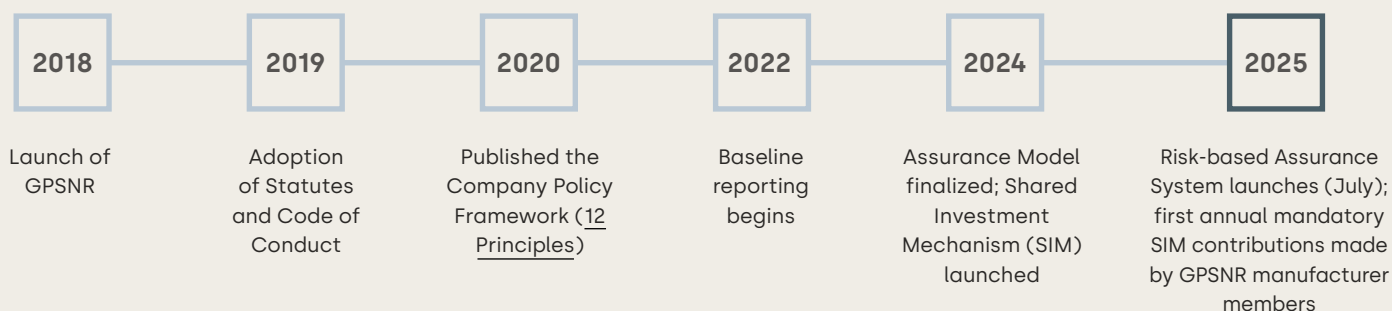
Impact Pathway 1:

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.

The Global Platform for Sustainable Natural Rubber (GPSNR) brings together companies, smallholders, and civil society to make the natural rubber supply chain sustainable, equitable and fair. Since 2022, TIP members have been disclosing to GPSNR and publicly reporting their efforts toward environmental and social sustainability in the natural rubber supply chain.



GPSNR Core Principles & Disclosure Framework



2025 Highlights: From Commitment to Accountability

GPSNR Assurance System Content

A risk-based framework that puts member commitments to the test. Rather than relying on policies alone, the Assurance System independently verifies action on deforestation, biodiversity loss, labor conditions and human rights, thus shifting the industry from pledges to proof, with third-party assessment and annual reporting.

GPSNR Shared Investment Mechanism (SIM)

In 2025, TIP members made their first annual mandatory contributions to GPSNR's Shared Investment Mechanism (SIM). This collective GPSNR fund mobilized approximately USD 3 million in 2025 to scale smallholder capacity building and ensure sustainability costs are shared fairly across the value chain.



100%

All TIP members have been disclosing to GPSNR since 2022. (KPI 1)

Conclusion: Through externally assured annual disclosures and mandatory yearly contributions to the SIM, TIP members are moving beyond commitment to verified action and managing key risks in the natural rubber value chain, while investing directly in the smallholders who underpin it.



02.

Impact Pathway 2:

Supply Chain - Responsible Sourcing

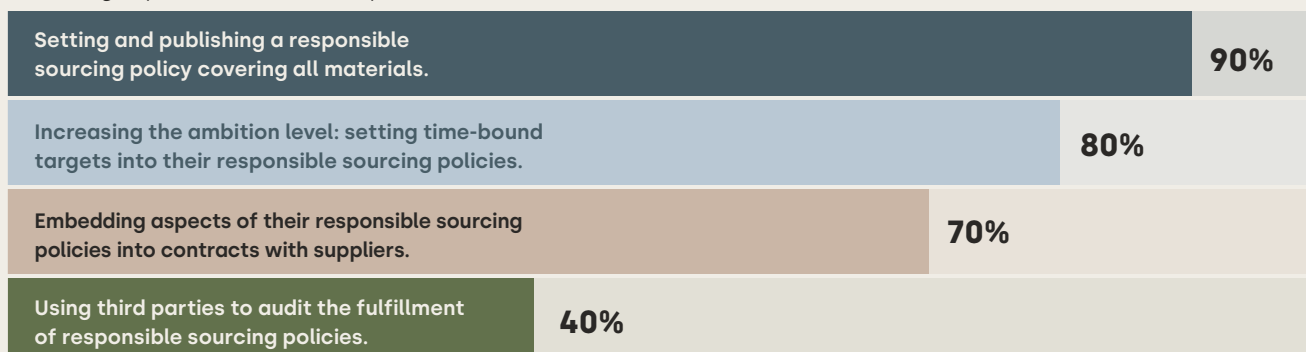


Implement sustainable procurement practices and establish environmental, social and governance (ESG) responsibilities throughout the supply chain, including the promotion of transparency and traceability.

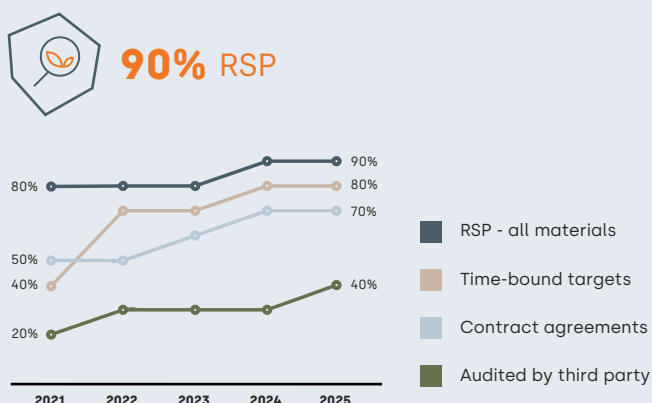
TIP members are increasing their ambition on the journey toward responsible sourcing.

Tires are made from a complex mix of materials, including natural and synthetic rubber, fillers like carbon black and silica, textiles, steel and additives. Responsible sourcing across the full supply chain for all the inputs is therefore essential to sustainability and alignment with the SDGs. TIP members are setting responsible sourcing policies and time-bound targets for ESG aspects, making responsible sourcing requirements contractually binding for suppliers whenever possible and monitoring progress through ongoing measurement and audits.

Percentage of TIP members that implemented the below measures in 2025



KPI 2 - Members with sustainable or responsible sourcing policies (RSP) covering all materials



Members with time-bound targets for responsible sourcing:



Conclusion: The above KPIs demonstrate progress among TIP members in defining and formalizing responsible procurement via policies that are reflected in contracts with suppliers, time-bound targets with transparent verification via third-party audits.

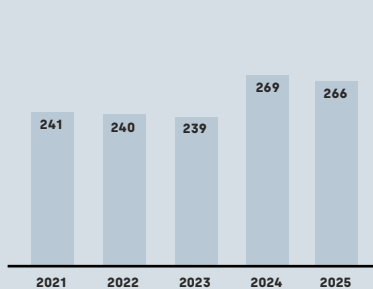
03.

Impact Pathway 3: Operations - Manufacturing



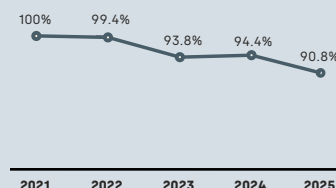
Develop methods to decarbonize operations, reduce emissions and ensure the sustainable use of natural resources.

Production and decarbonization in the tire industry



266
sites

The total number of sites operated by TIP members in 2025.



15.9M
tons

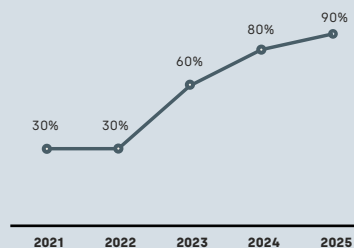
of output in 2025, representing a **9.2% reduction** compared to 2021 and a **4.4% reduction** compared to 2024.

KPI 6 - Members with validated SBTs



90%

Members with validated Science Based Targets (SBTs)

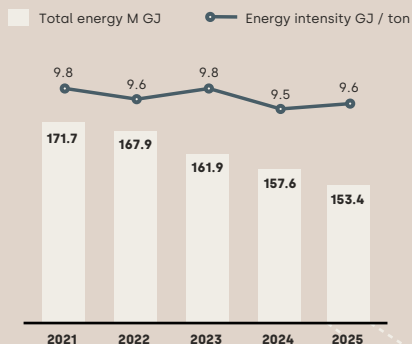


The validation of SBTs has become an established practice across the TIP members, reflecting the sector's continued progress toward greater ambition in decarbonization.



Energy and CO₂e emissions trends

KPI 3 - Energy consumption



153.4M GJ

net calorific value (NCV)

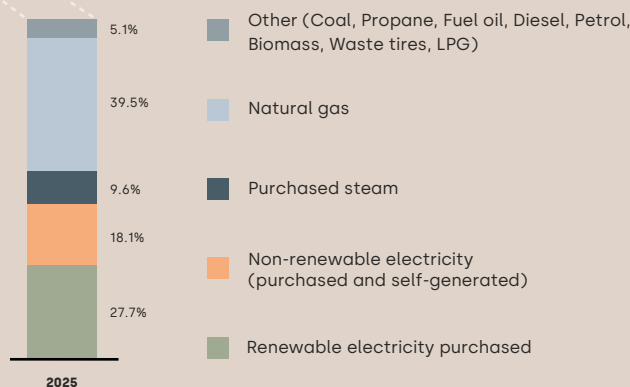
total energy consumed by TIP members in 2025

In 2025, TIP members sustained the energy efficiency gains of previous years: energy intensity stood at **9.6 GJ per ton** of finished product, **down from 9.8 GJ per ton** of finished product in 2021.

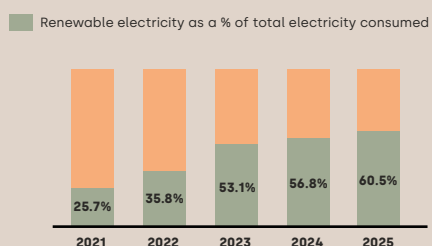
TIP members' energy consumption decreased by **10.7%** from 2021 to 2025. Production output decreased by **9.2%** during the same period.

Renewable electricity increased from **10.9%** in 2021 to **27.7%** in 2025 as a percentage of total energy consumption.

This increase illustrates TIP members' efforts toward decarbonizing their energy mix, starting with electricity.



KPI 4 - Electricity from renewable sources

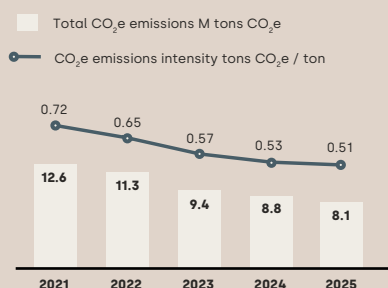


60.5%

of total electricity purchased

Renewable electricity procurement continued its upward trend, both in absolute terms and as a percentage of total electricity consumed. TIP members have moved from purchasing **25.7%** of their electricity from renewable sources in 2021 to **60.5%** in 2025.

KPI 5 - CO₂e emissions



8.1M

tons CO₂e

The emissions intensity of production continued to decrease, reflecting TIP members' efforts to decarbonize manufacturing.

In 2025, TIP members emitted approximately **0.51 tons** of CO₂e per ton of output, **29.2% less** than in 2021 and **4.9% less** than in 2024.

Water, waste and ISO performance KPI results



KPI 7 - Total water withdrawals

87.2M m³

In 2025, total water withdrawals decreased by **18.4%** versus 2021 and by **5.7%** versus 2024 to **87.2M m³**, reflecting TIP members' efforts toward water efficiency.

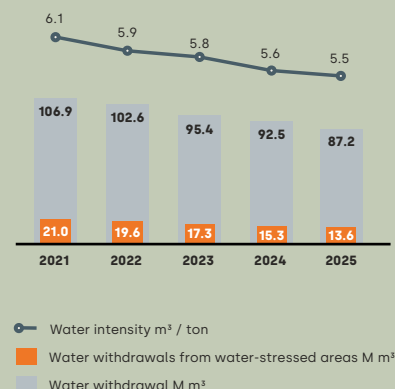
The commitment toward water efficiency is also reflected in an average year on year decrease of **3%** in water intensity, down to **5.5 m³/ ton** of output. Compared to 2021, water intensity was **9.8%** lower.

In 2025, withdrawals from water-stressed areas declined*, falling **35.2%** versus 2021 with an average year on year reduction of **10%**, to **13.6 m³**.

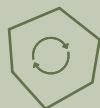
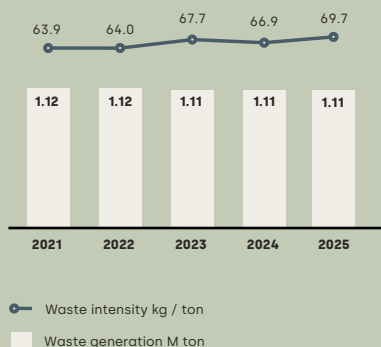
**Contributing to the trend was the reclassification of two sites in China and one in Vietnam previously rated as having high or extremely high water stress to medium and low.*



KPI 8 - Water withdrawals from water-stressed areas

13.6M m³


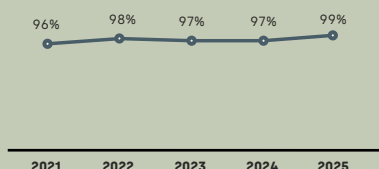
KPI 9 - Waste generation


1.11M tons


Waste generation remained consistent with 2021-2024 levels at **1.11** million tons, while waste intensity increased by **4.2%** from 2024 to 2025 and by **9.1%** compared to 2021 to **69.7 kg** of waste per ton of output.

The reasons behind the increase in waste intensity are complex. Often, when production decreases, waste intensity can increase because some of the waste generated is fixed and not dependent on production output.

KPI 10 - ISO 14001 certification rate


99% Sites with ISO 14001 certifications


The rate of **ISO 14001 certification** for TIP members' sites has consistently **exceeded 95%**, signaling a **commitment to effective management of environmental impacts**, as well as of resources and waste. In 2025, **99%** of TIP members' sites were ISO 14001 certified, up from 97% in 2024 and 96% in 2021. The small variations in ISO 14001 certification rates over the years are the result of new acquisitions or divestment/ closure of sites.

Conclusion: The KPIs corresponding to Impact Pathway 3 reflect TIP members' continued efforts toward more sustainable operations insofar as energy consumption, CO₂e gas emissions, water consumption, and environmental management are concerned.



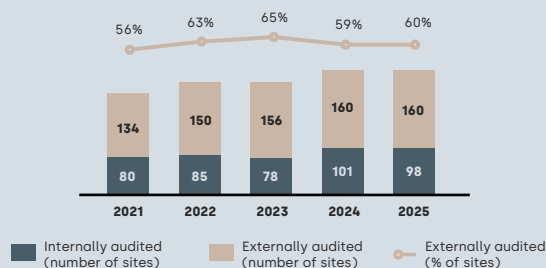
04. Impact Pathway 4: Operations - Employees



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

TIP members are continuing to promote sound H&S management practices and gender diversity in the workplace.

KPI 11 - Sites with externally audited H&S management systems

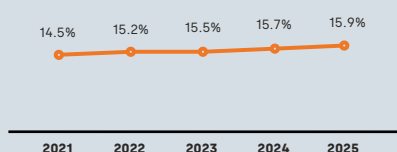


60% of TIP members' sites had externally audited H&S management systems in 2025

The number of externally audited sites rose from **134** in 2021 to **160** in 2024 and 2025.

TIP members have strengthened H&S oversight since 2021, covering **over 60%** of sites with external audits by 2025, up from **55.6%** in 2021.

KPI 12 - Women in total workforce

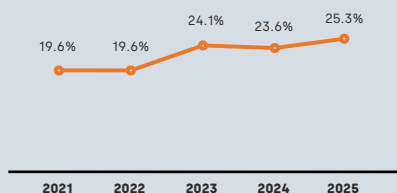


15.9%

Women in total workforce

Members registered marginal improvement in gender inclusion in the workforce, with this number increasing from **14.5%** in 2021 and from **15.7%** in 2024.

KPI 13 - Women on Boards of Directors



25.3%

Women on Boards of Directors

Increased steadily from **19.6%** in 2021 to **25.3%** in 2025, reflecting a more gender-inclusive leadership.

Conclusion: The KPIs corresponding to Impact Pathway 4 demonstrate TIP members' commitment to strong safety governance and workforce protection across their operations. The gradual increase in female representation across both the workforce and Boards of Directors indicates positive momentum. Continued focus on attracting, developing and retaining women across all levels of the organization will be important to sustain this progress.

05.

Impact Pathway 5:

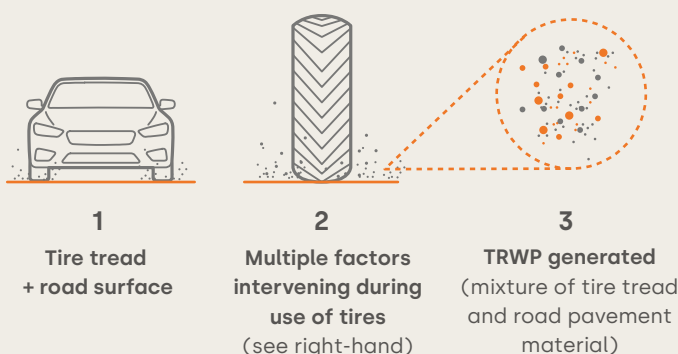
Products and Services - Tire and Road Wear Particles (TRWP)



Further leverage multi-stakeholder efforts to support the development and evaluation of evidence-based measures addressing TRWP.

What are TRWP?

How TRWP are created



The frictional grip between tires and road surfaces, critical to vehicle safety, causes wear that generates tire and road wear particles (TRWP).

They are an approximately **half-and-half mixture of tire tread and road pavement material**.

Factors influencing the generation of TRWP



TIP members' role in addressing TRWP

Contributing to knowledge generation	Providing tire expertise
Creating platforms for multi-stakeholder action	Supporting assessment of the real-world performance

Open Call for Projects (OCP)

This TIP initiative offers financial support for research projects that will actively contribute to advancing sustainability practices and environmental stewardship within the tire industry.

The OCP supports the generation of scientific knowledge that can be published through peer-reviewed journals. Learn more about the OCP [here](#).

TIP's OCP advances Impact Pathway 5 by funding independent research and initiatives that support the development and evaluation of evidence-based measures addressing TRWP.

First Open Call for Projects



5 projects funded
from 22 submissions



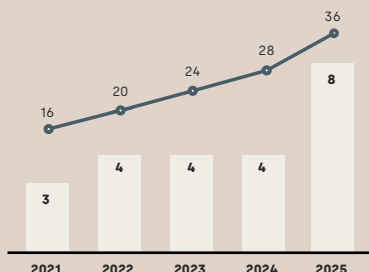
Nearly USD 2
million committed
to independent
research initiatives

TIP members' contribution to TRWP-related scientific research

KPI 15 - Cumulative number of TIP-sponsored publications on TRWP



8 new publications in 2025
36 in total



The number of TIP-sponsored publications doubled from **four** in 2024 to **eight** in 2025.

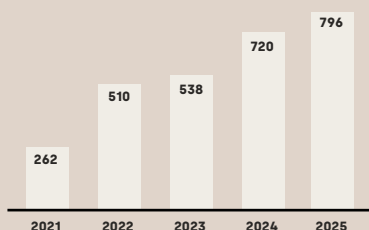
TIP accelerated global research collaboration on tire emissions, convening international experts and funding new studies to generate the scientific evidence needed to close knowledge gaps and advance scalable mitigation solutions.

Areas of focus of 2025 TIP-sponsored research included what happens to TRWP chemicals over time and the prevalence and potential tracking of nano-particles emitted from tires during use. The full list of publications is available on the TIP website.

KPI 16 - Annual number of citations of TIP-sponsored* TRWP publications



796 citations in research papers and articles in 2025



The number of citations of TIP-sponsored publications on TRWP has increased more than threefold, from **262** in 2021 to **796** in 2025, demonstrating that TIP's research is increasingly seen as a credible source of knowledge in this area. The total number of citations between 2021 and 2025 stood at **2,826**.

*While funded by the TIP, research projects and corresponding publications are carried out independently.

Second edition of the Tire Emissions Research Conference (TERC)

TIP, in collaboration with the Massachusetts Institute of Technology (MIT), convened the second edition of the Tire Emissions Research Conference (TERC) on 3-4 September 2025. The conference focused exclusively on discussing scientific research and promoting scientific dialogue and discussion of potential approaches relating to tire emissions. The program covered TRWP generation and characterization (particulates and constituents); the environmental distribution and fate of tire emissions; the behavior and impact of tire emissions on the environment; design alternatives; and civil engineering measures and environmental practices for mitigation of tire emissions.

Building on this progress, the 2026 edition of TERC is scheduled to take place in Cambridge, UK in December 2026.



On going case study – Understanding how effective wastewater treatment processes are at removing TRWP

Background

TIP published its “[Commitment to addressing TRWP](#)” report in 2024, which prioritized nine mitigation measures, grouped into prevention and after release measures. The paper emphasizes that achieving meaningful progress requires implementation of multiple measures at scale through multifaceted actions by all actors involved in TRWP generation and management including the tire, road construction and automotive industries, alongside municipal authorities, academia, and other public and private stakeholders. At the same time, the review also showed that none of the mitigation measures analyzed have been proven to be effective to date, specifically regarding TRWP, and would require on-ground assessment.

What

In 2025, TIP initiated a multi-stakeholder pilot study at the Valenton wastewater treatment plant in Paris, France, to assess how effectively wastewater treatment plants (WWTP) can remove TRWP. The study is being conducted with Greater Paris Sanitation Authority (SIAAP) at one of Europe’s largest wastewater treatment facilities. The Valenton pilot represents TIP’s first initiative to evaluate the real-world efficacy of wastewater treatment processes with respect to TRWP removal, bringing together multiple stakeholders from the public and private sector.

How

Using staged sampling and analytical techniques including pyrolysis gas chromatography-mass spectrometry (PY-GC/MS), the project aims to assess removal efficiency and generate field-based evidence to address data gaps, supporting scalable, science-based mitigation measures for TRWP.

Why it matters

- **Fills a knowledge gap** — Limited evidence to date systematically quantifies TRWP removal in wastewater plants.
- **Real-world first** — TIP’s first field test of a priority mitigation measure, moving beyond the lab.
- **Informs best practice** — Results may help inform more widespread implementation of best practices in wastewater management, support policy discussions and future wastewater treatment planning and readiness for upcoming regulatory requirements.

Results are expected to be submitted to a scientific journal for peer review, with final publication likely in early 2027.

Further information is available through “[How wastewater treatment may remove Tire and Road Wear Particles](#)”.

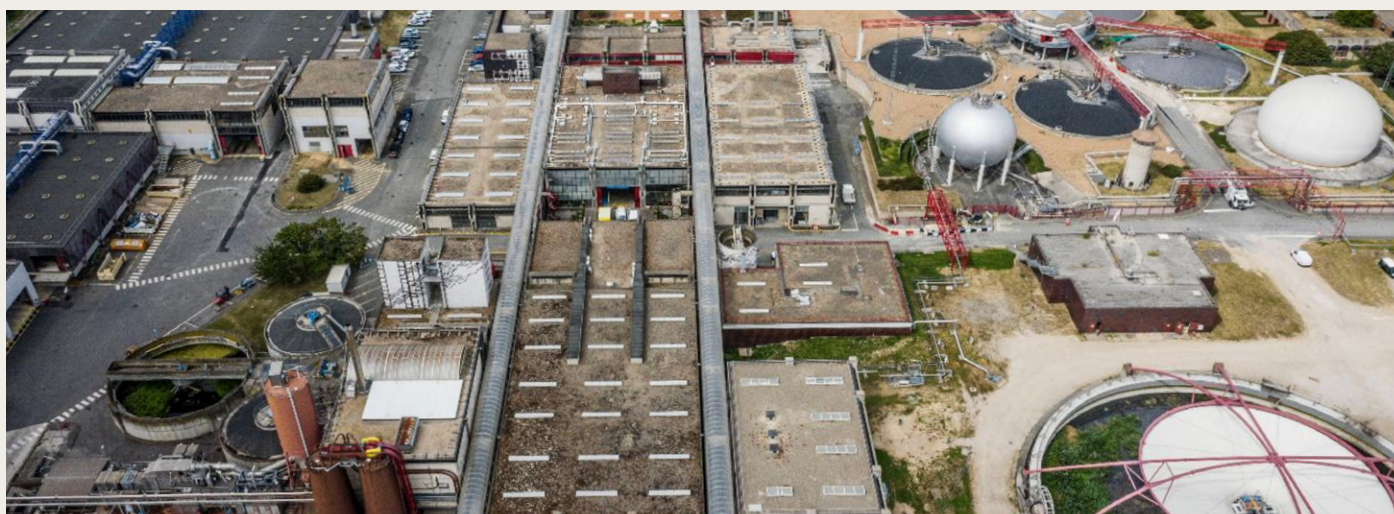


Photo by SIAAP/Olivier Rolfe

Conclusion: TIP members are continuing the efforts to develop the scientific understanding of TRWP, while in parallel supporting the translation of that understanding into real-world use cases.



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.



The updated tire Product Category Rules (PCR): enabling more accurate and credible environmental disclosures

What is a PCR?

A PCR is a guideline for manufacturers of a given type of product to conduct Life Cycle Assessments (LCAs) and produce Environmental Product Declarations (EPDs), ensuring comparable environmental reporting for their products.

Key figures about the updated tire PCR



60% of global tire manufacturing capacity

The updated PCR has been independently adopted by TIP members, which collectively represent 60% of global tire manufacturing capacity.



5 years

The revised PCR is effective for the next five years.



4th version

This is the fourth iteration of the PCR, with the previous update in 2022.

The changes introduced in 2025-2026:

- **Revised carbon footprint calculations:** Introduces updated methodology for renewable materials, including the treatment of biogenic carbon.
- **Broader applicability:** Expands category coverage to all tire types, including off-road and specialty tires.
- **Enhanced regional precision:** Includes region-specific data for ELT management, vehicle efficiency, fuel mixes and payload factors, which will enable LCAs and EPDs to better reflect local market conditions.
- **Clearer methodology:** Applies a structured hierarchy to calculate impacts for manufacturing processes that produce multiple products (e.g., tires and saleable rubber scraps), which improves consistency and comparability.
- **Aligned impact indicators:** Aligns environmental impact indicators and methodologies with the European Commission's Environmental Footprint 3.1, a widely recognized standard.
- **Updated, more accurate datasets:** Features updated datasets for raw materials as well as refined background emission factors, which improves overall data quality.

Conclusion: By fostering innovation across the tire value chain, TIP members continued to drive sustainable mobility in 2025, supporting safer operations, more efficient product development and improved sustainability performance.



Impact Pathway 7:

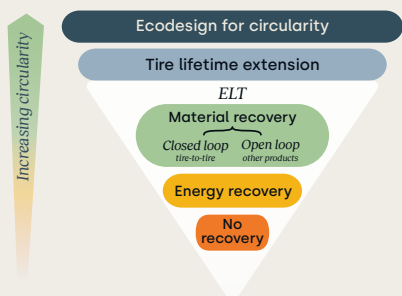
Products and Services - Low-Carbon, Circular Solutions and End-of-life Tires



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.

2025

ELT Management Hierarchy



2026

ELT Interactive Data Map

Establishes a global reference by consolidating information on the ELT management systems, ELT arisings and treatment pathways in each country within an interactive visual map. This helps address a key challenge in understanding of ELT data, namely highlighting that data availability and quality vary across countries.

- Identifies where information is established and where data gaps persist, country by country
- Facilitates trend monitoring
- Supports benchmarking across systems and informs discussions among stakeholders
- Rates data robustness to highlight gaps and limitations.

Further information and supporting references are available through the [ELT Interactive Map and Diagrams](#).

Feb 2026

ELT Toolkit 2.0

Action-oriented implementation guide

A comprehensive, practical guide to more sustainable ELT management systems, reducing waste and fostering circularity within the sector worldwide.

Who is it for



The need it addresses

Roughly 1 billion: the number of tires that reach the end of life every year globally

Building on the first edition published in 2021, this Toolkit is **one of the most comprehensive consolidations of current knowledge**, real-world case studies and insights from ELT experts on the evolving challenges and opportunities across the ELT value chain.

Content of the toolkit

- Maturity assessment tools for ELT management systems
- Case studies of a broad variety of ELT management systems in nine countries
- Action-oriented recommendations

Conclusion: TIP members contributed actively toward developing industry guidance, addressing data gaps, and providing action-oriented recommendations to improve the management of ELTs globally in 2025-2026 developing a variety of decision-support tools.

Annex 1

Methodological Note

The 2025 data presented in this report was collated and analyzed by dss+ on behalf of TIP. The reporting scope encompasses all sites under the operational control of TIP members — 266 sites in 2025. In accordance with the TIP Common Reporting Methodology, no restatement of historical data was performed in cases where companies closed sites.

All data for entities under operational control was consolidated, irrespective of the financial consolidation rate.

The reporting scope comprises tire manufacturing sites and all related onsite activities (canteen, R&D, mixing, bladder production, reused tire processing, motorsport tire production facilities, etc.), as well as standalone sites with mixing activities and those dedicated solely to motorsport tire production, the latter of which were newly added this year.

Other standalone sites (bladder production, steel cord, textile facilities, retread tire processing, headquarters, offices, etc.) are excluded. Offices are, however, included within the scope of the waste indicator.

Data was collected on an individual-company basis and subsequently aggregated by dss+.

A series of data quality checks was carried out by dss+ and TIP members to ensure quality and consistency with previous reporting years.

Historical data was amended only where an error was identified a posteriori by a member.

The aggregated data was used to produce the figures and tables included in this report.

The qualitative information reported is not exhaustive, and the implementation of measures may 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.

Participation in the 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 members 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 into 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 (2022).

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. CO₂e emissions are calculated by multiplying each energy source by factors (2006 IPCC guidelines for scope 1, IEA CO₂e 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. CO₂e intensity is weighted by production, which is calculated by dividing the total CO₂e emitted (in tons of CO₂e) by the total production (tons) during the same year.

Science Based Targets (SBTs): This indicator calculates the percentage of TIP members who have 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). 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 member) 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 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 Boards of Directors: Percentage of women employees on Boards of Directors as of 31 December of the reporting year. It considers only employees as per the Global Reporting Initiative (GRI) 405 definition.

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): 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, and ii) number of citations of articles sponsored by TIP, in peer-reviewed journals.



Annex 2

How TIP members contribute to the SDGs

SDG target contribution	Theme	Impact Pathway (IP)	KPI	Performance					Unit
				2021	2022	2023	2024	2025	
4.5 8.4 12.2	Supply chain 	IP 1 Natural rubber sustainability	1. Members that disclose to the GPSNR	100	100	100	100	100	%
8.4 12.2 12.6	Supply chain 	IP 2 Responsible sourcing	2. Members with sustainable or responsible sourcing policies covering all materials	80	80	80	90	90	%
			Members with time-bound targets for responsible sourcing	40	70	70	80	80	%
6.4 9.4 12.2 12.5	Operations 	IP 3 Operations, incl. manufacturing	3. Energy consumption	171.7	167.9	161.9	157.6	153.4	M GJ NCV*
			4. Electricity from renewable sources	25.7	35.8	53.1	56.8	60.5	%
			5. CO ₂ e emissions	12.6	11.3	9.4	8.8	8.1	M tons
			6. Members with validated SBTs	30	30	60	80	90	%
			7. Total water withdrawals	106.9	102.6	95.4	92.5	87.2	M m ³
			8. Water withdrawals from water-stressed areas	21.0	19.6	17.3	15.3	13.6	M m ³
			9. Waste generation	1.12	1.12	1.11	1.11	1.11	M tons
			10. ISO 14001 certification rate	96	98	97	97	99	%
5.5 10.3 10.4	Operations 	IP 4 Employees	11. Sites with externally audited H&S management system	56	63	65	59	60	%
			12. Women in total workforce	14	15	15	16	16	%
			13. Women on Boards of Directors	20	20	24	24	25	%
			14. Members with public commitments to D&I	100	100	100	100	100	%
12.4 12.6	Products & Services 	IP 5 Tire and Road Wear Particles (TRWP)	15. Cumulative number of TIP-sponsored publications on TRWP	16	20	24	28	36	Number
			16. Annual number of citations of TIP-sponsored TRWP publications	262	510	538	720	796	Number
3.6 9.5 11.2 12.2 12.8	Products & Services 	IP 6 Sustainable mobility and digital solutions		Qualitative disclosure					
8.4 12.2 12.5	Products & Services 	IP 7 Low-carbon, circular solutions and end-of-life tires (ELT)		Qualitative disclosure					

Historical data may have been adjusted by members to reflect improvements in data quality, calculation methodologies, and verification procedures. Consequently, some figures may differ from those reported in previous editions. Dashboard figures are rounded to whole percentage for presentation purpose.

Annex 3

List of key publications about TRWP

No	Title	Year	Lead Author
1	<i>Chemical mapping of tire particles for single particle analysis</i>	2021	Michael Kovochich
2	<i>Characterization of Individual Tire and Road Wear Particles in Environmental Road Dust, Tunnel Dust, and Sediment</i>	2021	Michael Kovochich
3	<i>In Vitro Digestion of Tire Particles in a Fish Model (<i>Oncorhynchus mykiss</i>): Solubilization Kinetics of Heavy Metals and Effects of Food Coingestion</i>	2021	Thibault Masset
4	<i>Aging of tire and road wear particles in terrestrial and freshwater environments – A review on processes, testing, analysis and impact</i>	2022	Stephan Wagner
5	<i>Bioaccessibility of Organic Compounds Associated with Tire Particles Using a Fish In Vitro Digestive Model: Solubilization Kinetics and Effects of Food Coingestion</i>	2022	Thibault Masset
6	<i>Pyrolysis-Gas Chromatography-Mass Spectrometry (Py-GC-MS) Quantification of Tire and Road Wear Particles (TRWP) in Environmental Matrices: Assessing the Importance of Microstructure in Instrument Calibration Protocols</i>	2022	Julie Miller / Kenny Unice
7	<i>Evaluation of three pyrolyzer technologies for quantitative pyrolysis GC-MS of tire tread polymer</i>	2022	Julie Miller
8	<i>Refinement of a microfurnace pyrolysis-GC-MS method for quantification of tire and road wear particles (TRWP) in sediment and solid matrices</i>	2023	Sharlee More
9	<i>Accelerated aging of tire and road wear particles by elevated temperature, artificial sunlight and mechanical stress – A laboratory study on particle properties, extractables and leachables</i>	2023	Steffen Weyrauch
10	<i>Evaluation of tire tread particle toxicity to fish using rainbow trout cell lines</i>	2023	William Dufefoi
11	<i>Characterization of Tire and Road Wear Particles in Urban River Samples</i>	2023	Michael Kovochich
12	<i>The chemical composition and sources of road dust, and of tire and road wear particles – A review</i>	2024	Stephan Wagner
13	<i>Abundance and distribution of tire and road wear particles in the Seine River, France</i>	2024	Tim Barber
14	<i>Estrogenic, genotoxic, and antibacterial effects of chemicals from cryogenically milled tire tread</i>	2024	Alan Bergmann

No	Title	Year	Lead Author
15	<i>Method Development and Analysis of Nanoparticle Size Fraction from Tire-Wear Emissions</i>	2024	Molly Haugen
16	<i>The identification and quantification of tire and road wear particles in Osaka Bay, Japan, by two analytical methods</i>	2025	Tim Barber
17	<i>Tire emissions during the use phase of tires – current and future trends</i>	2025	Kathrin Müller
18	<i>Risk assessment of tire wear in the environment – a literature review</i>	2025	Kathrin Müller
19	<i>Long term biodegradation study on tire and road wear particles and chemicals thereof</i>	2025	Steffen Weyrauch
20	<i>Pyrolysis-GC/MS calibration for environmental quantification of tire tread: Standards and marketplace averaged elastomer subunit profiles</i>	2025	Stephanie A. Thornton
21	<i>Particle emissions study from tire sample with nano-silver tracer from different steps of its life cycle. A new approach to trace emissions of tire microparticles</i>	2025	Christophe Bressot
22	<i>Characterization of tire and road wear particles in experimental biota samples</i>	2025	Michael Kovochich
23	<i>Biodegradation pathways and products of tire-related phenylenediamines and phenylenediamine quinones in solution – a laboratory study</i>	2025	Limei Han

Acknowledgements

Disclaimer

This publication has been developed in the name of TIP. Like other TIP publications, it is the result of collaborative efforts by representatives from TIP members and external experts. TIP members 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 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.

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About TIP

Formed in 2005, 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 60% 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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