



Overall Assessment

Planet Tracker's analysis shows Toray Industries on a pathway aligned with +3°C. Toray Industries disputes this claim.

In 2022, total emissions were 12,703 ktCO₂e with nearly 60% from Scope 3. Toray Industries does not disclose downstream Scope 3 emissions and there is no Scope 3 target. The company aims to reduce absolute emissions by 50% per unit of revenue by 2031. Management is keen to focus investors on 'avoided' emissions – i.e. how much customers save by using Toray products.

Management compensation is lower than many of its peers and there appears little incentive to deliver on the short-term goals, accounting for 15% of total remuneration, which includes improving energy efficiency and green innovative products.

Toray does assess suppliers' environmental performance but appears to rely on a 'retain and engage' strategy with underperformers. Its carbon neutrality target by 2050 is for Scopes 1 & 2 only. Toray is investing in "growth business fields" which are expected to grow faster and have higher gross margins. Some of these activities will help reduce customer emissions.

The 2050 Scope 1 & 2 carbon neutrality is based on technologies such as hydrogen and to develop products that help absorb greenhouse gases (GHGs), such as CO₂ separation membranes, and the development of energy saving activities more generally. Like many of its peers the technical risk for investors is high both for 2031 and for 2050.



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 [here](#).



Climate Alignment

- Toray's total disclosed emissions were 12,703 ktCO₂e in 2022, of which 24% were Scope 1, 19% were Scope 2 and 57% were Scope 3.
- The disclosed Scope 3 emissions are only for upstream activities, mainly 'purchased goods & services'. Toray does not disclose downstream Scope 3 emissions such as 'use of sold products'. Judging by other chemical companies, Toray's total Scope 3 emissions will be considerably higher than just the disclosed upstream emissions. Although not disclosed, management dispute this claim.
- Toray does disclose 'avoided emissions' from the use of Toray products but this metric is not comparable to Scope 3 use of products. It is an estimate of the lifetime emissions saved by using more efficient Toray products as opposed to conventional products. We find this metric to be unhelpful and impossible to compare with peers.
- Toray aims to reduce total group Scope 1 & 2 emissions by 50% per unit of revenue by March 2031 (FY 2030) compared to a FY 2013 baseline. It also plans to reduce absolute emissions from its Japanese operations by 40% over the same period. There is no Scope 3 target.
- Toray aspires to become carbon-neutral for Scope 1 & 2 by 2050.
- For reasons stated above and within this report, we assess that Toray is not on track to hit its 2031 or 2050 targets.



Policy and Governance

- Toray's executive pay is lower than international peers and bonuses formed only 15% of total remuneration in 2022. Approximately 15% of the CEO's total remuneration is bonuses linked to short-term goals, including expanding green innovation products and improving energy efficiency.
- We conclude that the CEO has a low financial incentive to reduce emissions.
- Toray does assess suppliers' environmental performance, but the process appears to be less than rigorous. The overall policy is to 'retain and engage' with underperformers.



Risk Analysis

- Toray provides minimal tangible detail about how it intends to hit its 2031 targets.
- The aspiration to become carbon neutral for Scope 1 & 2 by 2050 appears to focus on technologies such as hydrogen, and to develop products that help absorb greenhouse gases (GHGs), such as CO₂ separation membranes, and the development of energy saving activities more generally.
- We assess that the technical risk is high both for 2031 and for 2050.



Strategy Assessment

- Toray is investing in what it calls "growth business fields". These are expected to grow faster and have higher gross margins. Some of these will help reduce customer emissions, for example by being lighter in weight.
- Our analysis concludes that Toray does not have a credible strategy to reach net zero for Scope 1 & 2 by 2050. There is no Scope 3 strategy.

Company Overview

Toray Industries (Toray) is a Japanese chemical company. It makes a wide range of products including textile fibres, resins, films, carbon fibre and pharmaceutical and medical products.

“At the Toray Group, we consider sustainability to be the most important global issue of the 21st century¹.”
Toray claims to be aligned with the Paris Agreement².

Toray has 5 segments:

- **Fibers & Textiles** makes nylon, polyester and acrylic fibre. It was Toray’s original business when it was founded in 1926.
- **Performance Chemicals** makes films and other products with electronics applications.
- **Carbon Fiber Composite Materials** makes carbon fibre fabric, ‘pre-preg’ sheet (carbon fibre fabric impregnated with resin) and finished carbon fibre products.
- **Environment & Engineering** makes membranes for water purification. Toray is the world market leader in reverse osmosis membranes.
- **Life Science** makes pharmaceutical and medical products including dialysis machines.

The largest two segments are Fibers & Textiles (39% of revenues 2019-2023) and Performance Chemicals (37%) – see Figures 1 & 2 for revenue and operating income.

We note that Toray has a March year-end, which can be confusing. For example, the annual report for the year ending March 2022 says ‘2022’ on the front cover but is referred to inside by the company as ‘FY2021’. All references to reporting years in this report refer to the year when the period ended. 2023 is therefore the year to 31st March 2023; Toray calls this period FY2022.

Toray is notably less profitable than its western peers. The core operating margin has averaged 5.3% over the last 5 years; peers are typically in the teens.

Note that we do not have the CDP submission for 2023 at the time of writing.

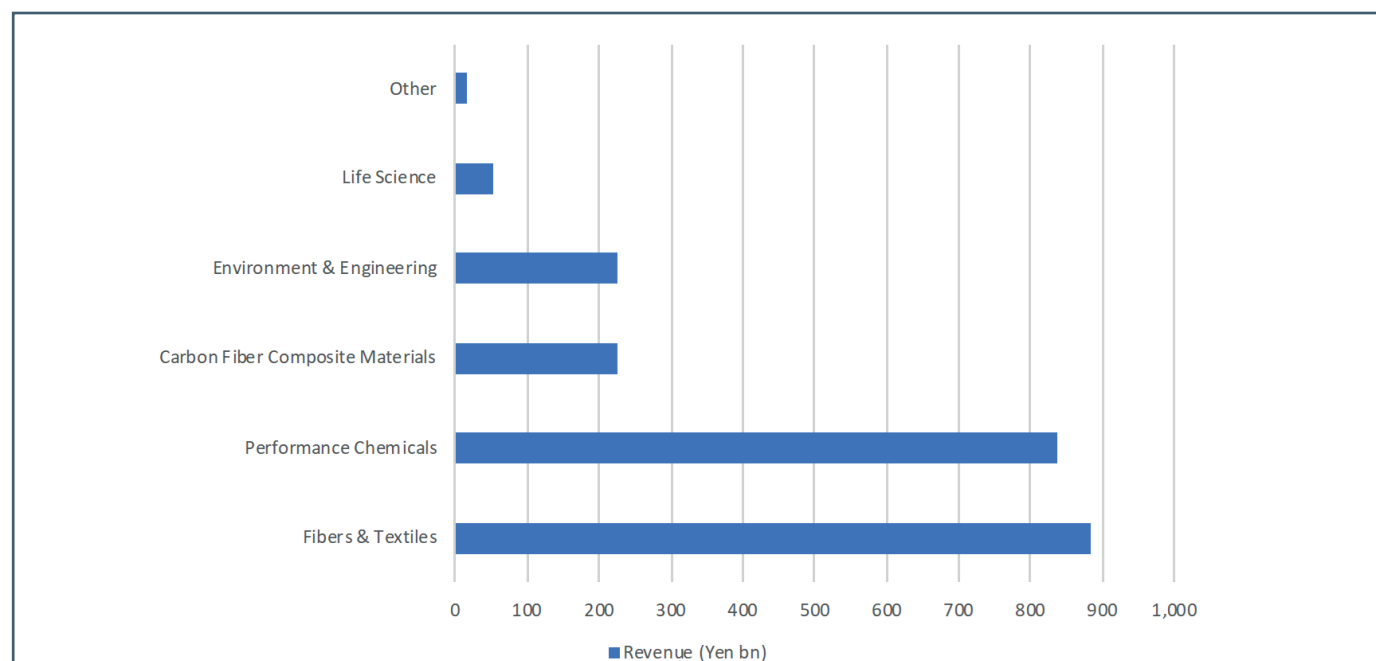


Figure 1: Toray revenue by segment (5-year average 2019-2023). Source Toray annual reports.

1 Source: Toray website, sustainability tab
2 Source: Toray 2022 CDP submission, C12.3a

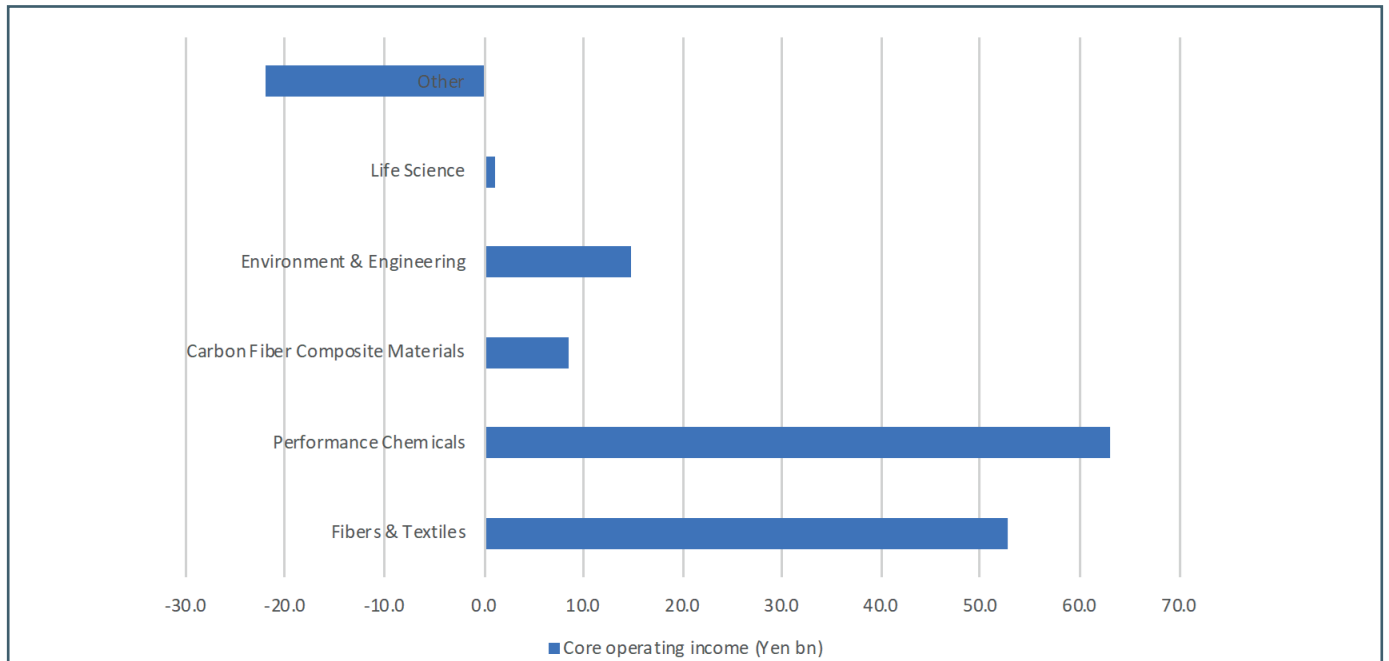


Figure 2: Toray Operating Income by segment (5-year average 2019-2023). Source Toray annual reports

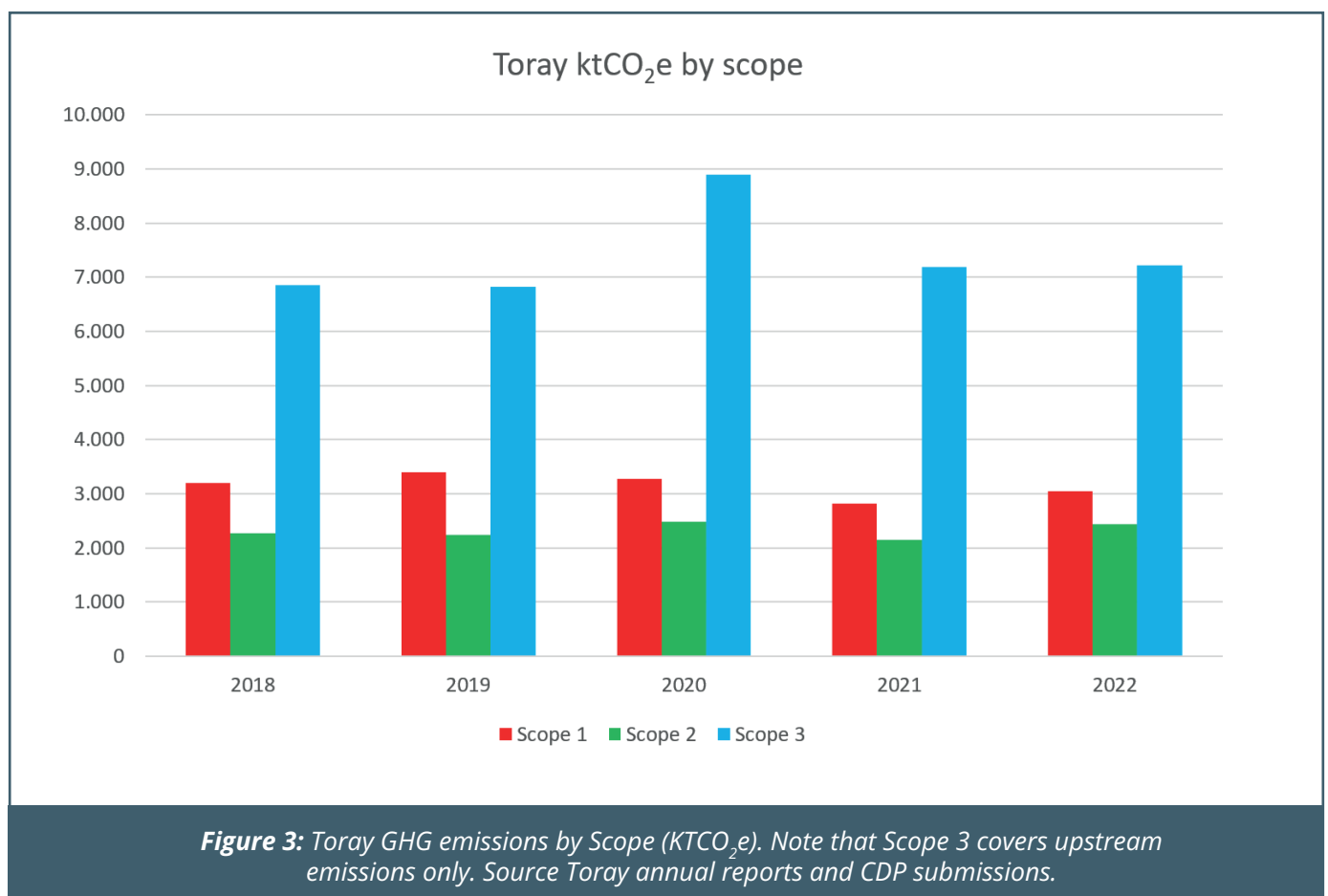
Climate Alignment

EMISSIONS INVENTORY

In 2022 (FY 2021), Toray produced 12,703 ktCO₂e of GHG emissions, split between 3,044 of Scope 1 (24% of the total), 2,440 of Scope 2 (19%) and 7,219 of Scope 3 (57%) – see Figure 3. Note the Scope 3 emissions are only for upstream activities, mainly ‘purchased goods & services’.

Also, company representatives argue that in the last five years, the annual calculation and boundaries used to determine Scope 3 figures differ from year to year. Furthermore, Toray does not disclose downstream Scope 3 emissions such as ‘use of sold products’, even though it has a target to reduce emissions across the whole value chain.

About 40% of Scope 1 & 2 emissions are produced in Japan³.



3 Source: Toray 2022 CDP submission, C3.2b

EXTERNALITIES AND TARGETS

Toray has three sets of environmental targets covering different time periods.

There is a **long-term aspiration** which Toray calls a 'Sustainability Vision for 2050'. It is based on 4 pillars⁴:

1. A net zero emissions world, where greenhouse gas emissions are completely offset by absorption⁵.
2. A world where resources are sustainably managed.
3. A world with a restored natural environment, with clean water and air for everyone.
4. A world where everyone enjoys good health and hygiene.

The first pillar links directly to greenhouse gas emissions. The second pillar is based on "sustainable, recycling-based use of resources and production", which would in theory eliminate the GHG emissions from using oil and natural gas as feedstock. The Toray Group "seeks to achieve the world envisioned by Toray Group in 2050⁶", so it is an aspiration rather than a formal target.

Toray claims to have a transition plan that aligns with a 1.5C world⁷.

There is also a **medium-term vision** called Toray Vision 2030⁸ which was announced in May 2020. This includes targets for what Toray calls FY2030, i.e. the year to March 2031.

Lastly, there is a **near-term plan** called the 'Medium-term management program AP-G⁸ 2025' which covers the period from fiscal 2023 to fiscal 2025, i.e. to March 2026. This program superseded the earlier AP-G 2022 program, i.e. to March 2023.

Unusually, Toray has both relative GHG-related targets for the whole group and absolute targets for the Japanese operations; the relative ones are per unit of revenue in Yen. The main targets are:

- **2026:** 20% reduction in absolute GHG emissions from Toray's Japanese operations compared to a 2014 baseline⁹.
- **2026:** 40% reduction in global GHG emissions in production activities per unit of sales compared to a 2014 baseline¹⁰. We note that the earlier 2022 program had a 20% target; the actual outcome was a 26% reduction. In other words, the earlier target was exceeded and the new target is more demanding.
- **2026:** 15-fold increase in 'CO₂ emissions avoided in value chain' compared to a 2014 baseline of 38,000 ktCO₂e¹¹. We note that the earlier 2022 program had a 5.3x target; the actual outcome was a 9.5-fold reduction. This is very different to Scope 3 'use of products' emissions, although it could be considered a proxy, and is discussed in more detail below.
- **2026:** Expanding revenues from businesses related to Sustainability Innovation and Digital Innovation to about 60% of total [group revenues]¹². This includes making materials for producing and storing Compressed Natural Gas (CNG) and hydrogen.

4 Source: Toray website, <https://www.toray.com/global/sustainability/vision/>
5 Toray's 2022 CDP submission adds that it plans to use Carbon Capture Utilisation and Storage (CCUS) for emissions that cannot be reduced. (paragraph C1.1b)

6 Source: Toray 2022 CSR Report, page 18

7 Source: Toray 2022 CDP submission, C3.1

8 Short for 'Action Program for Business Growth'

9 Source: Toray Medium-term Management Program 2025 presentation, page 18

10 Source: Toray Medium-term Management Program 2025 presentation, page 18

11 Source: Toray Medium-term Management Program 2025 presentation, page 18

12 Source: Toray Medium-term Management Program 2025 presentation, page 20

- **2031:** 50%+ reduction in global Scope 1 & 2 GHG emissions in production activities per unit of sales compared to a 2014 baseline¹³. This was increased from the earlier target of 30% in March 2023.
- **2031:** 40%+ reduction in absolute CO₂ emissions from Toray's Japanese operations compared to a 2014 baseline¹⁴. Toray plans to set absolute reduction targets for plants outside Japan "in the near future"¹⁵.
- **2031:** 25-fold increase in 'CO₂ emissions avoided in value chain' compared to a 2014 baseline¹⁶. This was increased from the earlier target of an 8-fold increase.
- **2031:** 4.5-fold increase in sales of 'Green Innovation' (GR) products¹⁷.
- **2031:** 20% of raw materials for making PET and nylon polymers to be sourced from recycling, derived from biomass, or produced with CO₂ from Toray's operations¹⁸.
- **2050:** Toray aims to become carbon-neutral¹⁹. This excludes Scope 3 emissions.

Scope 1 & 2 in more detail

We note that the target of reducing group CO₂ emissions per unit of revenue is inherently linked to the strength of the Japanese currency. If the Yen weakens for example, total group sales in Yen will rise and so Scope 1 & 2 emissions per unit of sales will automatically fall; the converse is also true. Targets for carbon intensity are in theory a good idea but are usually based on emissions per tonne of finished product, not on emissions per unit of revenue.

Toray's Scope 1 & 2 emissions have been broadly flat over the last 5 years both in absolute and relative terms. Disclosure on concrete plans to hit the 2031 targets is minimal. Globally, Toray hit its 2022 target of a reduction in GHG emissions per unit of revenue relative to a 2014 baseline, but we note that the trend over the last 5 years has been largely flat – see Figure 4.

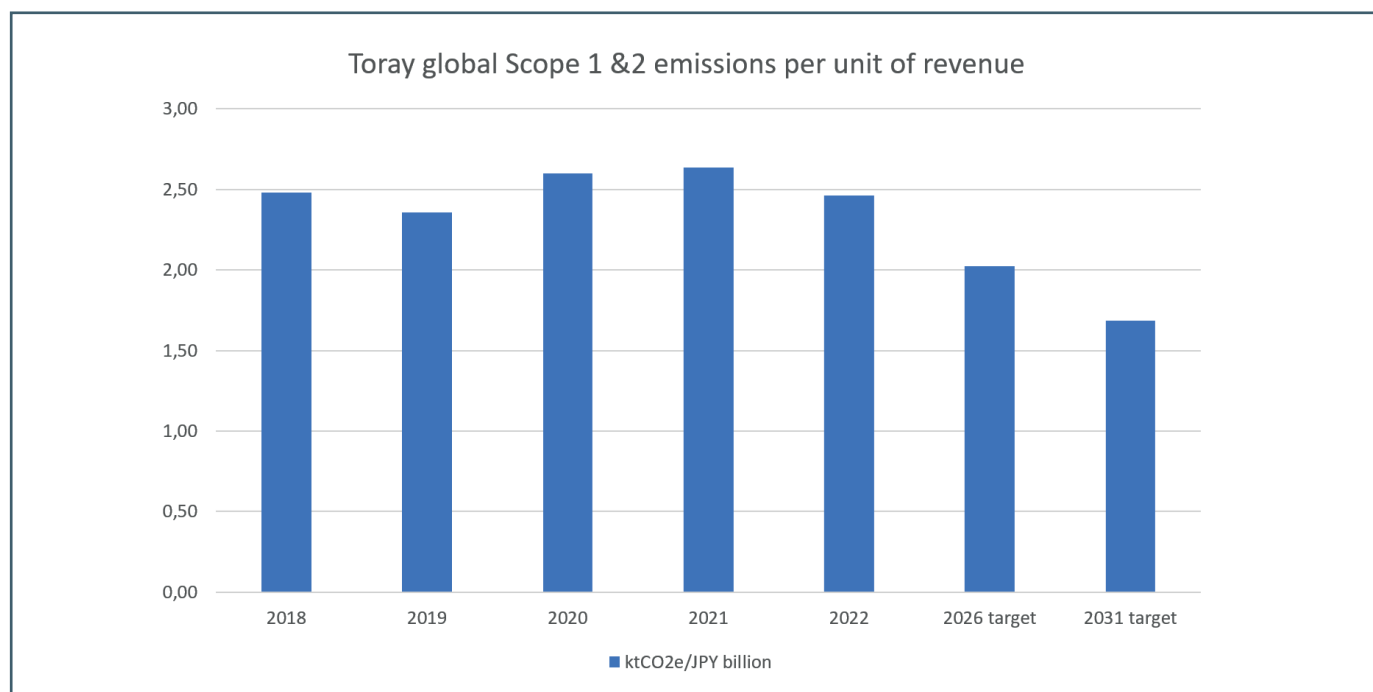


Figure 4: Toray global Scope 1 & 2 GHG emissions per unit of revenue. Source Toray annual reports and CDP submissions.

13 Source: Toray 2022 Annual Report, page 25

14 Source: Toray Medium-term Management Program 2025 presentation, page 43

15 Source: Toray 2022 CDP submission, C4.1a

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Source: Toray Medium-term Management Program 2025 presentation, page 43

Source: Toray Medium-term Management Program 2025 presentation, page 43

Source: Toray Medium-term Management Program 2025 presentation, page 47

Source: Toray 2022 CDP submission, C4.2c

We assess that Toray is not on target to hit either its 2026 or its 2031 Scope 1 & 2 reduction targets. However, company representatives disagree with our assessment arguing that in FY 2022 Toray achieved a 35% reduction in the GHG emissions per unit of sales, which positions them for the FY 2025 target of 40% reduction and FY 2030 target of 50% reduction.

Scope 3 in more detail

Toray's Scope 3 disclosure is less than comprehensive. Unlike most peers, it does not disclose downstream Scope 3, only upstream. Downstream Scope 3 emissions are inherently difficult to measure accurately but the absence of any downstream estimates makes it problematic to assess Toray's progress. It also hampers any assessment of Toray relative to its peers.

Toray states that its sales are "mainly intermediate products that are widely used in various fields such as textiles, films, chemicals, resins, electronic information materials, carbon fiber composite materials, pharmaceuticals, medical care, water treatment, and the environment. There are many uncertainties involved in calculating the emissions associated with the [processing, use and end of life treatment] of our products. Therefore, it is not possible to reasonably estimate GHG emissions, and [these categories are] excluded from calculations as it is not relevant²⁰". We accept that estimating downstream Scope 3 emissions is inherently imprecise, but Toray's peers manage to do it.

Toray does have a target of contributing to CO₂ reduction "due to the use of Toray products", which implies that it does have an internal mechanism for estimating downstream emissions. Toray states that the use of its products reduced emissions by 306,220 ktCO₂e in 2022²¹. Toray further states that this number is "calculated independently by Toray in accordance with chemical sector guidelines".

As we understand it, the 306,220 ktCO₂e of avoided emissions in 2022 is very different to the (undisclosed) Scope 3 emissions from the use of Toray products. It is a broader cradle-to-grave definition of reduced GHG emissions as a result of using more efficient parts supplied by Toray. Section 4.5a of Toray's 2022 CDP submission gives the example of an aircraft with 50% of its airframe made of carbon fibre. This aircraft would:

- Be 20% lighter (48 tonnes rather than 60 tonnes)
- Consume 6.4% less fuel (9.04 litres/km rather than 9.71)
- Consume 10.7 million litres less fuel over an estimated lifetime of 10 years or 10 million miles
- In theory emit about 32 ktCO₂e less than a conventional aluminium aircraft over its life.²²

This calculation is based on a number of questionable assumptions (for example the lifetime aircraft mileage in the example above) and Toray's 'avoided emission' total automatically ratchets up over time. Scope 3 'use of products' calculations are also estimates but have the twin benefits of 1) being comparable across peers and 2) giving a better picture of annual progress.

Toray does disclose the high-level methodology but does not disclose how the 306,220 breaks down. For example, we do not know how much comes from aircraft, from cars and from other sources. This makes it difficult to have full confidence in the way the number is calculated.

We note that Toray has a target to source 20% of its core polymers from raw materials derived from "recycling, biomass, or produced with CO₂ recycling used in Toray core polymers in FY 2030²³". Core polymers means PET and Nylon only. This should reduce upstream Scope 3 emissions, but we have been unable to assess either the scale or the status of this target.

Given the above, it is not surprising that Toray has no Scope 3 target.

20 Source: Toray 2022 CDP submission, C6.5

21 Source: Toray 2022 CDP submission, C4.5a

22 Source: Planet Tracker calculation based on Toray data. Assumes that burning 1kg of kerosene produces 3kg of CO₂.

23 Source: Toray AP-G 2025 program presentation, page 47, March 2023

Policy and Governance

ENGAGEMENT AND INFLUENCE

Suppliers' Engagement

Toray conducts a CSR procurement survey every 2 years covering 90% of its procurement volume²⁴. Suppliers are rated in five levels from 'needs improvement' to 'excellent'. Underperformers are asked to "make improvements" and 94% of "suppliers with whom we engaged in dialogue improved their efforts".

We have not noted any mention of ceasing to purchase from suppliers who score badly. The survey also appears to rely on a qualitative assessment; the CDP submission does not mention any quantitative scoring process.

Suppliers are also required to undertake to comply with Toray's CSR Procurement Action Guidelines. Toray states that 100% of its suppliers comply with this requirement and that Toray's response in the event of non-compliance is to "retain and engage"²⁵.

Overall we conclude that Toray's supplier engagement programme is not very rigorous, and that corrective action appears to be minimal.

Other Value Chain Partners' Engagement

Toray has a policy of engaging both directly with policymakers and also indirectly via trade associations. Much of the engagement appears to be in Japan²⁶ but Toray also engages with the International Council of Chemical Associations (ICCA).

24 Source: Toray 2022 CDP submission, C12.1a

25 Source: Toray 2022 CDP submission, C12.2a

26 Source: Toray 2022 CDP submission, C12.3a

27 Source: Toray 2022 CDP submission, C1.1a

MANAGEMENT ALIGNMENT

"At Toray Group, the CEO is responsible for climate change issues²⁷". The CEO is also the Chairman of the Sustainability Committee. Toray has a Chief CSR officer, Shigeki Taniguchi²⁸, who is not listed as a member of the board of directors.

Unlike its peers, Toray's disclosure on executive compensation is minimal and variable pay is not a major feature of the compensation plan.

For FY 2022, Toray's board of directors comprised 13 members of which 5 are 'outside board members'. Furthermore there are 5 corporate auditors, three of which are 'outside' corporate auditors²⁹. Total remuneration for the 13 board members was JPY 622 million in 2022, which is about USD 4.4 million at the time of writing. Of this, JPY79 million (about USD 0.6 million) was for cash bonuses and a JPY107 million (USD 0.8 million) in stock rights³⁰.

The 2022 CDP submission contains more information on ESG-related bonuses. It states that approximately 15% of the CEO's total remuneration is "bonuses linked to short-term goals" which include "goals for expanding business of green innovation products that contribute to reducing GHG emissions and improving energy efficiency throughout the lifecycle³¹".

We note however that total remuneration is low by international standards and also that bonuses form a small proportion of total pay.

We conclude that the linkage between the CEO's pay and environmental performance is low.

28 Which substituted Hideki Hirabayashi after the General Meeting of shareholders on June 27, 2023.

29 Source: Toray Corporate Governance Report (June 2023) pp12-16

30 Source: Toray Corporate Governance Report (June 2023) p17

31 Source: Toray 2022 CDP submission, C1.3a

Risk Analysis

FINANCIAL IMPACT

Toray discusses a wide range of potential risks in its CDP submission³². It identifies 2 risks as having a potential substantive impact:

- **Carbon tax.** Toray estimates that a carbon tax of USD140/tonne, which it suggests is the level needed to achieve carbon neutrality, would cost Toray about JPY 100 billion per annum, or about 4% of 2023 revenues. Toray categorises this risk as 'likely'.
- **Acute floods.** Toray operates in regions that are susceptible to flooding but categorises this risk as 'unlikely'. It estimates the cost at JPY2.6billion.

It appears that Toray intends to rely significantly on CCUS to become carbon neutral in Scope 1 & 2 by 2050. The company representatives challenge this assumption stating that carbon neutrality will be achieved through the combination of reduction of Scope 1 emissions through energy transition in Ehime and Tokai (Japan), and of Scope 2 through measures such as expansion of the use of renewable energy, the development of new energy-conservation processes, and the use of hydrogen among others. Still, the company does not quantify the impact of these initiatives.

This strongly implies that Toray plans to rely on technologies that are not yet proven. For example, CCUS has yet to be deployed at scale and undeveloped technologies are, by definition, immature. Toray management responded that 'No company in the steel, chemical, or other emission-intensive industries can see the realization of carbon neutrality with existing technologies. It is not easy to achieve both business expansion and profit growth and carbon neutrality³⁴'. Planet Tracker recognises the challenge faced by management of these energy intensive industries, but many have issued both 2030 emission targets and net zero commitments by 2050, without indicating the pathway. We also note that a few leaders in these sectors are investing in new technologies, with capital expenditure plans shared with the financial markets, while the majority show few signs of progress.

32 Source: Toray 2022 CDP submission, C2.3a

33 Source: Toray AP-G 2025 program presentation, page 43, March 2023

34 Source: Response on 4 December 2023 by the company to draft note shared with Toray Industries.

Strategic Assessment

CAPITAL ALIGNMENT

Toray expects to invest about JPY500 billion in capital investment and JPY220 billion in R&D over the three years to 2026³⁵. Most of this investment will be directed towards what Toray calls 'growth business fields' such as lightweight materials and reverse osmosis membranes. The growth business fields are expected to grow faster and have higher gross margins.

Some of these products will reduce customer emissions but will not by themselves reduce Toray's own GHG emissions. We have not been able to identify direct alignment between capital deployment and Toray's own emissions.

Toray is aiming to build a "total recycling system", including the use of recycled material and non-fossil materials. It quantifies the investment required to be JPY 37billion per annum or about half of Toray's R&D budget. This does not appear to cover any needed capital investment.

TRANSITION APPRAISAL

Further, in order to achieve carbon neutrality in 2050, Toray recognizes the need to make changes and take a leap in technological innovation based on non-conventional ideas, as well as the need for efforts that are not limited to single corporations, but involve industry, government, and broader society working together to achieve this goal³⁶.

Our assessment is that, despite some reduction of GHG emissions over the last five year³⁷, Toray has made little tangible progress in transitioning to a low-carbon future

Roadmap to 2030

The closest we can find to a 2030 roadmap is the graphic we have reproduced below – see Figure 5. The box at the bottom lists 6 key levers for lowering Toray's Scope 1 and 2 emissions:

- Replacing coil-fired boilers with purchased electricity.
- Fuel conversion.
- Expanding use of biomass fuels
- Expanding use of renewable electricity
- Maintain energy-saving activities
- Deploying successful improvement models across the group

No further detail is provided, making it impossible to assess the likely outcome. The text does state that Toray's "carbon neutralization and sustainability initiatives are progressing ahead of plan³⁸". We do not share this assessment, based on progress to date towards the 2031 goals.

35 Source: Toray AP-G 2025 program presentation, page 39, March 2023

36 Source: Toray website, sustainability tab

37 Source: [Link](#)

38 Source: Toray AP-G 2025 program presentation, page 45, March 2023

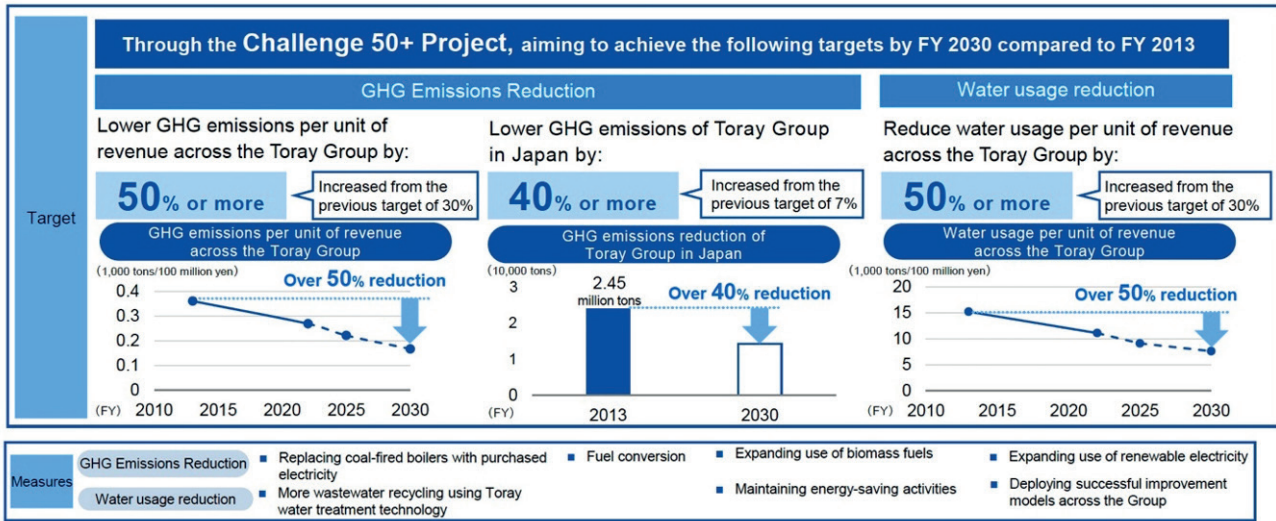


Figure 5: Toray roadmap to carbon neutrality by 2030. NB Scope 1 & 2 only. Source: Toray AP-G 2025 program presentation, page 45, March 2023.

The right bar chart appears to suggest that Toray will need to use CCUS for about one-quarter of its emissions to reach carbon neutrality

Roadmap to 2050

Toray has published a roadmap to carbon neutrality by 2050, which we have reproduced below – see Figure 6. There is very little detail, just graphics with imprecise boundaries .

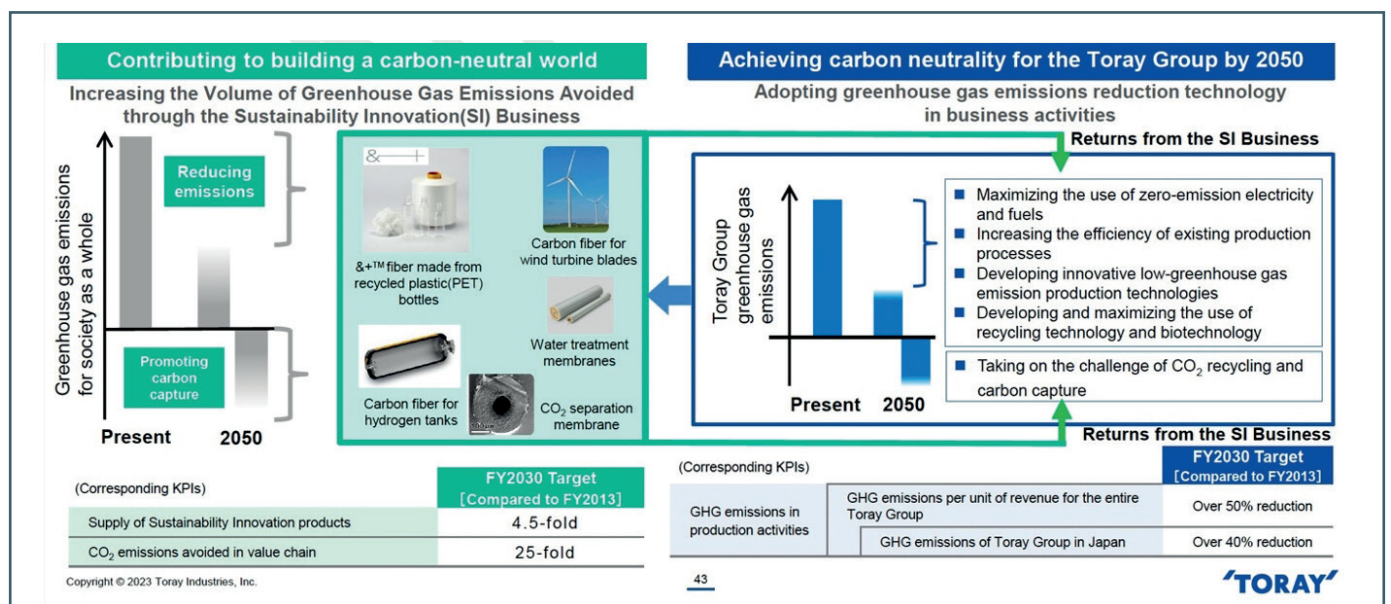


Figure 6: Toray roadmap to carbon neutrality by 2050. NB Scope 1 & 2 only. Source Toray AP-G 2025 program presentation, page 43, March 2023.

39 The company representatives challenge this interpretation but do not offer alternative quantification of their initiatives expected impacts.

Our overall assessment is that Toray Industries is on a +3°C pathway and Planet Tracker struggles to see how investors can be confident that management will achieve carbon neutrality by 2050 as there is little detail and inadequate metrics.

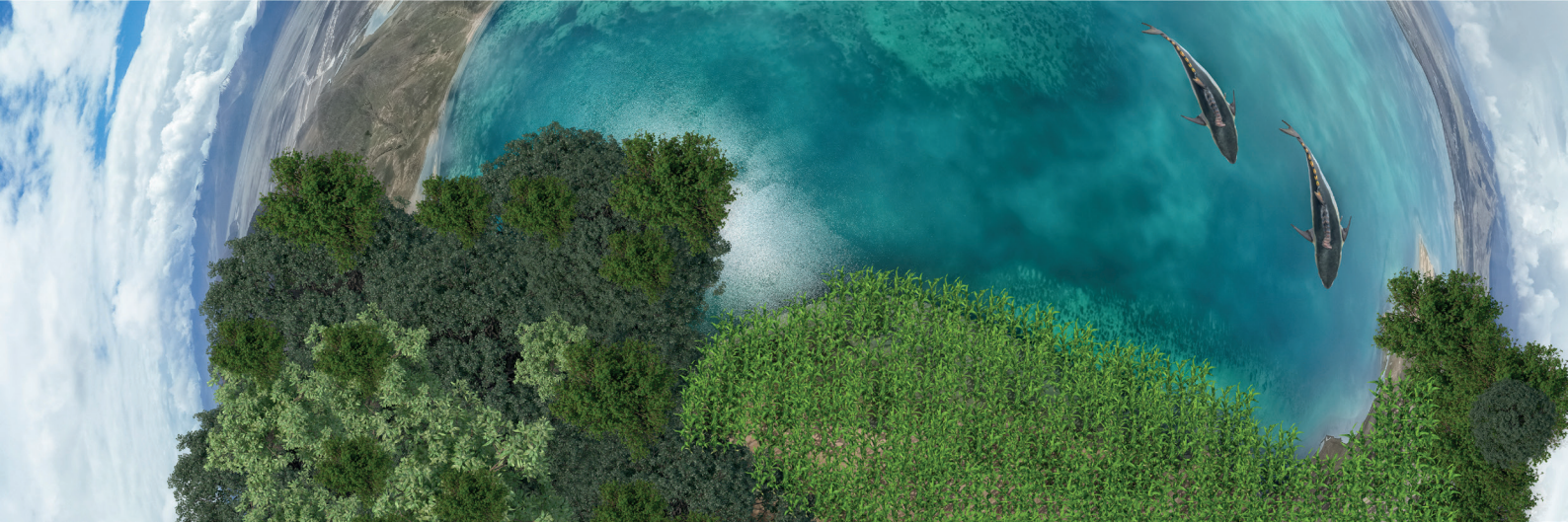
***End note:** All Climate Transition Analyses undertaken by Planet Tracker are sent to the company for comment prior to publication, giving management an opportunity to respond. Toray Industries provided a detailed written response to our draft on 4 December 2023. Where appropriate, disagreements with Planet Tracker's analysis are included within the report.*

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Planet Tracker is a non-profit financial think tank producing analytics and reports to align capital markets with planetary boundaries. Our mission is to create 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 – CHEMICAL COMPANIES

As part of its material system transition programme, Planet Tracker is examining the transition plans of the chemical companies covered by the [Climate Action 100+ list](#). Our goal is to provide investors with the key information and analysis they need to be able to hold chemical companies to account for the quality of their climate transition plans and their execution against those plans, and to encourage them to use this information to engage effectively with these companies with the ultimate aim of driving the sustainable transformation of the chemical sector.

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