

# Environment

## Disclosure of financial information related to climate change (based on the TCFD recommendations)

In January 2020, Toyobo group endorsed the Task Force on Climate-related Financial Disclosure (TCFD) recommendations and has been advancing the disclosure of our initiatives in line with these recommendations.

### Governance

We have established the Sustainability Committee, chaired by the President and Chief Executive Officer, who has the highest seniority regarding issues related to climate change. The committee deliberates on setting high-level policies and targets for addressing these issues. The Board of Directors regularly receives reports from the committee, approves important items such as high-level policies and targets, and monitors the progress of related activities.

### Strategy

In Sustainable Vision 2030, Toyobo group has designated the achievement of a decarbonized and circular society as a key sustainability goal. Consistent with the TCFD recommendations, we have analyzed and organized future risks and business opportunities based on climate change scenarios aligned with the Paris Agreement. By identifying the financial impacts of these risks and opportunities, we aim to strengthen the resilience of our business strategy through the development of targeted countermeasures and the establishment of relevant indicators and goals.

#### ► Scenario analysis

Given the increasing severity of climate change impacts and advancements in countermeasures, various scenarios are conceivable. We referred to the scenarios shown in the diagram at right as typical examples.

### Risk management

Based on the results of a company-wide risk assessment, we manage natural disaster risks, including those exacerbated by climate change such as severe flooding and storm surges, as key risks for Toyobo group.

### Overview of the scenario analysis

Set scenarios	1.5°C scenario	4°C scenario
<b>Social context</b>	Ambitious policies and technological innovations are implemented to limit the average global temperature increase to 1.5°C by the end of the century and achieve sustainable development in society. The transition to a decarbonized society is expected to bring significant social changes that will likely affect business operations. Examples: • Introduction of carbon taxes and rising carbon prices • Shift to electric vehicles and expansion of renewable energy	Policies based on the Paris Agreement, including draft commitments from various countries, have been implemented. However, the average global temperature is expected to rise up to 4°C by the end of the century. This scenario would create a society where climate changes, such as temperature increases, are highly likely to impact business operations. Examples: • Increased flooding damage from heavy rainfall
<b>Reference scenarios</b>	<ul style="list-style-type: none"> <li>• NZE (IEA WEO2023)</li> <li>• SDS (IEA WEO2021/ETP2020)</li> <li>• RCP2.6 (IPCC AR5)</li> </ul>	<ul style="list-style-type: none"> <li>• APS (IEA WEO2023)</li> <li>• SSP1-1.9 (IPCC AR6)</li> <li>• Global Ambition scenario (OECD Global Plastics Outlook)</li> </ul>
<b>Trends in risks and opportunities</b>	Transition risks and opportunities, including social changes such as strengthened regulations, are more likely to become apparent.	Physical risks and opportunities, such as changes in weather patterns, are more likely to become apparent.

### Risks, opportunities, and mitigation measures by scenario

Social changes and their impact	Risks and opportunities			Measures taken by Toyobo group
	Category	Period	Details	
<b>Impacts of transitioning to a decarbonized society</b>  Changes in policies, regulations, technology, and markets on a broad scale, etc.	Transition risks	Short term	Introduction of carbon pricing	<ul style="list-style-type: none"> <li>• Promotion of GHG emission-reduction plans (including energy conservation, production efficiency enhancements, fuel conversion, and adoption of renewable energy)</li> <li>• Use of internal carbon pricing systems</li> </ul>
		Medium to long term	Increases in raw materials and fuel prices (e.g., carbon price pass-through)	<ul style="list-style-type: none"> <li>• Shift to non-petroleum-based resources</li> <li>• Engagement and collaboration with suppliers (e.g., development of low-carbon raw materials)</li> <li>• Diversification of raw material procurement methods (expanding multiple sourcing and local procurement)</li> </ul>
			Increased costs associated with energy efficiency initiatives and high-efficiency equipment, etc.	<ul style="list-style-type: none"> <li>• Innovation and pursuit of ultra-high efficiency in production processes</li> <li>• Utilization of green transition bonds and transition finance</li> <li>• Enhancement of production efficiency across the value chain (e.g., integration and collaboration with affiliates, M&amp;A)</li> </ul>
	Transition opportunities	Medium term	Increased costs due to low-carbon/decarbonization requirements in product manufacturing	<ul style="list-style-type: none"> <li>• Expansion of renewable energy adoption and procurement</li> <li>• Enhancement of production process efficiency, promotion of energy conservation, and cost pass-through to product prices</li> </ul>
			Increasing calls for reduction or substitution of petroleum-based resources	<ul style="list-style-type: none"> <li>• Acceleration of the shift to recycled and biomass-derived raw materials</li> <li>• Review of general-purpose material businesses reliant on petroleum-based resources</li> </ul>
		Medium term	Increasing calls for reduction or substitution of petroleum-based resources	<ul style="list-style-type: none"> <li>• Acceleration of the shift to recycled and biomass-derived raw materials</li> <li>• Innovation in production processes for bio-businesses using microorganisms such as yeast for bio-manufacturing</li> <li>• Addressing procurement challenges related to raw materials (recycled and biomass-derived) due to material scarcity</li> <li>• Promotion of product development and planning with low-carbon and decarbonized materials</li> <li>• Acceleration of the development of innovative low-carbon and decarbonized materials</li> <li>• Strengthening of production and quality management systems for low-carbon and decarbonized products</li> </ul>
<b>Impacts of climate change progression</b>  Direct damage to assets, indirect effects from supply chain disruptions, and changes in technology and markets, etc.	Physical risks	Short to medium term	Disruption of raw material supply due to natural disasters	<ul style="list-style-type: none"> <li>• Review of inventory levels and expansion of bulk purchases</li> <li>• Diversification of logistics routes</li> </ul>
		Medium term	Damage to equipment and operational shutdowns caused by flooding and storm surges	<ul style="list-style-type: none"> <li>• Enhancement of durability for production and power facilities, relocation, and raising of equipment</li> <li>• Diversification, relocation, and consolidation of production bases</li> <li>• BCP training</li> </ul>
	Physical opportunities	Medium term	Increased demand for civil engineering projects	<ul style="list-style-type: none"> <li>• Expansion of products used in disaster mitigation and restoration work*</li> <li>* Examples include sand-proofing sheets, concrete delamination prevention sheets, and soft roadbed improvement materials.</li> </ul>
		Long term	Increased need for desalination due to water shortages and droughts Rising demand for zero liquid discharge (ZLD) solutions due to freshwater scarcity	<ul style="list-style-type: none"> <li>• Expansion of sales for seawater desalination membranes such as RO/FO membranes*1</li> <li>• Development of energy-efficient and durable RO/FO membranes, etc.*1</li> <li>• System development for high-efficiency concentration membranes (BC membranes)*2</li> <li>• Strengthening of production and quality control systems for RO/FO/BC membranes, etc.</li> <li>• Enhancement of sales capabilities through TOYOBO MC Corporation leveraging Mitsubishi Corporation's overseas network</li> </ul>
		Long term	Increased demand for infection control measures (prevention and treatment) due to rising temperatures	<ul style="list-style-type: none"> <li>• Expansion of sales of food packaging-related products in response to increasing demand for food hygiene</li> <li>• Promotion of research and development for infectious disease-related products and technologies</li> </ul>

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### Indicators and goals

Toyoibo group has set goals for climate change and is advancing various initiatives to address them.

Key risks and opportunities	Financial impact		
	Summary	Impact amount	Mitigation costs
<b>Key risk 1</b> Risk of damage to buildings and equipment due to water-related disasters (e.g., floods, storm surges)	Our main facilities (Tsuruga, Iwakuni, and Inuyama) are exposed to water-related risks, which are expected to increase due to climate change. An estimate has been made of the potential loss of assets at these facilities due to water damage.	Time frame: 2030s Estimated asset loss: Up to approx. ¥60 billion* * Estimated based on the book value of the facility and the damage ratio from water-related disasters (as published by the Ministry of Land, Infrastructure, Transport and Tourism).	FY2023–26 cumulative total: ¥18 billion (total investment in safety, disaster prevention, and environmental measures)
<b>Key risk 2</b> Introduction of carbon pricing	Assuming a carbon price of ¥15,000 per tonne of CO <sub>2</sub> for fiscal 2031, we compare the carbon tax burden under two scenarios: one without additional GHG emission-reduction measures (BAU scenario) and one with implemented measures (transition scenario).	Time frame: FY2031 Cost reduction: Approx. ¥10 billion* * Difference in the carbon tax burden between the BAU scenario and the transition scenario • BAU scenario: ¥20 billion (carbon price for approximately 1.3 million tonnes of CO <sub>2</sub> emissions) • Transition scenario: ¥10 billion (carbon price for approximately 655,000 tonnes of CO <sub>2</sub> emissions)	
<b>Key risk 3</b> Increasing calls for reduction or substitution of petroleum-based resources  <b>Key opportunity 1</b> Growing demand for low-carbon and decarbonized materials and products	In anticipation of increasing societal demands, including from customers, for the reduction and substitution of petroleum-based resources as part of future decarbonization efforts, we estimate the revenue from low-carbon and decarbonized materials and products in the film business for fiscal 2031.	Time frame: FY2031 Revenue from opportunities: Approx. ¥130 billion* * Estimated as 60% of the target revenue for FY2031 (¥220 billion) from low-carbon and decarbonized materials and products	Part of the ¥4.1 billion R&D expenditure for the Film segment in FY2024
<b>Key opportunity 2</b> Rising demand for advanced water treatment due to the scarcity of water resources	Given advancing climate change and societal shifts toward decarbonization, we anticipate increased demand for products and services* that contribute to GHG reduction for customers and water treatment membranes. We estimate the revenue for fiscal 2031 in the Environmental and Functional Materials segment, which encompasses many of these materials and products. * Examples include energy-efficient seawater desalination membranes, VOC recovery equipment that enables reuse by avoiding solvent combustion treatment, water-processed flexo plates that contribute to reducing GHG emissions from wastewater treatment, renewable energy and storage battery-related materials and products, and EV-related materials and products.	Time frame: FY2031 Revenue for the Environmental and Functional Materials segment: Approx. ¥250 billion* * Includes not only water treatment membranes and VOC recovery equipment but also mooring lines for floating offshore wind power, engineering plastics for EVs, and storage battery-related materials.	Part of the ¥4.9 billion R&D expenditure for the Environmental and Functional Materials segment in FY2024
<b>Key opportunity 3</b> Expansion of demand for products contributing to greenhouse gas (GHG) emission reduction			

Category	Indicator	Target	Main initiatives	FY2024 performance
GHG	GHG emissions	Scope 1, 2 FY2031: 27% reduction (SBT) (Base year: FY2021) Note: Equivalent to a 46% reduction compared with FY2014	<ul style="list-style-type: none"> <li>Improved energy conservation, enhanced production efficiency, fuel conversion, adoption of renewable energy, among others</li> </ul>	8% reduction compared with FY2021 (831 thousand t-CO <sub>2</sub> )
		Scope 3 (Categories 1 and 11) FY2031: 12.5% reduction (SBT) (Base year: FY2021)	<ul style="list-style-type: none"> <li>Adoption of carbon-free fuels, renewable energy procurement, production process innovation, among others</li> </ul>	The electricity generated from renewable energy in FY2024 was 896 MWh
			<ul style="list-style-type: none"> <li><b>Category 1*</b>: Acceleration in the shift to recycled and biomass-derived raw materials * Emissions from activities related to purchased raw materials and services such as manufacturing</li> <li><b>Category 11*</b>: Energy conservation with VOC recovery equipment, among others * Emissions from the use of products sold</li> </ul>	109% increase (4.84 million tonnes)
Environmental investment		<ul style="list-style-type: none"> <li>Plan: ¥18 billion cumulative for FY2023–2026 (total investment in safety, disaster prevention, and environmental measures)</li> <li>Initiatives: Low carbonization of in-house power generation facilities, introduction of renewable energy equipment, and water damage countermeasures for production and power equipment (such as relocation and raising of facilities)</li> <li>FY2024 performance: Low-carbonization and water damage countermeasures for the in-house thermal power plant at the Iwakuni Production Center, installation of solar power systems at the Inuyama Plant, the Utsunomiya Plant, and the Research Center</li> </ul>		
Internal carbon pricing		<ul style="list-style-type: none"> <li>The internal carbon pricing system was introduced in FY2023 and is still in operation: ¥10,000 per tonne of CO<sub>2</sub></li> <li>Expansion of decision-making on capital investment and investment in development facilities, considering variations in CO<sub>2</sub> emissions</li> </ul>		
Compensation			To enhance the effectiveness of GHG emission reductions, executive compensation incentives linked to reduction performance will be applied starting from the July 2025 compensation period.	
Climate-related opportunities	Indicator: Green ratio of film products (Set as a measure to also address transition risks)	FY2031: 60%	<ul style="list-style-type: none"> <li>Key measures include promotion of material and chemical recycling, development and increased adoption of biomass raw materials, reduction of film thickness, among others</li> </ul>	13%
	Seawater desalination with membranes	FY2031: Equivalent to tap water volume for 10 million people	<ul style="list-style-type: none"> <li>Expansion of sales of membranes for seawater desalination such as RO/FO membranes</li> <li>Development of energy-efficient and high-durability RO/FO membranes, among others</li> <li>Strengthening of production and quality control systems for RO/FO membranes, etc.</li> <li>Enhancement of sales structure through the joint venture TOYOBO MC Corporation</li> </ul>	Tap water volume for 5.2 million people
	Air volume treated by VOC recovery equipment for lithium-ion battery separators*	FY2031: 7 billion Nm <sup>3</sup> per year * Air volume treated by devices that have been sold and are currently in operation	<ul style="list-style-type: none"> <li>Strengthening of sales activities focused on GHG reduction contributions from customers (collaborating with customers)</li> <li>Enhancement of sales structure through the joint venture TOYOBO MC Corporation</li> <li>Strengthening of sales in areas beyond the manufacturing process of separators for EV lithium batteries</li> </ul>	6 billion Nm <sup>3</sup> per year