



Overall Assessment

Planet Tracker:
Toray is likely on track to follow a pathway of between 2°C to 3°C by 2030.

Planet Tracker assessed Toray's climate transition strategy across emissions, policy and engagement, governance, risk management, and capital allocation. While Toray aims for carbon neutrality by 2050 and invests in low-carbon opportunities, its focus on intensity-based and avoidance targets – rather than absolute reductions – undermines its alignment with the most ambitious climate goals. Supplier and customer engagements also lack emissions abatement details and third-party-assessed sustainability targets, limiting their reliability. Although governance integrates sustainability oversight and management incentives include climate-related factors, these measures do not fully tie compensation to Net Zero progress. On a positive note, Toray has considerably improved its sustainability-linked disclosures in recent years, a key example being its scenario analysis which identifies both market opportunities and climate related risks. Still, the absence of a link between investment, timelines and mitigated emissions as well as the lack of absolute Scope 3 targets leaves its long-term trajectory uncertain. Without stronger absolute reduction commitments, enhanced supply chain accountability, and clearer links between incentives and Net Zero goals, Toray appears more likely to align with a 2°C to 3°C scenario rather than the more ambitious 1.5°C target.



This report is one of a series examining the climate transition plans of companies in the Climate Action 100+ list. This project is separate to and not affiliated with Climate Action 100+.

Download the Shareholder [Engagement Sheet](#).



Climate Alignment

- Toray aims to achieve carbon neutrality by 2050, but its reliance on intensity-based and avoidance-focused targets rather than absolute reduction goals, especially for Scope 3, makes its Net Zero trajectory alignment uncertain.
- Between 2019 and 2023, Scopes 1, 2, and upstream Scope 3 increased by 3.9%, primarily driven by an absolute increase of 15.7% in upstream Scope 3. By 2030, Upstream Scope 3 emissions are expected to increase by 29% resulting in an absolute emissions growth of 13% (excluding downstream Scope 3).



Policy and Governance

- Toray has established corporate social responsibility policies and conducts supplier assessments to promote sustainable practices, but lacks specific targets, enforcement mechanisms, and data on emission reductions in its supply chain.
- Management compensation includes climate-related incentives; however, executive incentives focus more on revenue and product growth rather than explicitly linking pay to Net Zero progress.



Risk Analysis

- Toray's scenario analyses suggest a balance of substantial market opportunities in low-carbon solutions and significant transition and physical climate risks.
- However, despite its efforts to mitigate these risks and take advantage of the potential opportunities, it remains unclear how these measures will align Toray with the Paris Agreement, as key details are missing.



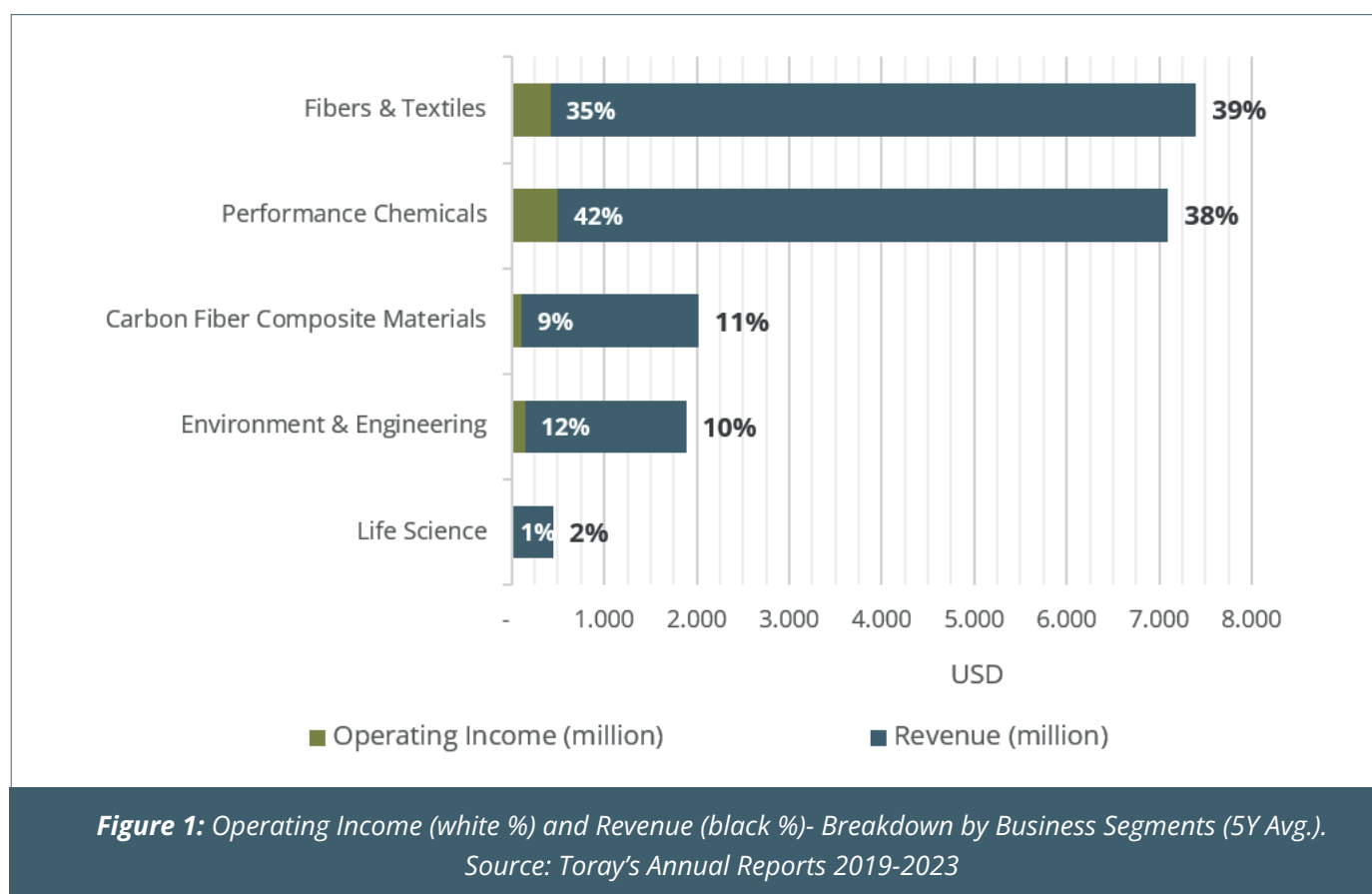
Strategy Assessment

- Toray dedicates about 45% of its Research & Development spending and 20% of its Capital Expenditure to climate change countermeasures. Notably, while considering climate the majority of said investment is dedicated to product development rather than absolute emissions reductions.
- Lastly, without a link between investments and absolute emissions targets, comprehensive supply chain accountability, and specific governance and incentives towards Net Zero ambitions, Toray may find itself on a pathway closer to a 2°C to 3°C scenario rather than the more ambitious 1.5°C target.

Company Overview

Toray Industries (Toray) is a Japan-based multinational corporation specialising in the integrated chemical industry. Over the past five years (2019–2023), the company has reported an average annual revenue of JPY 2,254.8 billion (approximately USD 18.9 billion¹).

Toray operates through five core business segments: **Fibres & Textiles**², **Performance Chemicals**³, **Carbon Fibre Composite Materials**⁴, **Environment & Engineering**⁵, and **Life Science**⁶. The **Fibres & Textiles** and **Performance Chemicals** segments are the principal revenue drivers, jointly contributing close to 77% of the company's average revenue during this period – see **Figure 1**. Notably, the **Performance Chemicals** segment is the most profitable, accounting for 42% of operating profit over the last five years, followed by **Fibres & Textiles** with 35%, and **Environment & Engineering** with 12%.



1 To calculate the average revenue in USD the following JPY to USD exchange rates were applied: 0.009201 (2019), 0.009686 (2020), 0.008687 (2021), 0.007627(2022), 0.007091 (2023).

2 Main products: (a) Filament yarns, staple fibres, spun yarns, woven and knitted fabrics of nylon, polyester, acrylic, and others; (b)Nonwoven fabrics; (c) Ultra-microfiber nonwoven fabric with a suede texture; (d) Other apparel products.

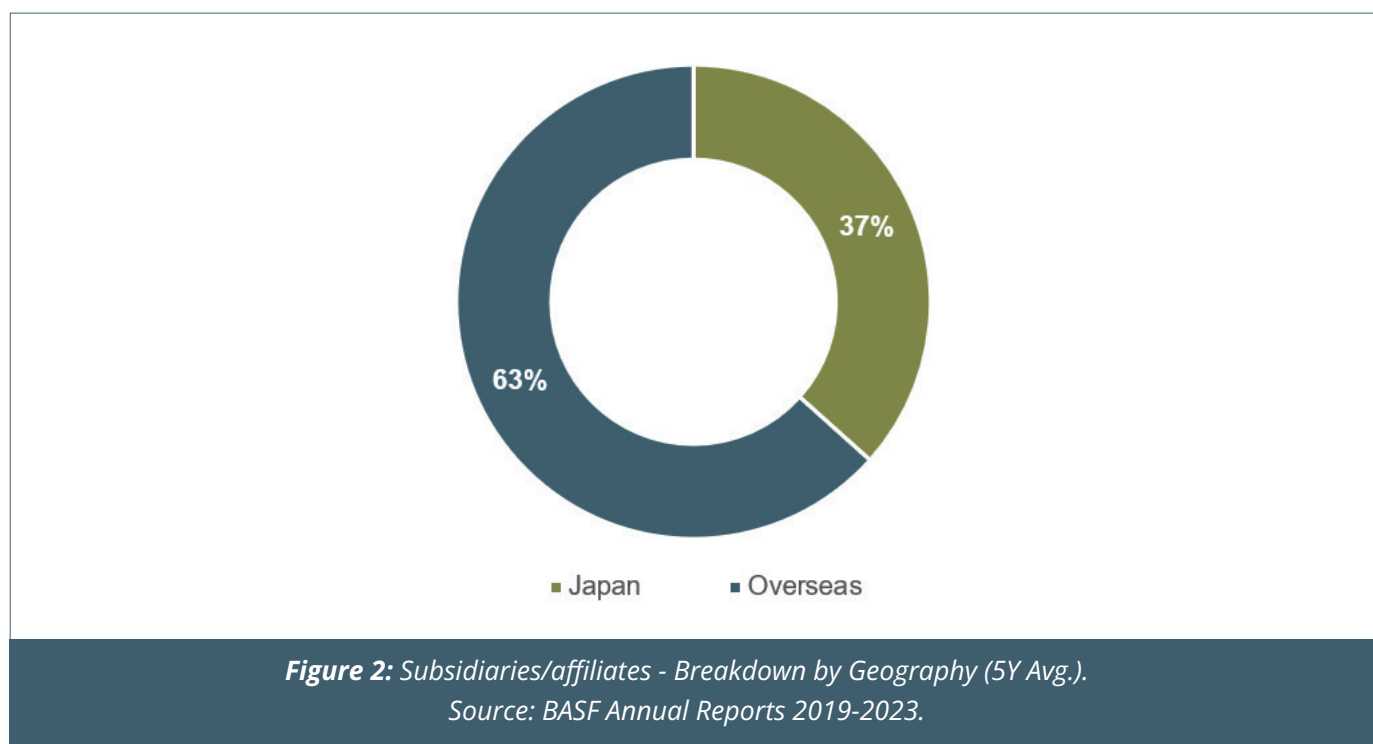
3 Main products: (a) Nylon, ABS, PBT, PPS, and other resins and moulded products; (b) Polyolefin foam; (c) Polyester, polyethylene, polypropylene, and other films and processed film products; (d) Raw materials for synthetic fibres, and other plastics; (e) Fine chemical; (f) Electronic and information materials, and graphic materials.

4 Main products: Carbon fibres, carbon fibre composite materials, and their moulded products.

5 Main products: (a) Comprehensive engineering; (b) Condominiums; (c) Industrial equipment and machinery; (d) IT-related equipment; (e) Water treatment membranes and related equipment; (f) Materials for housing, building, and civil engineering applications.

6 Main products: (a) Pharmaceuticals; (b) Medical devices.

Geographically, Toray has established a significant presence in Japan, China, other Asian regions, Europe, and North America⁷. The Asian market constitutes the majority of Toray's total revenue, supported by the distribution of its subsidiaries and affiliates, of which over one-third have been located in Japan over the past three years – see **Figure 2**.



In summary, Toray's global operations in key developing regions like the Asia-Pacific and developed markets such as Japan suggest that its climate transition risks and opportunities, along with regulatory impacts, are concentrated in these areas. Additionally, due to the significant influence of the **Fibres & Textiles** and **Performance Chemicals** segments on its financial performance, the company is highly dependent on climate transition developments within these industries.

⁷ See Annex I.

Climate Alignment

EMISSIONS INVENTORY

Between 2019 and 2022, Toray Industries only reported Scope 1, Scope 2, and upstream Scope 3 greenhouse gas (GHG) emissions. These emissions increased from a low of 14,657 kilotons of CO₂ equivalent (KTCO₂e) in 2019 to a peak of 15,637 KTCO₂e in 2022. In 2023, Scope 1, 2 and upstream Scope 3 emissions slightly decreased to 15,241 KTCO₂e. However, in line with Planet Tracker's Climate Transition Analysis (CTA) recommendations featuring Toray⁸, the company also disclosed in 2023 its downstream Scope 3 emissions, amounting to 7,270 KTCO₂e. Consequently, Toray's total GHG footprint in 2023 stood at 22,511 KTCO₂e, with the following breakdown of emissions:

- **Scope 1 emissions:** 11.1% of total emissions
- **Scope 2 emissions (market-based):** 10.9%
- **Upstream Scope 3 emissions⁹:** 45.7%
- **Downstream Scope 3 emissions¹⁰:** 32.3%

Within the Scope 3 category, key contributors were:

- **Purchased Goods and Services** (upstream): 38.2% of total emissions
- **End-of-Life Treatment of Sold Products** (downstream): 19.9%

For more details see **Figure 3**.

⁸ See Toray's [CTA Engagement Sheet](#).

⁹ Scope 3 upstream emissions include: (1) Purchased Goods – calculated by Toray by multiplying the volume of purchased products and services (physical and monetary data) by the emission factor for each item; (2) Processing - including the emissions from "Capital Goods" – calculated by Toray by multiplying the amount of payment for purchased capital goods by the emission factor; "Fuel and Energy Activities" not covered in Scope 1 and 2, and the emissions from "Waste from Operations" – calculated by Toray by multiplying the amount of waste for each type of waste by the emission factor applicable to type of waste; (3) Transportation - covering emissions from "Transport & Distribution" and "Employee commuting".

¹⁰ Scope 3 downstream emissions include: (1) Distribution – accounting for downstream "Transportation and Distribution" emissions and "Business Travel" emissions; (2) Consumption – covering emissions from the "Use of sold products" which stands for emissions related to the use of Toray's products and downstream "Leased Assets" emissions from the operation of assets that are owned by Toray but leased to other entities in the reporting year and are not already included in Scope 1 or 2. (4) Disposal – covering the emissions from the "End of life treatment of sold products".

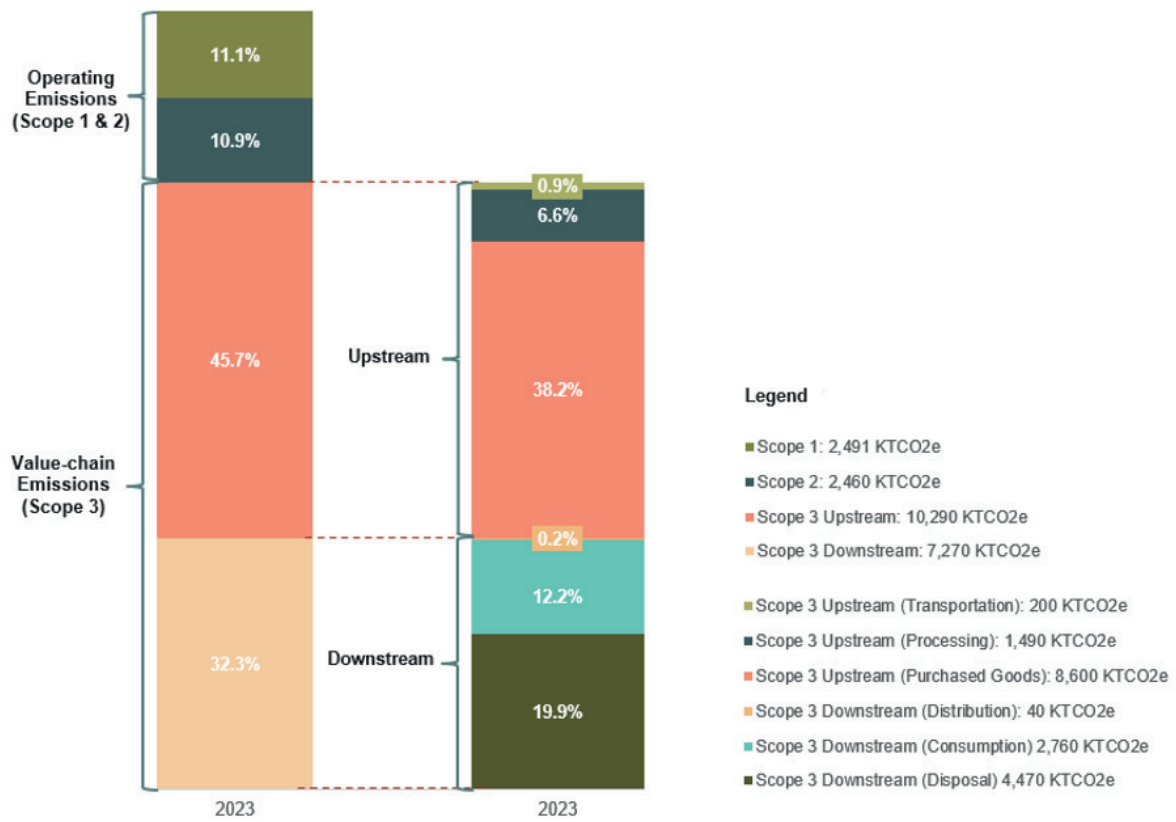


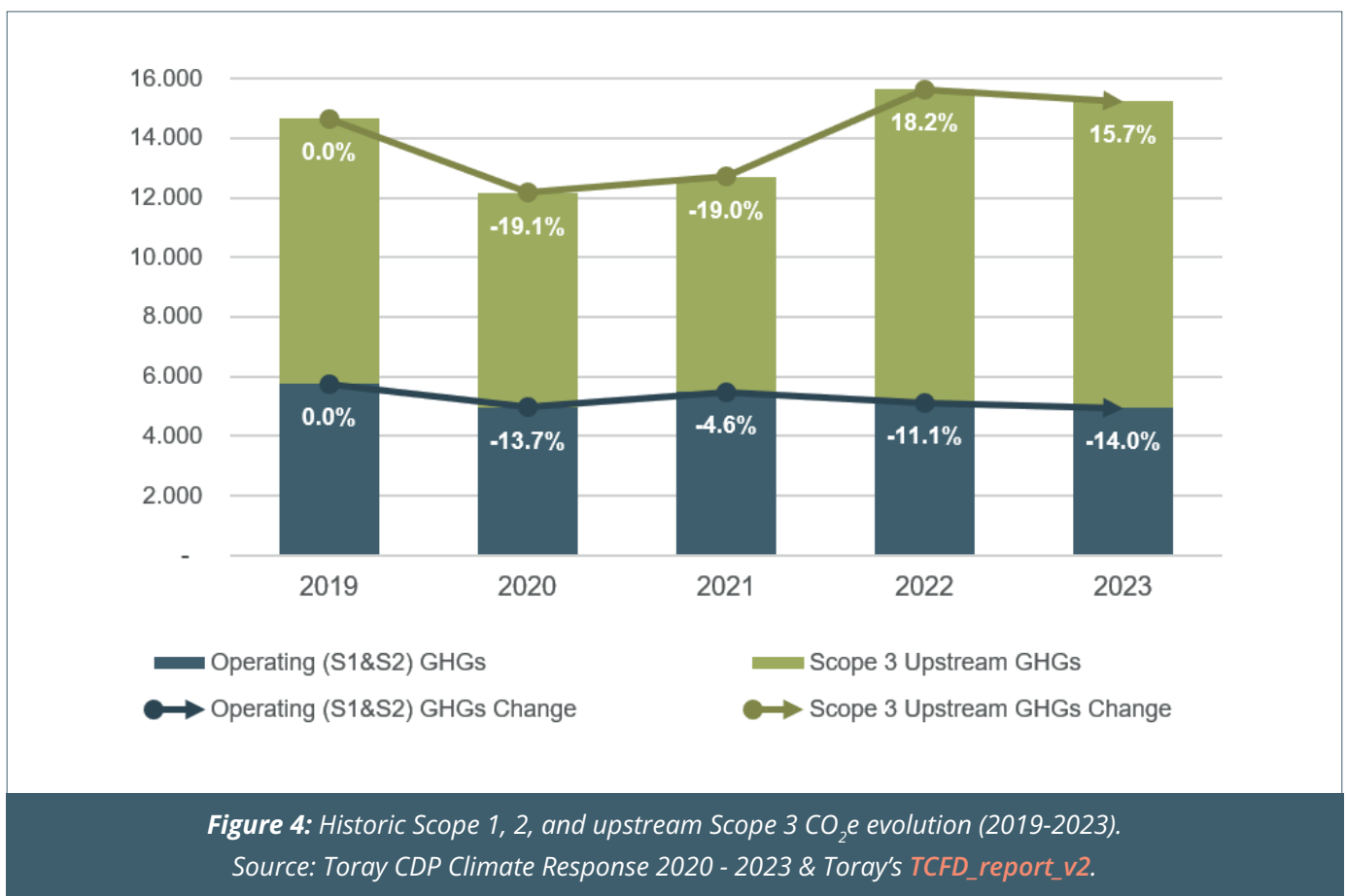
Figure 3: Total GHG Footprint (2023) - Percentage Breakdown by Scope.

Source: [Toray's TCFD_report_v2](#).

EMISSIONS TRENDS AND TARGETS

Historical and Expected Emissions

Between 2019 and 2023, for the scopes where consistent data is available (Scopes 1, 2, and upstream Scope 3), Toray's total GHG emissions increased by 3.9%. This rise was primarily driven by a 3.7% annual average increase in upstream Scope 3 emissions, representing an absolute increase of 15.7% over the period. In contrast, Scope 1 emissions decreased by an annual average of 6.6%, and Scope 2 emissions saw a marginal annual average reduction of 0.2%, resulting in a total decrease in operational emissions (Scopes 1 and 2) of 14%, as outlined in **Figure 4**.



A high-level extrapolation model was employed to forecast Toray's emissions up to 2030. This model projects the annual emissions change rate from the past five years forward, assuming that the company continues its historical mitigation efforts while maintaining an intrinsic annual revenue growth rate of 3.5%¹¹.

According to Planet Tracker's extrapolation:

- **Scope 1 emissions** are expected to decrease by 38% by 2030.
- **Scope 2 emissions** are projected to decrease by 2% by 2030.
- **Upstream Scope 3 emissions** are expected to increase by 29% by 2030¹².

This would result in an absolute emissions increase of 13%, with projected emissions (excluding downstream Scope 3) reaching 17,246 KTCO₂e by 2030, compared to 15,241 KTCO₂e in 2023. In this scenario, operational emissions (Scopes 1 and 2) would account for 23% of the total footprint, while upstream Scope 3 activities would contribute 77%, as presented in **Figure 5**.

¹¹ This is the 2019-2023 revenue growth rate which also accounts for the COVID-19 pandemic's transient economic impact, reflecting both the downturn and subsequent recovery.

¹² Company representatives argue that Category 1 "Purchased Goods and Services" emissions account for the majority of Scope 3 GHGs, and that full-scale efforts to recycle resources (e.g., biomass and other forms of recycling) are just beginning. Thus, forecasts based on past results may not be accurate. Planet Tracker finds this argument appropriate. That is why to assess Toray's likelihood of altering its historic pathway going forward, a deeper analysis of the company's policy, governance, risk management, and strategic alignment is presented in the subsequent sections.

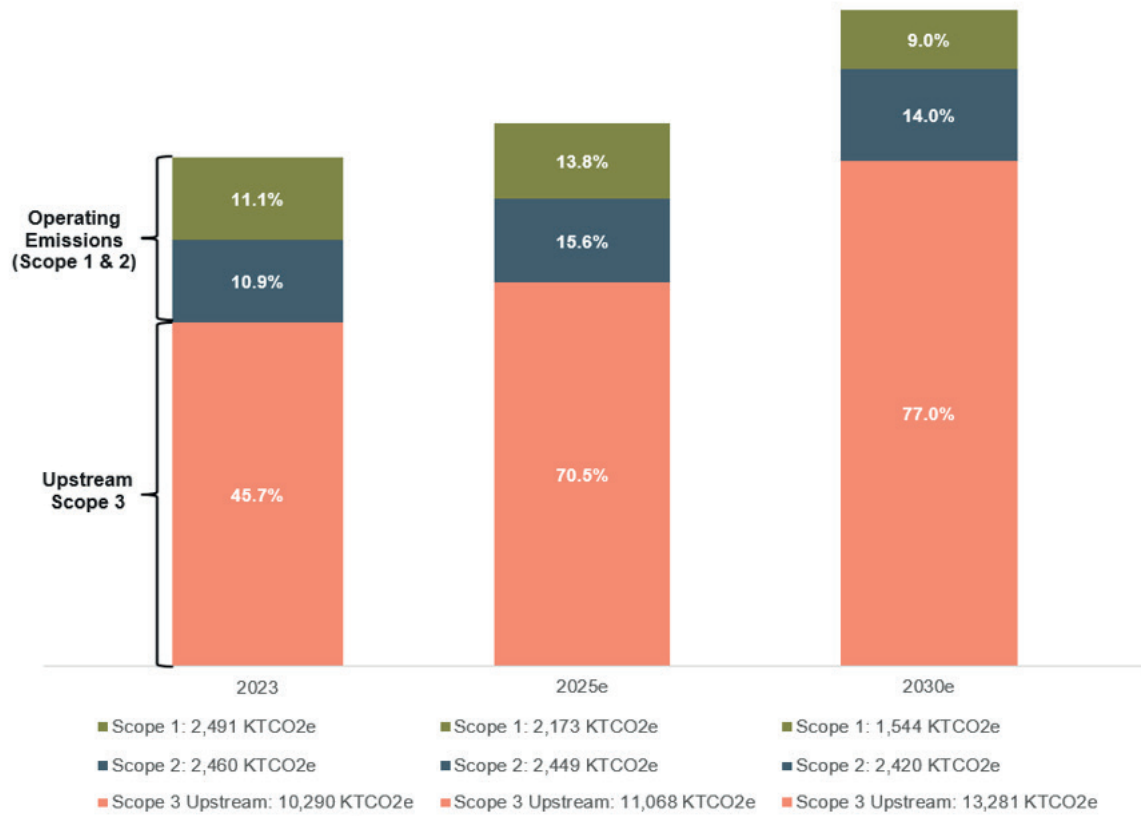


Figure 5: Expected Scope 1, 2, and upstream Scope 3 CO₂e evolution (2025e & 2030e) - Percentage Breakdown by Scope. Source: CDP Climate Response 2020 – 2023, Toray's *TCFD_report_v2* and Planet Tracker Calculations.

Decarbonisation Targets

Toray aims to achieve carbon neutrality by 2050. However, the company's approach differs from that of other Climate Action 100+ (CA100+) listed chemical companies. Specifically, Toray employs geographic and intensity-based targets for its own emissions and sets carbon avoidance targets for its supply chain. Accordingly, Toray's dual strategy, revised in 2023, focuses on two key mid-term initiatives:

1. **Sustainability Innovation (SI) Business Expansion Project:**

Aims to reduce GHG emissions across society through the company's products by:

- Increasing the supply of SI products by 4.5 times by FY2030 compared to FY2013.
- Increasing CO₂ emissions avoided in its value chain by 25 times by FY2030 compared to the FY2013 baseline.

2. **Climate Change Action Project:**

Intends to reduce GHG emissions in the company's own business by a set of actions¹³ aiming to:

- Reduce operational GHG emissions per unit of revenue for the entire group by over 50% by FY2030 compared to FY2013.
- Reduce operational GHG emissions of Toray Japan by over 40% by FY2030 compared to FY2013.

While the focus on avoiding emissions through sustainable products is commendable, from a climate transition perspective, Toray's approach lacks key details. It remains uncertain whether the company's absolute emissions are expected to increase (as sales grow) or decrease. Similarly, reducing operational GHG emissions per unit of revenue may not align with the broader goal of transitioning to a Net Zero economy¹⁴. Therefore, the most tangible target from a transition viewpoint is the ambition to reduce operational GHG emissions of Toray Japan (including Toray Industries and group companies in Japan) by over 40% by FY2030 from the FY2013 baseline.

For more details, in 2013, Toray had total operational emissions of approximately 5,660 KTCO₂e with around 2,450 KTCO₂e attributed to operations in Japan. A 40% absolute reduction would mean decreasing Japanese operational emissions by 980 KTCO₂e by 2030, leading to an expected footprint of 1,470 KTCO₂e in Japan.

By 2023, the company's operational emissions in Japan had decreased by 25.5%, reaching 1,825 KTCO₂e. Meanwhile, emissions outside Japan decreased by only 2.6%, reaching 3,126 KTCO₂e from 3,210 KTCO₂e in 2013. Overall, in the last ten years, Toray's operational emissions decreased by 12.5% in absolute terms.

¹³ These include ambitions such as: (1) Maximising the use of zero-emission electricity and fuels; (2) Increasing the efficiency of existing production processes; (3) Developing innovative low-GHG emission production technologies; (4) Developing and maximising the use of recycling technology and biotechnology; (5) Pursuing CO₂ recycling and carbon capture initiatives.

¹⁴ Additionally, making use of the available data, Planet Tracker was not able to replicate the intensity ratios the company discloses – i.e., dividing annual revenues by operating emissions would result in slightly different ratios.

Based on our extrapolation, operational emissions are expected to reach 3,965 KTCO₂e by 2030, representing a 30% absolute reduction compared to the 5,660 KTCO₂e level of FY2013. Assuming the target of reducing Japanese operational emissions to 1,470 KTCO₂e is met, this implies an approximate 22% absolute mitigation of operational emissions outside Japan, reaching 2,495 KTCO₂e by FY2030 from 3,210 KTCO₂e in FY2013.

Nevertheless, a potential outcome of a 30% reduction in operational emissions over 17 years is relatively modest compared to other CA100+ listed chemical companies, whose ambitions generally range between 25% and 42% reductions over a 10-year period (typically from 2020 to 2030)¹⁵. Additionally, beyond emissions avoidance, Toray lacks a specific target for Scope 3 emissions. Given the historical trend of increasing upstream Scope 3 emissions, this absence is concerning, as it suggests the company's total footprint could increase by 13% in absolute terms by 2030, as per our projection.

In conclusion, Toray's emissions trajectory indicates a potential alignment with a business-as-usual pathway by 2030, as the overall footprint appears likely to continue growing, and the mitigation ambition is low. The company's decarbonisation strategy lacks comprehensive Scope 3 emissions targets and absolute emissions reduction ambitions, with the expectation of modest commitments for Toray's operating emissions – which represent less than a quarter of its total footprint. To assess Toray's likelihood of altering its historic pathway going forward, a deeper analysis of the company's policy, governance, risk management, and strategic alignment is presented in the subsequent sections.

¹⁵ The only exceptions would be Dow, aiming for a 15% absolute reduction and Air Liquide which instead of 10 years aims for a 35% reduction in 13 years. For more details see "Tomorrow's Chemistry".

Policy and Governance

ENGAGEMENT AND INFLUENCE

Suppliers' Engagement

Toray Industries operates a global supply chain across diverse regions, with procurement activities distributed as follows: Japan (45%), the rest of Asia (38%), the Americas (11%), and Europe (6%). The company's main purchasing segments include Fibres & Textiles (32%), Plastics & Chemicals (23%), Films (15%), Carbon Fibre Composite Materials (12%), and others (18%).

Toray has established the Toray Group Corporate Social Responsibility (CSR) Procurement Policies and accompanying guidelines to promote ethical, environmental, social, and human rights considerations throughout its supply chain. Suppliers are expected to adhere to these guidelines, which outline general commitments such as:

- **Environmental Management:** Complying with environmental laws and establishing frameworks for continuous improvement.
- **Reduction of GHG Emissions:** Controlling and promoting the reduction of GHG emissions.
- **Minimisation of Environmental Impact:** Managing and reducing emissions that affect air, water, and soil quality.
- **Resource Reduction and Waste Management:** Properly handling waste and promoting recycling.
- **Chemical Substance Management:** Avoiding prohibited substances and managing environmental releases.
- **Biodiversity Conservation:** Considering biodiversity in raw material procurement.

While these policies demonstrate an intent to encourage sustainable practices, they lack specificity regarding targets, timelines, and enforcement mechanisms. For instance, terms like "control GHG emissions" and "strive to use energy effectively" are vague, leaving room for interpretation and making it challenging to measure compliance or progress.

In an attempt to ensure said compliance and progress, Toray conducts self-assessed CSR surveys of major suppliers every two years, targeting those responsible for 90% of its procurement value. The surveys assess suppliers on various aspects, including environmental compliance, GHG emissions reduction efforts, and biodiversity initiatives.

Notably, in FY2022, Toray received 448 responses from suppliers across different categories, with approximately 99% of suppliers meeting Toray's CSR standards, while 1% required further investigation. According to the company suppliers needing improvement were provided feedback and asked to implement corrective measures. Furthermore, Toray stated that it plans to visit these suppliers to confirm conditions and discuss improvements.

However, these surveys primarily confirm whether suppliers have policies or are taking steps toward CSR goals without detailing the effectiveness or extent of these actions. For example, the company notes that 84% of major suppliers are “taking steps to reduce GHG emissions,” but does not specify what those steps entail or how they contribute to actual emission reductions. Therefore, the actual impact of Toray’s supplier engagement on environmental performance remains unclear.

In short, Toray engages with its suppliers through policies, surveys, and educational initiatives aimed at promoting CSR practices. However, the lack of specific, enforceable targets and the absence of detailed reporting on supplier performance, ideally assessed by a third party, suggest that the current approach may have limited impact on reducing supply chain emissions. Company representatives argue that as business partners Toray could set specific targets for its suppliers, but enforcing them would be challenging.

Customers’ Engagement

Toray Industries extends its CSR initiatives to downstream operations, including distribution and logistics. The company revised its **Basic Purchasing Policies** and **Basic Distribution Policies** in March 2022 to address social responsibilities in procurement, purchasing, and distribution. These policies aim to ensure fair transactions, quality improvement, legal compliance, environmental protection, and respect for human rights.

Accordingly, Toray’s Basic Distribution Policies focus on:

- **Impartial Selection of Logistics Providers:** Choosing transport and warehousing providers based on economic rationality, considering factors like price, quality, supply stability, technological capabilities, reliability, and efforts to reduce environmental impact.
- **Open Selection Process:** Broadening the pool of potential logistics partners rather than relying exclusively on existing or affiliated companies.
- **Environmental Collaboration:** Working with logistics providers to assess and reduce the environmental impact of transport and warehousing operations.
- **Promotion of CSR:** Adhering to the Toray Group CSR Procurement Policies and Guidelines to uphold social responsibilities in distribution activities.

To implement these policies, Toray conducts annual Basic Distribution Policy Briefings for logistics companies. In fiscal 2022, 65 logistics companies participated in these briefings, which aimed to improve distribution performance and promote understanding of the company’s policies.

One initiative involves expanding the use of pallets and packing styles that facilitate loading with forklifts, thereby reducing cargo loading time. This change reportedly led to an 83% reduction in CO₂ emissions related to pallet recovery, amounting to a decrease of 0.2 KTCO₂e per year. Moreover, Toray is attempting to reduce CO₂ emissions from transport by reducing transport distances via optimisation, switching to transport modes with lower environmental impact (e.g., rail), and enhancing transportation efficiency. For example, in FY2022, Toray’s emissions from distribution activities in Japan were 27 KTCO₂e, a reduction of 3 KTCO₂e (10.3%) from the previous year, primarily due to decreased transport volume, as stated by the company.

Over the past five years, Toray has achieved an average annual reduction in CO₂ emissions intensity from distribution activities of 3.5%, meeting the legal requirement in Japan to reduce emissions intensity by at least 1% annually. However, it's important to note that transport and distribution account for only about 1.1% of the company's total GHG footprint in 2023, limiting the overall impact of these reductions on the company's climate goals. While Planet Tracker agrees with Toray representatives on the importance of small efforts to reduce emissions from distribution activities, to make a more substantive contribution to its climate goals, Toray needs to expand its downstream engagement strategies to address higher-impact areas within its value chain.

Influence on Policymakers

Toray engages with climate policies through various channels, showing a mix of supportive and ambiguous positions. While the company expresses general support for the energy transition in Japan, its stance on specific climate regulations is less clear. Additionally, Toray maintains memberships in industry associations that have, at times, negatively influenced climate policies.

Toray presents generally positive messaging on climate change. In its CSR report published in October 2023, the company affirmed its support for achieving carbon neutrality by 2050 to limit global warming to 1.5°C and endorsed the goals of the Paris Agreement. However, its position on the necessity of climate policy remains somewhat ambiguous.

For instance, in a December 2023 interview with Nikkei Business, Chairman Akihiro Nikkaku advocated for a greater role for Japan in international environmental rule-making but did not explicitly endorse specific climate regulations. Similarly, in its 2023 CDP response, Toray mentioned advocating for incentives and standards for GHG reductions in chemical and materials supply chains but did not clarify its stance on GHG emissions legislation.

In recent years, Toray has shown increasing support for the energy transition, particularly regarding the adoption of renewable energy and green hydrogen in the industrial and transportation sectors. In August 2023, during a METI hearing, the company advocated for the development of hydrogen and ammonia produced from renewable sources to decarbonise transport and heavy industry.

At the same time, Toray holds memberships in several industry associations, some of which have engaged negatively with climate-related policies. The company's disclosed affiliations include:

- **Japan Business Federation (Keidanren):** Toray participates in environment-related committees and supports Keidanren's Carbon Neutrality Action Plan aiming for carbon neutrality by 2050. The company engages in expressing views and making recommendations on promoting carbon neutrality from the manufacturing industry's perspective. However, Keidanren has historically opposed certain climate regulations, potentially diluting Toray's positive influence.
- **Japan Chemical Fibers Association (JCFA):** Toray supports the JCFA's "Action Policy of the Chemical Fibers Industry for Realizing a Sustainable Society" established in 2021. The company participates in committees to discuss issues related to carbon neutrality and recycling in the fibres industry, providing recommendations on necessary technologies and promotion systems.

- **Japan Chemical Industry Association (JCIA):** Toray endorses JCIA's stance on carbon neutrality and participates in various committees as a member company selling chemical products. The company contributed to compiling JCIA's guidelines on calculating carbon footprints in the chemical industry. Toray is also involved in the GX Promotion Subcommittee, collaborating with the government to develop a roadmap toward carbon neutrality. Despite these efforts, JCIA has occasionally resisted strict climate policies.
- **Japan Association for Chemical Innovation (JACI):** Toray engages in committees to express views on promoting carbon neutrality from the chemical industry's perspective and participates in working groups related to carbon neutrality.
- **GX League:** Toray participates in discussions on creating mechanisms for evaluating CO₂ emissions reductions. The company works to reduce its own emissions and those in the supply chain, disclosing emission reduction targets and progress on the league's GX Dashboard.

Toray's engagement with policymakers reflects a blend of general support for climate objectives and cautious positions on specific regulatory actions. While the company promotes the energy transition and the adoption of renewable energy technologies, its ambiguous stance on climate policies and affiliations with industry groups opposing such policies limit its influence on advancing robust climate regulations. To enhance its impact, Toray may need to adopt clearer support for specific climate regulations and reconsider its involvement with industry groups that hinder climate progress.

MANAGEMENT ALIGNMENT

Sustainability Targets Oversight

Toray Industries operates with a governance structure comprising a Board of Directors and a Board of Corporate Auditors. The Board of Directors, with a total of 12 members which includes 5 outside directors¹⁶, is responsible for deciding on business execution and supervising the performance of executive directors' duties. To ensure transparency and fairness, the Board of Corporate Auditors – entirely independent of the Board of Directors and including outside auditors – audits the execution of duties by the directors separately from the executing organisation.

A Governance Committee serves as a voluntary advisory body to the Board of Directors, enhancing the effectiveness of corporate governance. This committee consists of the chairman, the president¹⁷, and all outside directors, with an outside director acting as chairperson.

In 2024, Toray revised its implementation system concerning sustainability oversight. The former Sustainability Committee was dissolved and replaced with a more flexible structure. Important issues, such as basic strategies and capital investments related to the Sustainability Innovation (SI) Business Expansion Project and the Climate Change Action Project, are now deliberated by the Executive Committee, a conference organ of the Board of Directors, as needed. This change aims to accelerate action on climate change by adapting to the constantly evolving business environment while maintaining existing functions.

According to the company, sustainability initiatives are closely integrated with CSR, risk management, safety, health, environment, and research and technology development activities. Progress and results of sustainability activities are reported to the Board of Directors at least once a year, enabling the Board to monitor climate action and consider related challenges in management decisions.

Ultimately, the president is responsible for addressing climate change issues having oversight on the development of climate transition plans, the evaluation of climate-related risks and opportunities, and the management of these. The president reports on climate-related issues to on a quarterly basis to the Board of Directors.

¹⁶ The "outside director" is a term used by Toray to define elected directors who, at the time of this paper, happen to be independent.

¹⁷ The president in this case takes the role of CEO.

Management Compensation

The president and other executive managers receive performance-linked compensation, including monetary rewards, bonuses as a percentage of salary, and stock options. In FY2022, performance-linked pay constituted approximately 37% of the president's total compensation, with 17% tied to short-term targets (bonuses) and 20% to medium- and long-term targets (stock options). For other executive managers, performance-linked pay accounted for about 32% of total compensation, with 13% linked to short-term targets and 19% to long-term incentives.

Key targets for executives include:

- **Revenue Expansion:** Increase revenue from the Sustainability Innovation Business to JPY 1.6 trillion (or USD 11.3 billion¹⁸) by 2025.
- **Product Supply Growth:** Expand the supply of Sustainability Innovation products to 4.5 times the 2013 level by 2030.

Engineering department heads also receive incentives based on their success in reducing GHG emissions and improving energy efficiency within their departments. Their compensation includes monetary rewards and bonuses tied to:

- **GHG Emissions Intensity Reduction:** Decrease Scope 1 and 2 emissions intensity relative to revenue by 20% by 2022 (surpassing this with a 35% reduction), aiming for 40% by 2025 and 50% by 2030.
- **Absolute Emissions Reduction:** Reduce domestic Scope 1 and 2 GHG emissions by 40% by 2030 compared to 2013 levels.
- **Energy Efficiency Improvement:** Achieve a 2% year-on-year improvement in energy intensity at Toray Industries, Inc.

This incentive programme aims to embed climate-related targets in Toray's operational and strategic activities, an initiative we find commendable. However, it would seem that only engineering department heads would receive an undisclosed amount¹⁹ of monetary rewards for the company's climate transition. Meanwhile, executives' performance-linked pay focuses on expansion without a clear link between the achievement of said growth and the company's progress towards a Net Zero economy.

¹⁸ Based on the following JPY to USD exchange rate: 0.007091 (on 31st of December 2023).

¹⁹ Which puts in question its materiality.

Risk Analysis

FINANCIAL IMPACT

To assess its climate related risks and opportunities, Toray conducted a scenario analysis aligned with the TCFD recommendations, initially qualitatively in 2020 and more recently adding specific quantitative insights. Using scenarios aligned with the Paris Agreement (1.5°C and 2°C), as well as a 4°C scenario – which reflects inadequate climate action – the company examined potential impacts on its long-term strategies and business model. This analysis was restated in the Toray Group TCFD Report Ver. 2 (November 2023) and updated Ver. 2.1 (June 2024). Accordingly, the scenario assumptions and scope are described as follows:

1. Scenarios

- 1.5°C and 2°C scenarios assume successful efforts to mitigate climate change and achieve carbon neutrality by 2050.
- A 4°C scenario assumes insufficient progress in global efforts, leading to more severe physical impacts.

2. Focus

- The analysis is centred on sectors expected to experience significant climate-related impacts. These include synthetic fibres for apparel, electric vehicles, aircraft, wind power generation, lithium-ion batteries, seawater desalination, biopolymers/recycled polymers, and hydrogen-related products.

3. Timeframe

- While the 2020 qualitative analysis focused on 2030–2050, the quantitative analysis targets near - 2040 conditions.

Opportunities

Independent of the scenario chosen, Toray anticipates growing markets for products that facilitate decarbonisation, circular economy models, and adaptation to climate impacts. For instance:

- **Circular Economy:** Toray expects a new market worth approximately JPY 800 billion (or USD 5.7 billion²⁰) for bio-based and recycled materials.
- **Electrification of Mobility:** The company calculates around JPY 400 billion (or USD 2.8 billion²¹) in potential new markets for materials that reduce weight and improve energy efficiency in electric vehicles.
- **Water Treatment and Adaptation:** Toray states that substantial opportunities exist for adaptation-related products, such as advanced water treatment solutions.

These findings aim to support the company's Sustainability Vision, which intends to increase the supply of Sustainability Innovation (SI) products that help reduce GHG emissions.

²⁰ Based on the following JPY to USD exchange rate: 0.007091 (on 31st of December 2023).

²¹ Based on the following JPY to USD exchange rate: 0.007091 (on 31st of December 2023).

Transition Risks

Based on the company's assessment, in the shift to a low-carbon economy, Toray faces potential revenue setbacks if it does not adapt to the new environment:

- **Circular Economy Delays:** Toray expects up to JPY 300 billion (or USD 2.1 billion²²)²³ in lost revenue near 2040 if the company fails to respond effectively to reduced plastic use and stricter recycling requirements.
- **Electrification of Mobility:** The company calculates a possible JPY 230 billion (or USD 1.6 billion²⁴)²⁵ revenue contraction in materials for internal combustion engine vehicles, as the market moves towards electric vehicles.
- **Regulatory Costs:** Carbon taxes and emission regulations could also have a significant financial impact. For example, carbon taxes in a 1.5°C scenario could cost, according to Toray, around JPY 85 billion, while renewable energy procurement may add an additional JPY 60 billion in energy costs, for a total of JPY 145 billion (or USD 1 billion²⁶)²⁷.

Nevertheless, the company argues that, despite these expected risks, the overall market opportunities from climate-aligned products and services could outweigh these potential losses.

Physical Risks

When it comes to physical climate change impacts, such as more frequent extreme weather events, water scarcity, and supply chain disruptions, the company's recent reassessments have moderated some of its previous concerns:

- **Water Intake Restrictions:** While previously deemed a significant risk, this has been downgraded to "moderate"²⁸ due to updated analyses, particularly given that around 80% of Toray's water use occurs in Japan.
- **Disaster-Related Disruptions:** Operations and supply chains may still be vulnerable to extreme weather events, which could worsen in a 4°C scenario; but specific numbers are not disclosed.

The efforts to reduce GHG emissions, improve resource efficiency, and implement adaptation measures can help mitigate these physical risks.

In summary, Toray's quantitative scenario analysis suggests that, while there are substantial opportunities for growth in sustainability-driven products, the company also faces significant transition and physical risks. Accordingly, these will need to be countered through proactive measures which align with the company's Sustainability Vision.

22 Based on the following JPY to USD exchange rate: 0.007091 (on 31st of December 2023).

23 This is the equivalent of 11.3% of Toray's five-year annual average revenue (2019-2023).

24 Based on the following JPY to USD exchange rate: 0.007091 (on 31st of December 2023).

25 This is the equivalent of 8.6% of Toray's five-year annual average revenue (2019-2023).

26 Based on the following JPY to USD exchange rate: 0.007091 (on 31st of December 2023).

27 This is the equivalent of 5.5% of Toray's five-year annual average revenue (2019-2023).

28 "Moderate" is defined as an impact on revenue of between JPY 10.0 billion and JPY 50.0 billion or an impact on business profits of between JPY 1.0 billion and JPY 5.0 billion.

RISK MANAGEMENT

Transition Risk Management

On the transition front, the company aims to integrate climate considerations into its long-term strategies ([TORAY VISION 2030](#)) and actively adjust its business portfolio to capture opportunities in areas such as the circular economy, low-carbon materials, and electrified mobility supply chains. By anticipating regulatory changes, carbon pricing, and evolving market demands, Toray seeks to mitigate revenue losses from delayed responses and high-emission business models. According to the company, its scenario analyses and engagement with stakeholders guide its strategic decisions and help Toray maintain resilience under varying climate policy scenarios. Nevertheless, the costs of this transition risk mitigation and opportunity taking are not disclosed, nor are the specific timelines or the engagement with stakeholders' targets.

Physical Impact Management

When it comes to physical impact, Toray prioritises operational resilience and resource efficiency. According to the company, approximately 30% of Toray Group facilities face water-related disaster risks, prompting the development of business continuity plans (BCPs) that include measures like relocating evacuation sites, elevating critical equipment, and conducting regular evacuation drills. To address water scarcity, Toray pursues targets under the Challenge 50+ Project, aiming to reduce water consumption per unit of revenue by 50% from fiscal 2013 levels by 2030. As of fiscal 2023, a 35% reduction had already been achieved through strategies like wastewater reuse.

The company also continuously updates its BCPs to reflect emerging risks. For earthquakes, which were identified as a priority risk from fiscal 2018–2020, Toray implements regular scenario-based drills, strengthens the seismic resilience of plant infrastructure, and develops BCPs for key products. Similarly, wind and flood disaster risks, prioritised from fiscal 2021–2023, prompted the creation of a customised Wind and Flood Damage Control Checklist. The company inspects sites worldwide, evaluates the entire supply chain, and implements mitigation measures for plants at flood risk. By FY2021, Toray integrated these measures into BCPs covering not only earthquakes but also water hazards, ensuring continuity of critical product supply during extreme events.

From FY2022 to FY2024, Toray is conducting a further risk survey of 13 plants in Japan to refine its wind and flood disaster preparedness. This proactive and iterative approach, which combines environmental assessments, strategic planning, and risk mitigation measures, supports the company's ambition to manage physical climate risks, safeguarding operational stability.

In summary, Toray's approach to climate-related risk assessment and management includes both qualitative and quantitative scenario analyses. By incorporating resource efficiency, supply chain considerations, and strategies for potential regulatory and market changes, theoretically, the company positions itself well to address evolving climate challenges and take advantage of potential opportunities. To enhance its approach to best practice, we would recommend higher transparency in terms of implementation timelines and engagement targets.

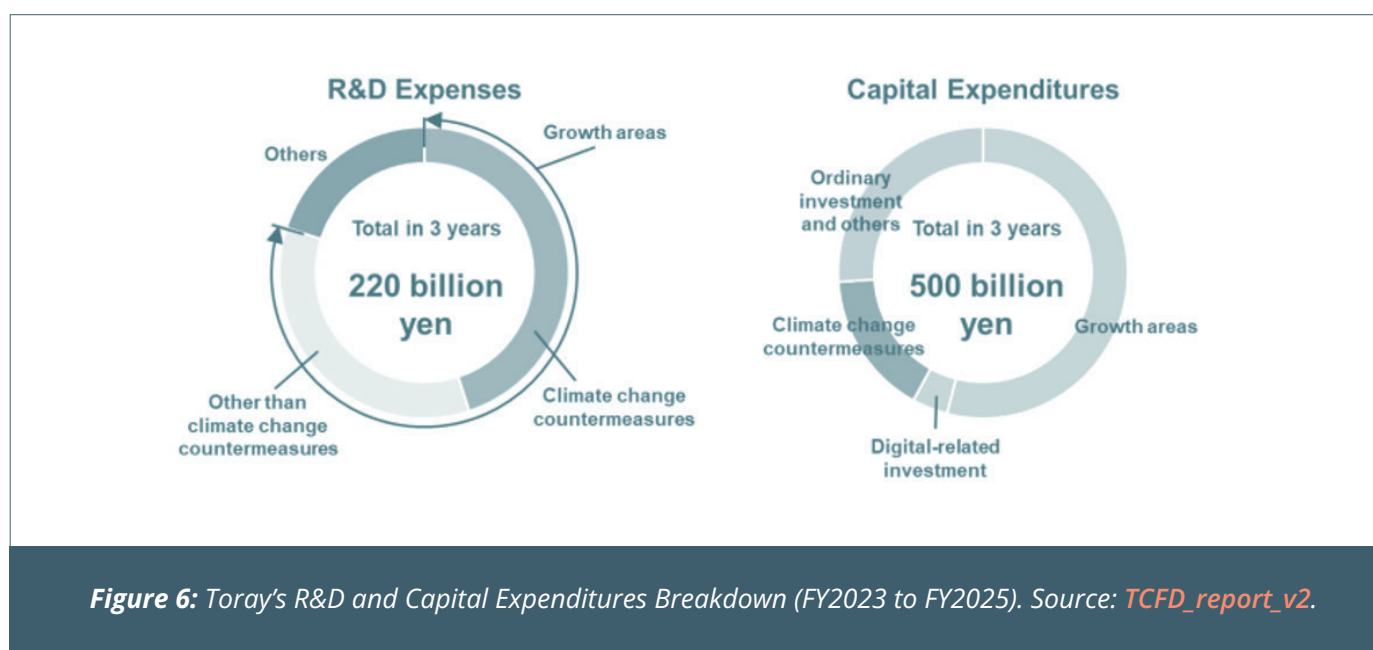
Strategic Assessment

CAPITAL ALIGNMENT

Under [TORAY VISION 2030](#) and the [Medium-Term Management Programme AP-G 2025](#), Toray directs a substantial portion of its Research & Development (R&D) budget (JPY 220 billion or USD 1.6 billion²⁹ over three years) and capital investment (JPY 500 billion or USD 3.5 billion³⁰ over three years) into climate-related growth areas, emphasising carbon neutrality and the circular economy. More specifically, as presented in Figure 7, about 45% of R&D spending and 20% of capital expenditure target climate change countermeasures, focusing on carbon fibre composites, fibres, films, and resins. To support these efforts, the company will also establish a new research facility in Nagoya aiming to integrate green and nano-technologies, process design, and digital solutions, in order to enhance its capacity to develop materials and solutions that reduce GHG emissions across supplied industries. However, it is worth noting that, while it considers climate implications, the bulk of these investments seem to be dedicated to product development rather than absolute emissions reductions.

Ultimately, Toray aims to achieve JPY 1 trillion or USD 7.1 billion in revenue from new businesses during the 2020s by advancing the Future Toray Project, which according to Toray, prioritises hydrogen and fuel cell materials, biomass utilisation, and eco-friendly printing solutions. The company is also exploring applications of porous carbon fibre to support efficient gas separation for CO₂, biogas, and hydrogen.

While these investments are encouraging and commendable, it remains unclear how effectively will they align Toray's long-term trajectory with the most ambitious climate targets. This uncertainty comes as links between investments and emission mitigated are missing as well as implications when it comes to Scope 3 reductions.



²⁹ Based on the following JPY to USD exchange rate: 0.007091 (on 31st of December 2023).

³⁰ Based on the following JPY to USD exchange rate: 0.007091 (on 31st of December 2023).

TRANSITION APPRAISAL

Throughout this assessment, we examined Toray's climate transition strategy across its emissions profile, policy and engagement, governance, risk management, and capital allocation. While the company is taking steps to integrate sustainability into its operations, several gaps may challenge its ability to align with the most ambitious climate target.

Toray's reliance on intensity-based and product-avoidance targets, rather than absolute GHG emission reduction goals, especially when it comes to Scope 3, creates uncertainty regarding its long-term trajectory. Although the company aims for carbon neutrality by 2050, its projected emissions suggest a business-as-usual pathway if it does not establish further comprehensive, time-bound absolute commitments. While the recent disclosure of downstream Scope 3 emissions underscores a step forward, there is an urgent need for setting more stringent targets regarding its upstream Scope 3 emissions to prevent its total footprint from growing further.

Engagement with suppliers and customers demonstrates an intent to promote sustainable practices, but the lack of specific engagement targets, enforcement mechanisms, and detailed evidence of emissions reductions limits the credibility and impact of these efforts. Similarly, while Toray integrates sustainability oversight into its existing governance framework, there is no dedicated sustainability committee³¹. Executive compensation includes climate-related factors, yet these incentives largely focus on revenue growth rather than clear progress toward Net Zero, signalling potential misalignment between financial rewards and long-term climate objectives.

On a positive note, Toray has conducted scenario analyses and identified opportunities in low-carbon markets. It invests in R&D and infrastructure for carbon neutrality and the circular economy, while taking measures to improve operational resilience to physical climate risks. However, without clearer disclosure on cost implications and the precise emissions abatement outcomes of these investments, the extent to which Toray's capital allocation supports a robust climate transition remains unclear.

In conclusion, Toray appears positioned to benefit from emerging sustainability-driven markets but must strengthen its emissions targets, enhance supply chain accountability, and better align its governance and incentives with Net Zero ambitions. While Toray's improved considerably its sustainability-linked initiatives and disclosures in recent years, without these steps, Toray may find itself on a pathway closer to a 2°C to 3°C scenario rather than the more ambitious 1.5°C target³².

Planet Tracker concludes TORAY is likely to align with a 2°C pathway by 2030³³.

³¹ As clarified by company representatives, important issues, such as basic strategies and capital investments related to the Sustainability Innovation (SI) Business Expansion Project and the Climate Change Action Project, are now deliberated by the Executive Committee, as needed. Still, at Planet Tracker we find the dissolution of the Sustainability Committee to be a step backwards.

³² Toray representatives argue that expanding a business and achieving carbon neutrality at the same time is a very challenging task. Accordingly, Toray will try to do this by phased reduction of CO₂ emissions (transition) by using available technology, make use of the new technology in the future, and undertake new efforts in cooperation with the Government or industry associations, as well as, new social structures. Only by taking all available measures and now and in the future, carbon neutrality can be achieved. Hence, according to Toray it is too early to make an assessment which target the company is aligned with.

³³ Based on the data accessed by Planet Tracker until 15th of December 2024.

Annex I

Toray Group Worldwide Network

306 subsidiaries and affiliated companies (112 in Japan, 194 overseas) (as of March 31, 2024)

Japan

- Toray Fine Chemicals Co., Ltd.
- Toray Advanced Film Co., Ltd.
- Suido Kiko Kaisha, Ltd.
- Toray Construction Co., Ltd.
- Toray Engineering Co., Ltd.
- Toray Medical Co., Ltd.
- Toray Systems Center, Inc.
- Toray International, Inc.
- Chori Co., Ltd.
- ■ Du Pont-Toray Co., Ltd.
- Japan Vilene Company, Ltd.
- DuPont Toray Specialty Materials K.K.
- Dow Toray Co., Ltd.
- Sanyo Chemical Industries, Ltd.

Americas

- Toray Advanced Composites USA Inc.
- Toray Composite Materials America, Inc.
- Toray Plastics (America), Inc.
- Zoltek Companies, Inc.

Europe

- Alcantara S.p.A.
- Toray Carbon Fibers Europe S.A.
- Toray Films Europe S.A.S
- Toray Textiles Europe Ltd.

Asia

- Pacific Textiles Holdings Ltd.
- ■ Penfibre Sdn. Berhad
- ■ P.T. Indonesia Toray Synthetics
- STECO, Ltd.
- STEMCO, Ltd.
- ■ Thai Toray Synthetics Co., Ltd.
- ■ ■ Toray Advanced Materials Korea Inc.
- Toray Battery Separator Film Korea Limited
- ■ Toray Fibers (Nantong) Co., Ltd.
- Toray Industries (China) Co., Ltd.
- Toray Industries (H.K.) Ltd.
- Toray Plastics (China) Co., Ltd.
- Toray Plastics (Malaysia) Sdn. Berhad
- Toray Sakai Weaving & Dyeing (Nantong) Co., Ltd.
- Toray Textiles (Thailand) Public Company Limite

Other group companies

- Fibers & Textiles
- Performance Chemicals
- Carbon Fiber Composite Materials
- Environment & Engineering
- Life Science
- Other
- Trading

Annex II

Kansai Economic Federation

Kankeiren's climate engagement is characterised by both support for innovation and reluctance to embrace more ambitious policies. While it has advocated for tax incentives to drive R&D and uptake of energy-efficient housing, it frequently emphasises the need to clarify costs and maintain industrial competitiveness. It has opposed stricter GHG reduction targets, carbon taxes, and rapid renewable energy expansion, calling for "careful discussion" and voicing concerns about increased electricity costs and potential economic burdens. Simultaneously, it supports incremental improvements – such as net-zero buildings, modal shifts in transportation, and limited use of renewables and hydrogen – though without clear commitments to decarbonising these energy sources. Ultimately, Kankeiren's position leans towards incremental transitions and stable energy supply rather than ambitious, fully decarbonised pathways.

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Planet Tracker is a non-profit financial think tank producing analytics and reports to align capital markets with planetary boundaries. We aim to create a significant and irreversible transformation of global financial activities by 2030. By informing, enabling and mobilising the transformative power of capital markets we aim to deliver a financial system that is fully aligned with a net-zero, nature-positive economy. Planet Tracker proactively engages with financial institutions to drive change in their investment strategies. We ensure they know exactly what risk is built into their investments and identify opportunities from funding the systems transformations we advocate.

PLANET TRACKER'S CLIMATE TRANSITION ANALYSIS

As part of its Petchems programme, Planet Tracker is examining the transition plans of chemical companies covered by the Climate Action 100+ list (<https://www.climateaction100.org/whos-involved/companies>). Our goal is to provide investors with the key information and analysis they need to be able to hold leading chemical companies to account for the quality of their climate transition plans and their execution against those plans. We also encourage investors to use this information to engage effectively with these companies with the ultimate aim of driving the sustainable transformation of the chemical industry.

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