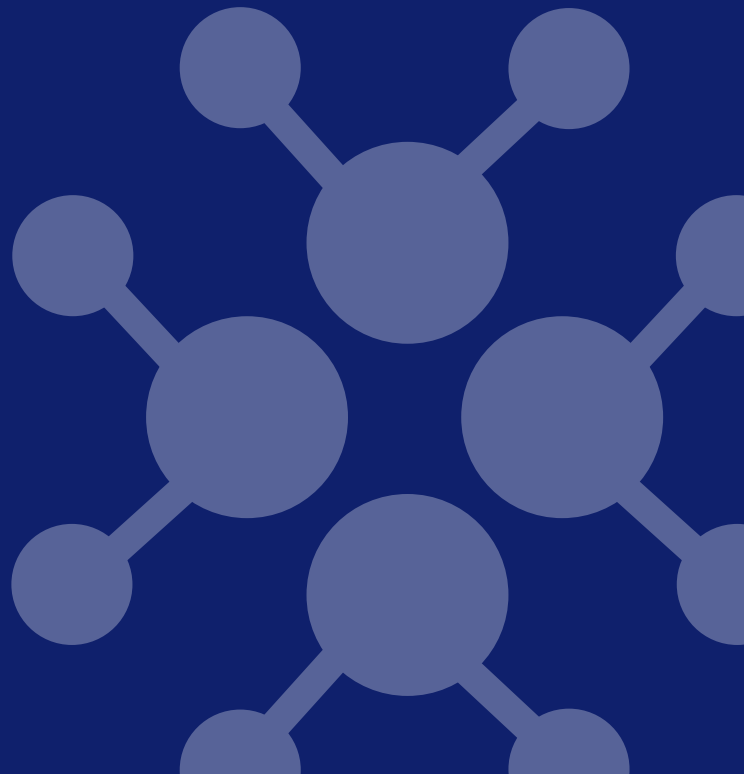
2023 TCFD Disclosure

TRONOX HOLDINGS PLC



a. Governance

Creating a strong governance structure and policies to support that structure reflects our belief that management control is the first line of defense to identify and mitigate not only commercial and financial risks, but environmental and sustainability risks that can derail a company.

In addition to core business risks, such as human capital management, the viability of our business model and supply chain resilience, Tronox's Board of Directors is actively engaged in monitoring sustainability-related risks, like progress on our decarbonization roadmap to achieve net zero by 2050.

We continually assess whether our Board of Directors maintains the right balance of skills, experience, diversity and business acumen to provide effective oversight of management and drive our strategy forward. Annually, there is a formal self-evaluation process of the Board of Directors' effectiveness undertaken by the Corporate Governance and Sustainability Committee.

Tronox's sustainability-related governance structure starts at the highest level of the enterprise: a dedicated committee of the Board of Directors called, the "Governance and Sustainability Committee," comprised of independent members of the Board of Directors, including the non-executive chairman of the Board, Ilan Kaufthal. Throughout 2023, the Corporate Governance and Sustainability Committee met regularly with senior management, including the Chief Sustainability Officer, to review and discuss ESG-related issues.

Underneath the board is a governance structure comprised of multiple layers, starting with Tronox's senior executives and cascading down to each local site. Climate change is a core focus: reducing emissions, mitigating risk and optimizing opportunities.

The governance structure and the roles/responsibilities are described in figure 1 below. The governance structure includes processes and initiatives to align the activities of the cross-enterprise global functions with individual sites and regions to effectively implement the sustainability and climate change-related strategies.

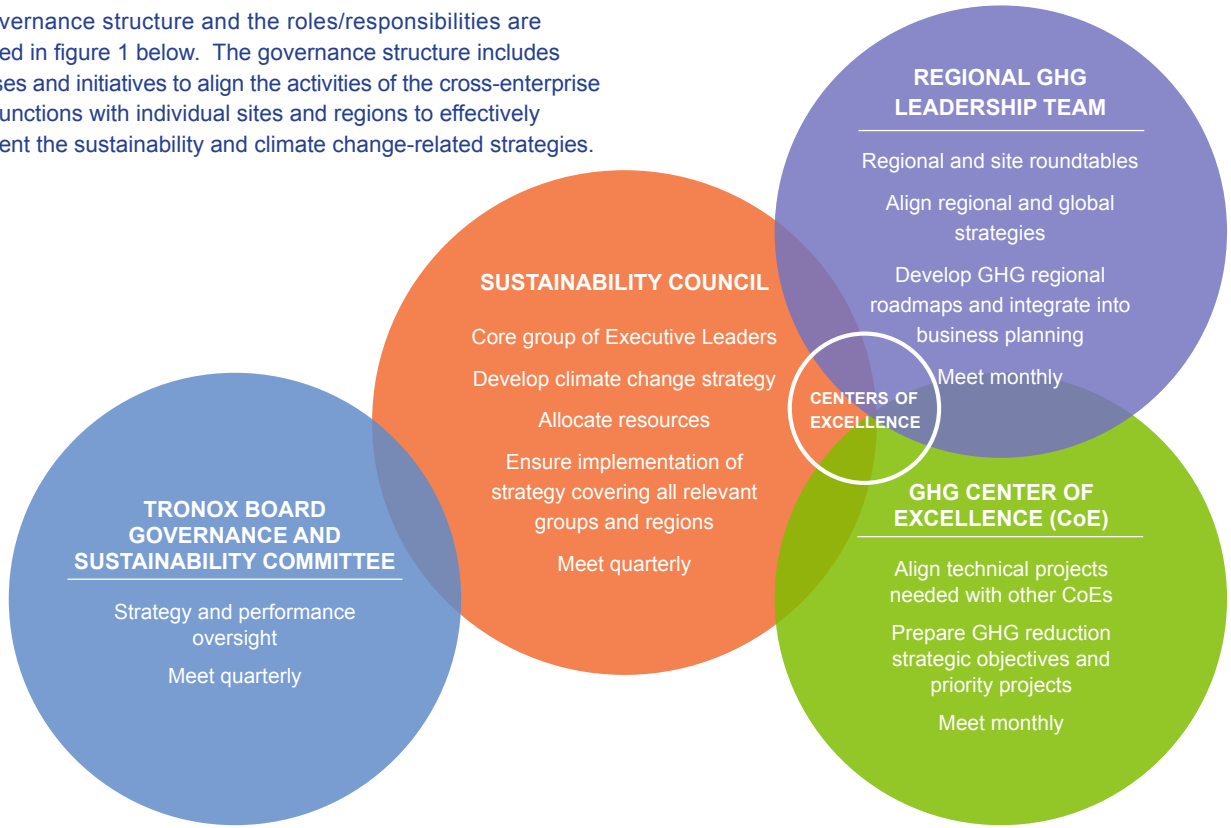


Figure 1: Collaborative Governance – Sustainability and Climate Change

The Sustainability Council is the most senior level executive body charged with managing sustainability-related matters at Tronox and meets on a periodic basis. In 2022, to reflect the importance of sustainability to our investors, customers and employees, we increased the seniority of the members and shrank its size to create more of a sense of ownership. The Council is now comprised of Tronox's most senior executives responsible for operations, finance, commercial, supply chain, legal and investor relations. It is chaired by the Chief Sustainability Officer and Head of Investor Relations. The Council reviews and provides the direction on management of climate related risks and opportunities following the identification and update provided by the sustainability team.

Key decisions made in 2023 included the approval of upstream Scope 3 emissions intensity targets and the mechanism to be used for internal carbon pricing.

During 2023, we created the new position of Chief Sustainability Officer and Head of Investor Relations, as well as the Vice President of Sustainability who reports to the Chief Sustainability Officer. This organizational change reflects the increased importance of sustainability as well as the increased scope of sustainability activity across the enterprise. Management believes that these new positions will be better able to drive Tronox's sustainability strategy, increase stakeholder collaboration and increase the likelihood that Tronox delivers on its sustainability goals.

The sustainability team lead by the Vice President of Sustainability is responsible for the identification of climate-related risks and opportunities. The team is also responsible for updating these risks and opportunities on a regular basis to ensure the fast changes in the regulatory and macro-economic environment are proactively monitored. The Vice President of Sustainability is also responsible for providing input and updates as to the risks and opportunities in the annual Enterprise Risk Management review.

Moreover, we have created 20+ sustainability workstreams to manage specific projects and initiatives. Similar to the governance of the GHG Center of Excellence, each workstream has a senior leader as a portfolio owner, supported by a cross functional team to deliver on project milestones. Below is a high level overview of these work streams:

- Operations: GHG roadmaps (site, regional and global), energy efficiency programs, reductants alternatives and fuel switching.
- Supply: purchased energy, sustainable procurement and carbon credit management.
- Stakeholders: internal carbon pricing, ratings; product carbon and environmental footprint.
- Regulatory: regulatory reporting, green incentives.

Under senior-level executive direction, our operating sites and the regional leadership teams are responsible for the development and execution of their respective GHG reduction roadmaps and integrating key GHG and energy reduction projects in their 5-year execution plans.

In addition, the Company's Annual Incentive Program (AIP) includes two sustainability-related metric representing 20% of the annual payout - 15% to safety and 5% to carbon emission reduction. The AIP is the annual broad-based cashed incentive program in which all salaried employees participate.

b. Strategy

Our strategy on climate change is based on three pillars.

- Achieve net zero carbon emissions by 2050.
- Ensure the resilience of our communities and operations against the physical impacts of climate change.
- Offer our customers products with the lowest carbon-content that is reasonably achievable to help them transition to a low carbon economy.

To move towards net zero carbon emissions, we established our initial goals in 2021 and then, based on the implementation of a few key carbon reduction projects and our robust pipeline of additional projects, we announced new, more aggressive medium-term goals with the publication of our 2021 Sustainability Report.

In addition, whereas our original goals measured reductions based solely on the carbon intensity of producing our products against a 2019 baseline, our updated goals set forth in the 2021 Sustainability Report relate both to carbon intensity and absolute reductions. Both sets of goals cover 100% of our Scope 1 and 2 emissions. Our carbon intensity reductions goals are set forth below and we intend to publicly disclose annually our progress against these goals.

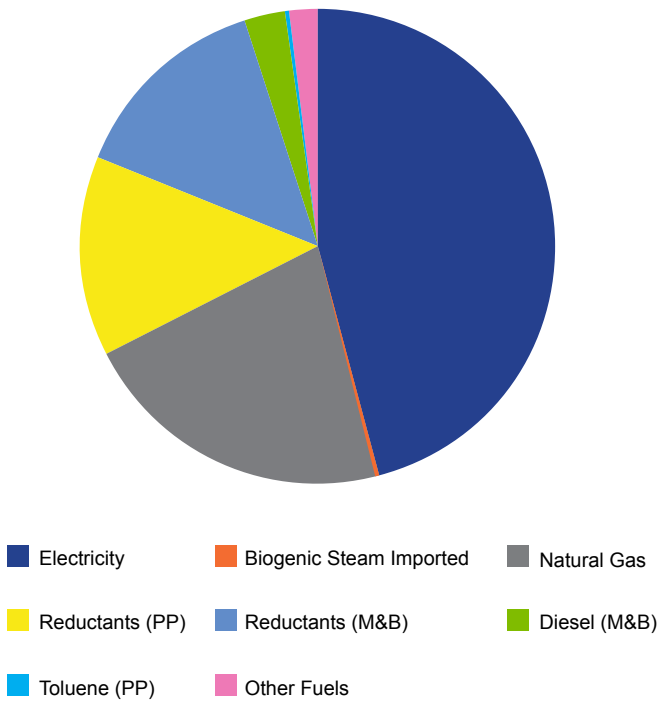
	"New" Target	How We'll Do It
2025	25% (Intensity)	• Replacing 40% of coal-intensive electricity power supply in South Africa with cleaner renewable sources (wind/solar) • Continued optimization/efficiency programs • Energy Management Systems
2030	50% (Intensity)	• Convert power supply to renewable sources at our mining sites and most of our pigment plants • Carbon capture and storage projects • Electrification of processes at selected sites • Renewable fuel alternatives as waste to energy, biogas, biomass at selected sites
2050	100% (Intensity)	• Alternative renewable reductants • Electrification of mining earthmoving equipment

** In the event of any mergers, acquisitions or divestments, the baseline will be re-calculated based on the GHG Protocol Accounting Standards.*

One of the most significant renewable energy projects the Company has undertaken is a 200 MW solar energy project in South Africa which we first announced in Q1 2022. This project commenced operations in early 2024 and we expect such project to be fully on-line in the first half of 2024. Not only is the project one of South Africa's largest renewable power projects which will help address the country's chronic electricity shortage, but it also will reduce Tronox's global Scope 1 and 2 emissions by approximately 13%. Management regards this as a substantial achievement. On top of our large-scale solar project, we anticipate announcing during 2024 a wind power project also in South Africa and are also working on numerous additional renewable energy projects to replace carbon-based electricity in both South Africa and Australia.

The pie chart shows the key contributors to our 2023 Scope 1 and 2 emissions. As the pie chart reflects, the main contributor is CO_2 emissions from purchased electricity, accounting for approximately 1.7 million tons of carbon emissions, followed by carbon-based reductants for mineral beneficiation and pigment production contributing approximately 1 million tons. The third largest contributor is natural gas contributing approximately 0.81 million. Other sources contribute around 0.13 million tons.

CO_2 Emissions by Component – 2023



Based on the proportion of emissions from each of the sources described above, we developed our global decarbonization roadmap which details how we will achieve our near-, mid- and long-term reduction goals described above. We are also working on more granular decarbonization roadmaps at the site and regional level for all geographic areas in which we operate. The regional roadmaps will help us set more ambitious targets in a pragmatic and feasible manner.

Our global decarbonization roadmap stems from extensive analysis using a TCFD-compliant methodology and involving all our internal climate governance teams as well as representatives of each business unit and operational function. This work was two-fold:

- Detailed climate-related transition risk assessment based on various scenarios (see Climate Risks and Opportunities and Scenario Analysis) to identify the key transition risks to the business.
- Identification of key mitigation opportunities and a techno-economic performance assessment to model their potential future impact on GHG emissions, energy consumption and mix, and economic performance.

As a result, we have been able to model projections of GHG emission reduction strategies for Tronox based on market insights (e.g. evolution of energy prices and national electrical grid carbon intensities) and a range of the most significant transition mitigation opportunities that could be implemented through to 2050.

Our roadmap covers three key focus areas to achieve our long-term emissions reductions goals: sourcing of 100% renewable electricity, switch to low-carbon reductants, and complete phaseout of fossil fuel energy for thermal needs (natural gas in particular).

Focus on 2022-2025 roadmap

To meet our emissions reduction target of 25% (intensity) by 2025 compared with our 2019 baseline, we are focusing on decarbonizing our electricity supply in geographies where the power grid supply has a high carbon content. As noted, the first significant project in South Africa is in the process of being commissioned. In that project, Tronox entered into a long-term Power Purchase Agreement (PPA) with independent power producer, SOLA Group, to supply Tronox's mining and smelting operations with 200 MW of solar power. We expect such project to be fully on-line in the first half of 2024. This PPA alone will replace 39% of the current coal-intensive electricity supply of our South African sites and contribute to a reduction in our global carbon emissions of approximately 13% compared to the 2019 baseline. Similar PPA-type projects are being considered to decarbonize electricity-related (Scope 2) emissions in other South African and Australian mineral beneficiation sites. These PPAs alone could help us meet our 35% reduction target by 2027 considering that the power grid carbon intensity is also forecasted to decrease in several of our geographies in the years to come.

Focus on 2025-2030 roadmap

To meet our goal of 50% (intensity) GHG emission reduction targets by 2030, our strategy is to tackle Scope 1 emissions through a near-total switch to renewable fuel alternatives, and where that is not possible to implement carbon capture solutions, as well as to eliminate a larger share of our Scope 2 emissions related to electricity consumption.

We also intend to electrify certain pieces of equipment such as natural-gas powered steam/boilers, which will result in a switch from fossil fuels to renewable electricity and therefore reduce our total carbon footprint. Such initiatives are being explored within the regional decarbonization roadmaps.

Given that Tronox's Scope 2 emissions will have been significantly reduced with renewable energy PPAs during the 2020-2025 period, from 2025 - 2030 we will focus primarily on Scope 1 emissions, as these will become the main contributor to the carbon intensity of our TiO2 products. To address our Scope 1 emissions, we intend to switch to low-carbon sources of energy to meet our thermal energy needs and phase out fossil fuels, such as natural gas. In addition, we intend to deploy Carbon Capture, Utilization and Storage (CCUS) projects at our Botlek (NL) pigment manufacturing plant by 2030. We expect that the Botlek plant will experience significant increases in CO_2 prices due to the increased ambitions of the EU-ETS carbon trading scheme.

Focus on 2030-2050 roadmap

To reach our long-term 2050 carbon neutrality target, we will need to develop and implement projects to address "hard-to-abate" GHG emissions such as eliminating fossil fuel reductants in our smelters and eliminating petroleum coke in TiO_2 chlorinators. We have identified four main opportunities described below which we will be exploring further.

The first opportunity focuses on finding alternative reductants to switch from anthracite and coke, which currently represent 1.2 Mt CO_2, or 21% of total GHG emissions. A few projects are currently under study to replace fossil reductants in our operations:

- Replacement of anthracite reductants with green hydrogen to pre-reduce ilmenite feedstock, which has the potential to cut 90% of the emissions associated with the titanium slag-making process
- After pre-reduction in the titanium slag production process, replacement of the remaining anthracite that is required with biochar. Biochar is biomass (usually wood pellets) that has gone through pyrolysis (thermal decomposition in an air-deprived environment). If used in conjunction with hydrogen pre-reduction of ilmenite, this has the potential to cut almost all the emissions associated with the titanium slag-making process.
- Replacement of coke in the rutile/slag/ilmenite chlorination process, with alternatives such as bio-coke or CO.

The types of alternative reductant initiatives described above will require significant investment in R&D programs, pilots and plant revamps over the next 10 years so that we can begin deployment by 2035.

The second key opportunity in the long-term roadmap is the increased electrification of operating activities that could benefit from the renewable energy projects implemented in the 2020-2025 focus period. For example, we aim to electrify mining earthmoving equipment in our operations in Australia and South Africa which by then should be running fully on low-carbon electricity.

However, the increasing electrification of our operations and the potential production of green hydrogen through electrolysis leads electricity consumption increases in all scenarios modelled. A cheap and clean electricity supply is therefore critical both to mitigate Scope 2 emissions and optimize costs. In the long term, opportunities to develop onsite renewable energy generation will be evaluated to switch from PPAs once those contracts expire.

After deploying new reductants and increased electrication of operating activities, residual Scope 1 emissions related to thermal energy needs will need to be tackled, with a focus on switching from natural gas across all sites. Relatively mature solutions to phase out natural gas from our processes will be explored further as part of the region-specific decarbonization roadmaps (e.g. switch to synthetic methane or biomethane), as they can gain maturity and become cost-competitive over time.

Finally, as all emissions may not be reduced to zero to reach our carbon neutrality target, several other actions are being contemplated to mitigate residual emissions such as deploying CCUS projects to other plants.

Scope 3 Emissions and Becoming the Low-Carbon Supplier of TiO_2

Tronox management approved the following Scope 3 GHG emissions intensity targets against our 2021 baseline:

- 9% reduction in upstream Scope 3 emissions intensity by 2025
- 16% reduction in upstream Scope 3 emissions intensity by 2030

Tronox was in a position to publicly announce Scope 3 targets based on efforts and initiatives undertaken in 2022 to ensure the methodology used meets the latest international standards. Refinements to our methodology continued into 2023. It is important to note that we are focused on cradle-to-gate greenhouse gas emissions.

66% of our carbon footprint arises from Scope 1 and 2 emissions and hence lies within our operational control. The extent of carbon emissions within our control is important because by aggressively reducing Scope 1 and Scope 2 emissions, we can offer our customers TiO_2 products that will help them reduce their scope 3 emissions. And, for many of our customers, TiO_2 is a significant source of Scope 3 emissions. Significantly reducing our own scope 3 emissions is also part of our strategic goal of offering our customers products with the lowest carbon-content that is reasonably achievable.

In 2023, our upstream Scope 3 emissions were approximately 1.7M tons. The main contributor to our Scope 3 emissions is the manufacturing and transportation of the chemical and other raw materials used in our production processes. A detailed breakdown of our Scope 3 emissions performance including the categories quantified are shown in the table below:

Scope 3 GHG Emission Category Per Year	Raw Materials (Feedstock, chemcials, materials)	Energy	Water	Wastewater	Waste	Total
GHG Emissions (tCO_2e)	1,280,060	345,844	2,605	56	6,324	1,634,889

The bulk of our Scope 3 emissions are from upstream raw materials for our intermediate or final products. For example, pet coke to produce an intermediate product (TiCl4) or alumina to produce pigment.

We find it difficult, if not impossible, to determine our downstream Scope 3 emissions due to the diversity of our products in terms of number of end-markets we serve — everything from architectural paint to coatings for plastics and paper — and the global geographical distribution of our sales.

We are planning to commit to the Science Based Targets Initiative. The SBTi-developed sector based approach for the high emitting chemical industry or “primary chemical”. This approach recognizes the potential growth in demand for these chemicals when setting targets for decarbonization. For other chemical industry: titanium dioxide manufacturing included, absolute contraction approach is applied.

In December 2020, the SBTi published a report on “Barriers, Challenges and Opportunities for Chemical Companies to Set Science-Based Targets.” The report made three high level recommendations to develop chemicals sector Sectoral Decarbonization Approach including physical intensity approach)es) for chemical companies, such as TiO_2 manufacturing which are not covered under primary chemical sectors with SDAs.

In the How-To-Guide published in December 2021 for the chemical sector, the chemical companies will have a choice either to use the Absolute Contraction Approach or 1.5 degree celsius SDA pathway when available. We believe that the SDA is the more appropriate approach for Tronox to support our journey to carbon neutrality while continuing to grow and deliver value to our shareholders.

In January 2023, Science Based Targets initiatives (SBTi) provided an update on the status of the project for Sectoral-Based Approach for the chemicals industry. This report outlined the key research questions and objectives for the SBTi’s project to develop sector-specific guidance and target-setting criteria for the global chemicals sector. The report also summarized the work performed by the SBTi until the date of publication, presented the opportunities and challenges facing chemical companies in setting emissions reduction targets, and provided background on the SBTi’s general target-setting methods. Following this report, the SBTi continues stakeholder inclusive process to develop the sector-specific guidance, pathways and target-setting criteria.

c. Risk Management

Tronox's primary tool for managing risk is through the Enterprise Risk Management process (ERM).

Board-Level Oversight

Our entire Board of Directors is actively engaged in the ERM process and views it as an important component of its risk oversight responsibilities. Feedback from our directors is used to help identify key risks and improve the effectiveness of the mitigation activities. After the ERM process is complete, the Vice President, Internal Audit and other key "risk owners" presents the results of the analysis to the full Board typically at its February meeting. A more in-depth discussion on key risks is led by the key "risk owner" as part of the Board's ERM discussion. Frequently, these reviews lead to requests for additional work and analysis on sub-components of each risk.

Management-Level Oversight

At the management-level, Tronox has formed a Global Risk Committee (GRC), comprising senior leaders from around the global representing all functions and business units, which is charged with assisting Tronox's board to identify significant enterprise risks, assess its risk mitigation strategies and, where appropriate, help implement those strategies, and review and suggest specific risk tolerances and risk appetite.

The GRC meets in the second quarter of each year to review the scope and appropriateness of the ERM plan, taking into consideration any changes since the prior-year ERM process, including changes in Tronox's scope of business activities, events in the prior year suggesting lapses in the prior year's ERM process, geopolitical events, and evolving stakeholder expectations. In addition, at that meeting the GRC reviews the results of any specific risk mitigation activities that resulted from the prior year's ERM process and the implementation of any specific risk tolerances or "risk appetite" adopted in the prior year.

The GRC meets again after the ERM process is completed. It reviews results of that year's ERM process and suggests specific risk mitigation actions that result from (or should result from) the ERM process and ensure adequate resources available to undertake activities. This may include, updates to existing policies or adoption and implementation of new policies, employee education and training related to specific risks, "desk top" risk mitigation exercises, specific risk tolerances or "risk appetite" standards that result from the ERM process.

Climate Risks and Opportunities

In 2021 we worked on analyzing how the relevant climate change "transition scenarios" would impact Tronox. These "transition scenarios" were based on the global community's ability to act against climate change ranging from inaction to sustainable development. We discussed with our internal and external stakeholders how these transition scenarios would impact Tronox and ways Tronox could adjust under each scenario. Next, we conducted a quantitative evaluation of how each scenario would likely impact Tronox's commercial activity. The outcomes of the quantitative risk assessment were reviewed through a cross functional team to prioritize risks and explore opportunities with the aim of developing a climate change roadmap that is integrated to the company Strategy. The outline of the roadmap is presented above.

Internal Carbon Pricing

As part of our commitment to sustainably transition to low carbon economy, we recognize the potential cost of inaction as a key risk. For that purpose, we established an internal carbon pricing mechanism covering all our functional and regional operations. The main objectives for this initiative are to accelerate low-carbon investment, improve energy efficiency and accelerate the evolution of our corporate culture to be even more climate and sustainability conscious. Establishing an internal carbon pricing mechanism will also help us better identify and benefit from new low-carbon opportunities, adapt to evolving GHG regulations, and stress test our investment decisions against possible future regulatory scenarios.

The methodology measures the financial impact of business decisions that increase or decrease our Scope 1, 2, and 3 emissions based on actual or potential per-ton emission costs in the jurisdictions where we operate. We apply an evolutionary internal carbon price covering Scope 1 and 2 GHG emissions based on the actual or potential per-ton cost to emit carbon in the relevant jurisdiction. The average global carbon price in 2030, based on jurisdiction, is approximately US$70 per ton gradually rising up to US$200 per ton by 2050. The tool is initially applied to capital investment decisions and be expanded over time to include longterm impacts of our major investments and large operational spend (e.g., Scope 2 and 3).

Transition Scenario Analysis

We built the climate change scenarios using a staged approach in alignment with the TCFD guidelines. We navigated through different climate scenarios and
sectoral specific roadmaps to understand risks and opportunities identified.

The reviews included:

- Reference Climate Scenarios: Intergovernmental Panel on Climate Change (IPCC); International Energy Agency (IEA); Greenpeace; and International Renewable Energy Agency (IRENA).
- Industry strategies and roadmaps: European Chemical Industry Council (CEFIC), Vision and Roadmap for European Raw Materials (VERAM); International Council of Chemical Associations (ICCA); US Department of Energy; and Mineral Council of Australia
- Sectoral decarbonization pathways: Science Based Target Initiative (SBTi) and Transition Pathway Initiative (TPI)

What is a Scenario?

A scenario describes a path of development leading to a particular outcome. Scenarios are not intended to represent a full description of the future, but rather to highlight central elements of a possible future and to draw attention to the key factors that will drive future developments. It is important to remember that scenarios are hypothetical constructs; they are not forecasts or predictions nor are they sensitivity analyses. Scenario analysis is a tool to enhance critical strategic thinking.[7]

[7] TCFD Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities (June 2017).

With the support with specialized consultants and subject matter experts, we developed three Tronox-specific scenarios in addition to the base-case (the case of no action taken):

These scenarios provide a comprehensive view of various climate change driven impacts that may affect our business. Risk assessments were carried out to determine each scenario's potential impact on our business, both quantitatively and qualitatively. The analysis helped to assess our business' resilience and evaluate various mitigation measures included in our roadmap.

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Tronox will update the scenario analysis at least every 3 years; or when a significant shift in climate change policies is anticipated. We will also commit to disclose progress of our actions to mitigate these risks on annual basis.

Transition Scenario	References	Brief Scenario Narrative
Inaction >+3,6°C in 2100	IPCC SSP3-7.0 and SSP5-8.5	• Little climate action is implemented, materialized by a low allocation of capital in low-carbon energy sources and technologies (incl. for T10j processes) and no ambitious policy extensions (e.g., no global carbon price emerges). • Extreme pressure on natural resources generates national and international tensions and fragilizes multilateral bodies, while climate changes are extremely visible with large impacts on health and life quality. • Used for base case analysis and as worst-case scenario for assessment of physical risks.
Announced Actions ~ +2,7°C in 2100	IPCC SSP2-4.5 IEA STEPS	• Climate action reflects current and announced policy settings but does enable to achieve global net-zero pledges made by countries. • Technology development enables to increase society's resilience but is insufficient to meet decarbonization needs, preventing the achievement of a low-carbon economic growth. • Used for scenario analysis for physical and business risks assessments.
Fast Technological Change ~ +2°C in 2100	IPCC SSP1-2.6 IEA APS Meadows Report - Comprehensive Technology	• Rapid technological progress enables to decrease energy and carbon intensity of the economy (incl. T10j via the value chain); renewable energy, electrification, energy efficiency, hydrogen, CCUS, biofuels, etc. • Steady economic growth and low-carbon technologies generate high pressure on critical minerals including titanium, which is mitigated by a high international cooperation. • Used for scenario analysis for business risks assessment.
Sustainable Development ~ +1,5°C in 2100	IPCC SSP1-1.9 IEA SDS IRENA 1.5°C Pathway	• High collective decarbonization efforts: all current net-zero pledges are achieved in full; advanced economies reach net-zero emissions by 2050, China around 2060, and all other countries by 2070 at the latest. • The combination of technological development, ambitious policies (e.g., rapid fossil-fuel phase out), and rapid shift of socio-economic behaviors (e.g., circular economy) enables the advent of carbon-neutral economies and green growth. • Used for scenario analysis for business risks assessment.

Figure 1: Transition scenarios constructed to evaluate transition risks

Risks Related to Policy and Regulation

	Carbon Price	Carbon Border Adjustment	Reduction of Importations	Supply Chain/ Production Tensions	Grid Carbon Intensity	Fossil Fuel Phase-Out	Natural Resources Tensions	Stricter Regulation	Environmental Taxonomy
Announced Actions	$$ Medium	Only in the EU	Low Reduction of Imports	High Risk	Planned Measures Only, Slow Decarbonization	Progressive	Very High	Not Beyond Planned Policies	Not Beyond Planned Policies
Fast Technological Change	$$ Medium	Only in Specific Countries	Low Reduction of Imports	Moderate Risk	Planned Measures Only, Slow Decarbonization	Progressive	High	Stricter Regulation	Strict Taxonomies
Sustainable World	$$$ High	Widespread	Short Circuits Privileged	Moderate Risk	Clean	Progressive Then fast	Moderate	Stricter Regulation	Strict Taxonomies
		Carbon Mechanisms		Internal Situation		Techno-Political Decisions		Environmental Regulation	

Risks Related toTechnology, Market and Reputation

	Tronox's Energy Mix	Grid Reliability	Tronox's Processes	Tensions on Energy Supply	Consumer Demand Shifts	Recycling Habits	Nuclear Phase-Out	Stakeholder Pressure	Social Acceptance
Announced Actions	Slow Replacement	Moderately Reliable	Slow Retrofit	High Tensions	Observed Shift	Observed Shift	Current, Announced	Moderate Pressure	Moderate Impact
Fast Technological Change	Active Replacement	Highly Reliable	Active Innovation	High Tensions	Observed Shift	Observed Shift	Current, Announced	Moderate Pressure	Moderate Impact
Sustainable World	Active Replacement	Highly Reliable	Active Innovation	Moderate Tensions	Progressive Shift	Progressive Shift	Phased Out in Some Countries	High Pressure	High Impact
			Technological Risks		Market Risks		Reputational Risks		

The following table summarizes the key transition risks facing Tronox globally that require mitigation action.

Transition Risk by 2050	Time Horizon	Process/ BU Concerned	Impact Description	Risk	Mitigation and Opportunities
Carbon Pricing	As of Today	All BUs	Carbon pricing policies and associated regulatory mechanisms – including carbon border taxes – are being adopted with increasing levels in various countries.	If no GHG emission reduction action is undertaken, production costs could increase dramatically resulting from both direct carbon pricing penalties ($/ton product sold) and indirect increasing costs of carbon-intensive energy sources and raw materials (chlorine, sulfur, petcoke, etc).	• Scope 1+2 emissions reduction of 25% by 2025 and 50% by 2030. • Scope 3 emissions reduction of 9% by 2025 and 16% by 2030. • Internal carbon pricing mechanism developed and approved for implementation in 2023.
Fossil-Fuel Phase Out	From 2030 Onwards	All BUs (in particular energy-intensive activities, e.g. pigment manufacturing).	Increasing number of countries with regulations to phase out from coal and other fossil fuels.	Rising energy and raw material costs; especially in the Sustainable World scenario; which can lead to a skyrocketing production cost increase particularly in smelting and chlorination processes if no major change is made in the energy and raw material supply mix.	• First 200MW solar power supply at South Africa expected to be fully on-line in the first half of 2024. Additional renewable energy project expected to be announced later in 2024. • Ongoing discussions with energy providers on opportunities for green Power Purchase Agreements and Gas Purchase Agreements. • Dedicated supply chain team focused on high GHG emitters at each site. More detailed discussions ongoing with our top 20 global emitter to discuss their baseline carbon footprint and their decarbonization plan. We aim to accelerate our Scope 3 emissions reduction targets once these discussions are concluded. • R&D project team is currently focusing on alternatives to high-carbon emitting reductants.

Transition Risk by 2050	Time Horizon	Process/ BU Concerned	Impact Description	Risk	Mitigation and Opportunities
Increased Environmental Regulations on End Products	As of Today	Pigments & SC&M	Increased sectoral regulations for the production of end products (plastics, paints, coatings, etc.) through eco-design requirements and environmental labelling of consumer products.	Reduced sales in certain markets (e.g. single-use plastics) and higher expectations from clients on the environmental footprint of products supplied.	• Continue our discussions with key customers on possible opportunities to market low-carbon Tronox products that benefit from the implementation of specific GHG emission reduction initiatives (see Decarbonisation Roadmap) and which are sold to customers along with a Guarantee of Origin (GO) mechanism, helping Tronox's clients decrease their Scope 3 emissions. • Regular scenario-based assessment of the evolution of the environmental regulation of end products (e.g. EU Chemicals Strategy) in order to best understand which end markets are at risk and how Tronox products can help those markets be more resilient. • Gap analysis against draft SEC regulations completed to proactively address the significant change in regulatory environment.
Technology Changes	As of Today	All Bus	Tronox needs to adopt new technologies to fully decarbonize its activities and thus respect its GHG emission reduction targets. The availability of decarbonization technologies at a competitive cost is thus a challenge.	Tronox may experience challenges reaching net zero by 2050 if some technologies are unavailable at a sufficiently competitive cost (e.g. green hydrogen, carbon capture, biocoke, etc.). Tronox can also face a high cost to implement those technologies.	• R&D project team is currently focusing on alternatives to high-carbon emitting reductants. • Working with specialized technology providers within the regional decarbonization roadmaps to identify new ideas and opportunities. • Energy efficiency group developed under the Global GHG Center of Excellence.

Transition Risk by 2050	Time Horizon	Process/ BU Concerned	Impact Description	Risk	Mitigation and Opportunities
Market shift for products with lower-carbon impact	As of Today	Pigments & SC&M	Demand from both clients and end consumers for products with a lower-carbon footprint.	The main risk consists of higher expectations from clients on the environmental footprint of products supplied. The TiO2 pigment market is for now relatively less threatened by a massive demand shift because of the absence of alternative products (e.g. biobased or synthetic pigments) with the same performance.	• Refer to progress update on decarbonization roadmaps. • Refer to discussion with customer on the evolution of low carbon products.
Reputation	As of Today	All BUs	Increased stakeholder concern about GHG emissions and reporting. Decreasing social acceptance of activities with negative environmental impact.	If Tronox does not implement the necessary actions to meet the climate ambitions it has set, several reputational risks can be faced: • Less funding available and/ or increased production costs due to boycott by shareholders, banks and commercial partners. • Closure of existing mining and pigment manufacturing plants and impossibility to create new plants and deliver because of potential activism.	• Renewable power supply in South Africa announced (Scope 2 & 3). • Additional large renewable power supply expected to be announced in 2024 (Scope 2 & 3). • Regional decarbonization roadmaps for all our operational sites/regions(Scope 1 & 2). • Continual dialogue with shareholders to update on progress and gain feedback on their expectations. • Maintain annual update on roadmap progression.

We also conducted a detailed assessment of the physical risks related to climate change for all of our operational sites. Both acute and chronic physical risks associated with climate change were assessed. Chronic risks are associated with those physical changes that change slowly over time and have a cumulative impact. These include changes to temperature, mean sea level, annual precipitation, and average monthly wind speed. Acute risks are those associated with extreme events such as bushfires, cyclones, storm surge, flooding, etc. While chronic climate change needs to be considered given the potential life of the risk management project, extreme events can cause the most disruption and pose the most significant risk to life and property.

The physical climate modelling undertaken includes the most recent Sixth Assessment Report (AR6) of the United Nations (UN) Intergovernmental Panel on Climate Change (IPCC). The Physical Science Basis (released in August 2021) underpins the modelling undertaken. These models include several new and updated emission pathways that explore a much more comprehensive range of possible future outcomes than were included in CMIP5. Specifically, a set of scenarios were chosen to provide a range of distinct end-of-century climate change outcomes.

For each physical climate change we explored how this will impact the business and the risks that result. In this way climate stressors are translated and the vulnerability of the business to climate change were established.

The following table summarizes the key risks facing Tronox globally that require action to either better define the vulnerability and exposure of Tronox to each risk or to investigate mitigation and adaption options further. We are working on assessing the resilience of each of our sites against the risks identified and the outcomes will be incorporated to our Enterprise Risk Management Process.

Physical Risk by 2050	Time Horizon	Sites Impacted	Business Impact	Risk	Mitigation and Opportunities
Temperature increase 0.8-2°C	Chronic	All sites - lesser impacted are sites that have lower annual mean temperatures to begin with such as European sites. Also, some sites exhibit an increase in rainfall (eg: Fuzhou, Hamilton) which helps to mitigate the impact of a hotter climate.	Increased degradation of infrastructure and physical assets.	Increased maintenance costs, potential for capital investment, increased management of workforce to ensure safety.	Investigation into the impact of baseline temperature on infrastructure degradation and maintenance costs across sites that experience currently different climate conditions.
	Chronic		Increased frequency and duration of electricity supply interruptions due to degradation of state- or privately-owned infrastructure.	Each site will face slightly different consequences depending on their specific requirements, exposure and resilience.	Become self-sufficient for energy production or move to hub model where applicable.
	Chronic		Competition for electricity during warmer conditions.		
	Chronic		Hotter conditions lead to increased base load for water resources, potentially increasing competition and placing greater pressure on water management and regulation.		Water management is already a key component of Tronox operations at most sites. Investigation of potential alternative sources of water (eg: self-managed groundwater, water recycling, desalinisation plants).
	Acute		Hotter conditions increase risk of damage from bushfires to not only Tronox infrastructure but physical assets that support energy, water and workforce.		Bushfire management plans are already in place for relevant sites, investigation as to adequacy with increasing climate risks and review emergency response procedures. Potential for investment in additional firefighting infrastructure.
	Chronic		Increased insurance costs associated with increased hazards and degradation of infrastructure.	Increased insurance costs as well as access to insurance.	
	Chronic	Sites that have dredging ponds.	Increased evaporation rates to dredging ponds.	Competition for water resources will only increase with increasing temperature, assessment of evaporation requirements needs to be considered as part of overall site water balance.	See water management.

Physical Risk by 2050	Time Horizon	Sites Impacted	Business Impact	Risk	Mitigation and Opportunities
Temperature increase 0.8-2°C	Chronic	Mining sites with closure requirements.	Increased risk to closure activities such as revegetation and impact of hotter conditions on TSF design and closure liability.	Increased failure rate for re-vegetation and potential TSF failure will increase risk of regulator involvement and potential for damage to brand reputation. Greater investment required will result in decreased shareholder value and increased closure costs.	Research into closure impacts due to changing climate required. Including implication to rehabilitation and TSF management.
	Chronic	All sites	Decreased air quality.	Increased temperature leads to decreased air quality at sites which may lead to increased incidence of compliance breaches, regulatory involvement, and damage to reputation.	Continue to work towards reducing emissions and assess each sites capacity to reduce/manage airborne pollutants and particulates.
	Chronic	Thann, Stallingborough, Botlek	Decreased incidence of cold related illness, and decreased energy requirements relating to heating.	Decreased energy requirements and increased workforce productivity.	
Extreme 24-month drought increase in likelihood	Chronic - acute	All sites	Increases in the frequency and intensity of drought conditions are predicted to occur across all sites leading to increased competition for water resources, increased occurrence, and intensity of bushfires.	Increased risks associated with access to water, water quality and the spread of disease and tighter regulation with respect to air quality control.	See water management.
			Regions with poorly developed support systems and resilience to drought may face hardships in terms of domestic food supply.	Decreased food and water security creating social and political issues in areas of operation.	Increase contributions to community development programs that help assist communities build resilience to climate change and encouragement of uptake in community of existing programs.

Physical Risk by 2050	Time Horizon	Sites Impacted	Business Impact	Risk	Mitigation and Opportunities
Increase in humidex "danger" days	Acute	All sites. Some sites are impacted to a greater extent than others. Lesser at European sites.	Increased head related illness among workforce, increased risk of accidents and slips because of heat, decreased productivity due to inability to undertake physical tasks.	Increased risk of safety incidents, breaches to regulation and employee discontent if not adequately managed.	As a global operator, management protocols and lessons learned at sites that have a higher mean annual temperature like Yanbu, can be used as a template for management of sites that are predicted to see an increased impact of heat on working conditions.
Extreme rainfall events increase in precipitation volume	Acute	All sites. Some sites are impacted to a greater extent than others.	Damage to infrastructure, physical assets and equipment at each site either directly or indirectly through flash flooding.	Interruptions to operations causing decreased production and increased costs of maintenance and repairs, possible replacement of infrastructure.	Assess each site's ability to handle predicted increases in precipitation amount during extreme rainfall events to determine current level of exposure.
	Acute		For mine sites increased risk of loss of ore from flash flooding and TSF competency both during operation and after closure. For other sites, exceedance to current drainage may lead to possible run-off and contamination from sites.	Loss of product with decrease profit as well as increased risk of contamination and TSF failure causing compliance breaches, regulator action and reputation damage.	Assess surface water and runoff management at each applicable site to determine exposure.
	Acute		Interference with the process either directly through cooling or dilution or indirectly through flash flooding.	Interruptions to operations causing decreased production, potential for quality of product to be impacted.	Ensure adequate protection for process during extreme rainfall events relevant to each site.
	Acute		Increased exposure to hazards and disruption of workforce during event and immediately after.	Decreased production, increased incidence of safety breaches, potential for increased liability and reputation damage.	Ensure each site has a flood management and response plan and that staff are trained and adequately prepared.

Physical Risk by 2050	Time Horizon	Sites Impacted	Business Impact	Risk	Mitigation and Opportunities
Extreme rainfall events increase in precipitation volume	Acute	All sites. Some sites are impacted to a greater extent than others.	Increased chance of accidents during commute and decreased site access.	Disruption to workforce and supply chain.	Education for staff and protocols in place during extreme events, risk analysis of supply chain response to extreme events.
	Acute		Increased likelihood of interruption to energy supply due to flooding of and damage to infrastructure.	Each site will face slightly different consequences depending on their specific requirements, exposure and resilience.	See energy management.
	Acute		Decreased capacity of wastewater network to deal with additional inundation, causing systems to clog.	Potential for interruptions to production, damage to product quality.	Assess each site's ability to handle predicted increases in precipitation amount during extreme rainfall events to determine current level of exposure.
	Chronic		Flood insurance costs increased.	Increased insurance costs as well as access to insurance.	
Extreme wind events increase in wind speed	Acute	Australian, South African, and European sites	Increased wind speeds during extreme events leading to damage to infrastructure, physical assets and equipment at each site.	Interruptions to operations causing decreased production and increased costs of maintenance and repairs, possible replacement of infrastructure.	Assess each sites ability to handle predicted increases in wind speed during extreme events to determine current level of exposure and requirement for any additional infrastructure changes.
			Potential for exceedance to safe operating envelopes in terms of production as well as interruptions to maintenance.	Decreased production and increased time required for maintenance as well as increased costs and potential for increased safety incidence.	Assess extreme wind event exposure at each site and develop management and response plan.

Physical Risk by 2050	Time Horizon	Sites Impacted	Business Impact	Risk	Mitigation and Opportunities
Increase in extreme Water Levels (1 in 100 year event)	Acute - chronic	Botlek, Stallingborough, Yanbu (lesser at Namakwa North and Australind).	Increased risk of inundation during storm surge events causing coastal erosion leading to damage to infrastructure, flooding, salt-water degradation. Site access may be impeded, and groundwater quality impacted.	Increased insurance costs as well as access to insurance. Decreased production and increased incidence of safety and contamination breaches during events, increased maintenances costs, damage to product quality, interruptions to supply chain.	Assess impact of extreme water level at each site and develop a management and response plan to deal with temporary effects. Explore potential for physical/engineering options and inundation management as well as changes to groundwater and surface water quality at site.

d. Metrics

Accounting Metric	Unit of Measure	2022	2023
Scope 1 GHG Emissions	t CO_2e	2,276,194	2,019,715
	tCO_2e/t product	0.94	0.87
Scope 2 GHG Emissions	t CO_2e	1,937,575	1,727,334
	tCO_2e/t product	0.80	0.74
Upstream Scope 3 GHG Emissions	t CO_2e	1,907,850	1,634,889
Energy Consumption	kWh	10,850,709,000	9,343,980,033
Energy Intensity	kWh/t product	4,459	4,006
Fuel consumption	kWh	8,460,999,000	7,178,490,594
Fuel Intensity	kWh/t product	3,477	3,078
Purchased Energy	kWh	2,389,710,000	2,165,489,439
Purchased Energy Intensity	kWh/t product	982	928
Renewable Energy	kWh	324,436,000	219,280,833
	(%)	2.99%	2.27%
Grid Electricity	%	22.62%	22.43%

The calculation method for the Key Performance Indicators mentioned in this section is detailed on our website: **tronox.com**