

Green Transformation (GX)

Overview of GX for Realizing Two Mutually Reinforcing Aspects of Sustainability

Guided by its Group Mission and Group Vision, the Asahi Kasei Group seeks to improve corporate value through optimal business portfolio management. Specifically, this entails achieving sustainable growth of corporate value by contributing to a sustainable society from the perspective of life and living for people around the world, having these two aspects of sustainability be mutually reinforcing rather than advancing independently. To this end, we are promoting GX as a priority theme under our MTP focused on the theme "Be a Trailblazer."

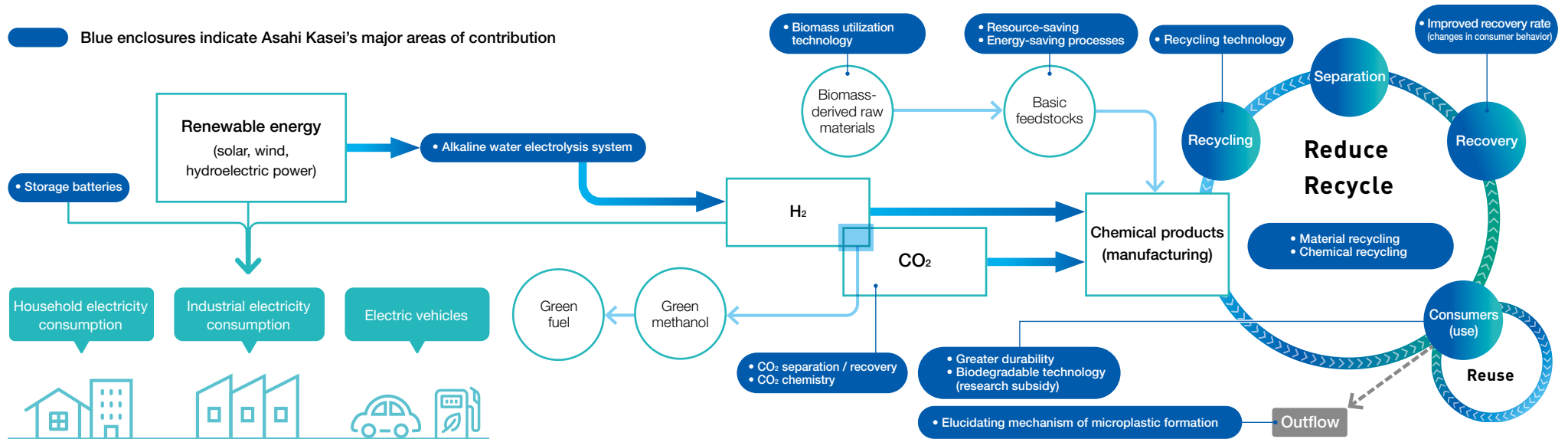
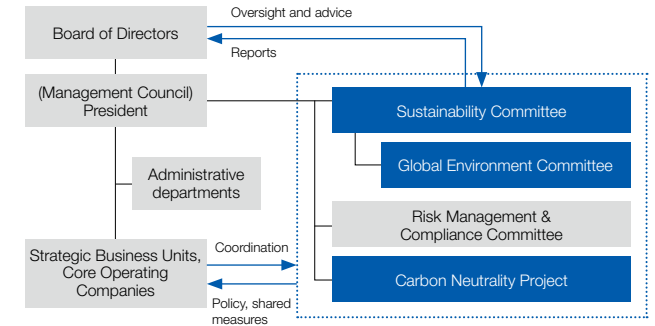
Asahi Kasei understands that issues in relation to climate change have a particularly significant impact on entire social systems. We are therefore promoting initiatives aimed at creating a carbon-neutral society by 2050 while transforming our business portfolio and improving productivity. At the same time, we are steadily reducing our GHG emissions (Scope 1 and Scope 2) and proactively working to reduce GHG emissions throughout our supply chain, including Scope 3.

The Board of Directors deliberates and decides on matters of the highest priority, such as sustainability policy and targets for reducing GHG emissions, and the Management Council does so on individual measures and other efforts.

The Sustainability Committee, chaired by the President, communicates these decisions to the heads of sectors and other bodies to ensure promotion on a group-wide basis. In addition, the Global Environment Committee, a subcommittee of the Sustainability Committee, facilitates promotion at the

business level through discussions focused on the environment by the heads of businesses. The Sustainability Committee reports the results of its discussions to the Board of Directors, receiving advice from it as appropriate.

We are also working on a specific scenario for achieving our GHG emission reduction targets through the Carbon Neutrality Project and creating new businesses focused on realizing carbon neutrality in strategic business units and core operating companies to accelerate our contribution to reducing society's GHG emissions.



Blue enclosures indicate Asahi Kasei's major areas of contribution

Reducing GHG Emissions from Business Activities

Asahi Kasei is reducing GHG emissions in its business activities to address climate risks. Under the MTP, we are working on reductions primarily through our established technologies, positioning the period up to 2030 as a first step in the road map to achieve carbon neutrality by 2050. In fiscal 2023, we are working on reducing GHG emissions using two approaches: group-wide activities to achieve carbon neutrality, and activities by individual product, such as calculating the carbon footprint of products (CFP).

Progress Toward Achieving Our Targets

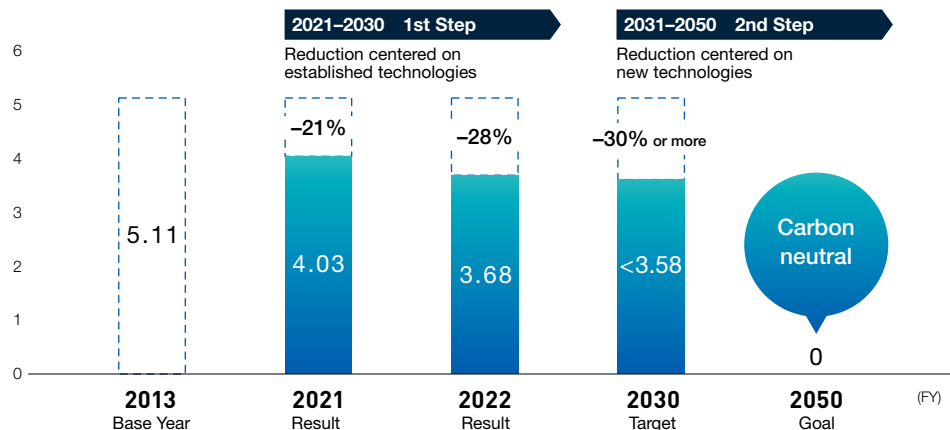
For Scope 1 (direct GHG emissions) and Scope 2 (indirect GHG emissions from the use of electricity, heat, and steam supplied by other companies), we have adopted targets to reduce GHG emissions by 30% or more by 2030 compared with fiscal 2013 and achieve carbon neutrality (net-zero emissions) by 2050.

In fiscal 2021, our GHG emissions were 21% lower than in fiscal 2013, and in fiscal 2022 they were 28% lower owing to measures including the low-carbonization of energy. We established a Carbon Neutrality Project in fiscal 2022 to strengthen initiatives for reducing group-wide GHG emissions. Under the guidance of the responsible Executive Officer, the project examines specific emission reduction measures and scenarios for achieving the 2030 and 2050 targets. The project will continue to examine measures and scenarios and proactively promote initiatives to achieve the targets.

Targets and results

GHG emissions (Scopes 1 and 2)

(Million tons CO₂ equivalent)



Note: Preliminary figures shown for fiscal 2022; subject to revision as a result of third-party verification.

Activities for Achieving Carbon Neutrality

Achieving carbon neutrality by 2050 is a major challenge for the Asahi Kasei Group. We recognize that fundamental technological innovation, business model change, and other large-scale endeavors, as well as steady energy-saving activities and continued efforts to reduce GHG emissions, are integral to achieving carbon neutrality.

In fiscal 2023, we are continuing to identify every possible reduction measure, examining specific measures and reduction scenarios from a variety of perspectives, such as the low-carbonization and decarbonization of energy, and improved efficiency and innovation of production processes. We are also considering structural transformation of petrochemical chain-related businesses that takes into account investments and costs for achieving carbon neutrality going forward.


Investment framework for CVC focused on the environment

The Asahi Kasei Group performs corporate venture capital (CVC) activity to acquire innovative technologies and create new businesses. In April 2023 we established a “Care for Earth” investment framework with up to \$100 million allocated over the five-year period to fiscal 2027 targeting early-stage startups working to solve issues in the field of the environment.

Systematizing calculations of the carbon footprint of products

Asahi Kasei works to calculate CFP as an approach to address customer needs and achieve carbon neutrality. With more than half of the business units in the Material sector already conducting calculations, our efforts to calculate CFP are proceeding steadily. In fiscal 2023, we will promote further calculations using a newly developed group-standard CFP calculation system, which we also plan to use in considering GHG emission reduction measures.

Contributing to Reductions in Society's GHG Emissions

The Asahi Kasei Group believes that its diverse technologies and businesses have the potential to contribute to reduced GHG emissions in society. Viewing this potential as a business opportunity, we focus on developing products that contribute to GHG emission reductions throughout the value chain. Designating products certified internally for their contribution to improving the environment or reducing the impact on the environment across the entire life cycle of the product or service as **Environmental Contribution Products** , we have established targets and work to balance business growth with environmental contribution. Meanwhile, most GG10 businesses will create business opportunities through both climate change adaptation and mitigation. We have therefore decided to focus our allocation of resources on GG10, including investment of approximately ¥600 billion over the three-year period from fiscal 2022 to fiscal 2024.

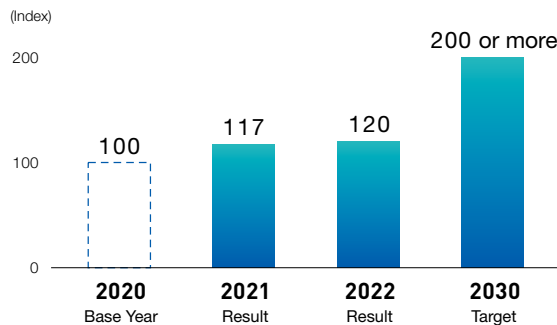
Progress Toward Achieving Our Targets

Regarding Environmental Contribution Products which we internally certify, we have fiscal 2030 targets of at least doubling the volume of their contributions to GHG emission reduction from the fiscal 2020 level, and increasing the proportion of their sales relative to our total net sales excluding the Health Care sector.

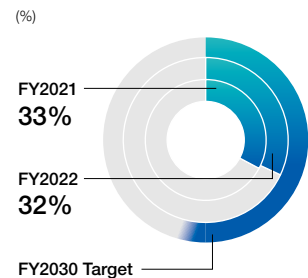
A total of 23 products have been certified as Environmental Contribution Products as of fiscal 2023, and their contribution to reduced GHG emissions rose to 1.2 times the fiscal 2020 level, and their sales were 32% of the total. In certifying Environmental Contribution Products, we confirm the rationality by receiving advice from outside experts on the method of calculating environmental contribution and on the suitability of our approach.

Targets and results

GHG reduction by Environmental Contribution Products



Sales proportion of Environmental Contribution Products

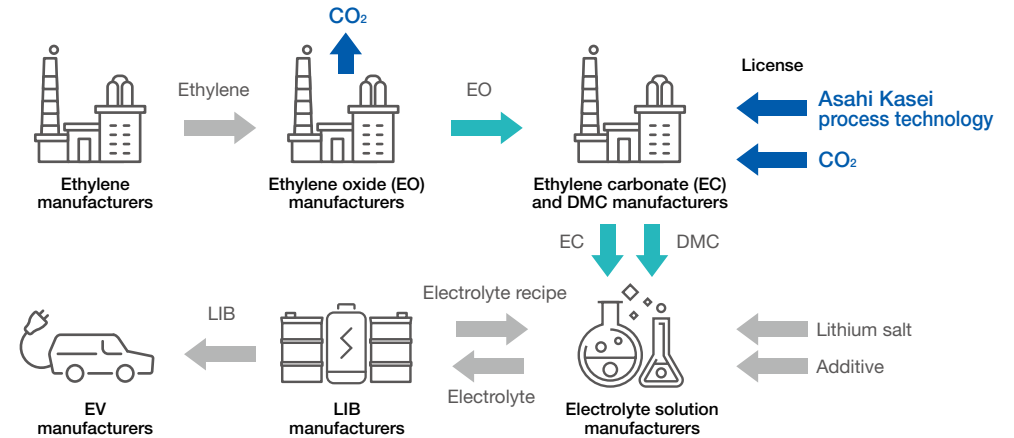


Note: Percentage of total net sales excluding the Health Care sector

Examples of Environmental Contribution Products

Process for manufacturing dimethyl carbonate using CO₂ as feedstock

Demand for dimethyl carbonate (DMC) is increasing sharply as a feedstock for polycarbonate and as a component of lithium-ion battery (LIB) electrolyte. Asahi Kasei licenses technology for a process to manufacture DMC using CO₂ for half of the feedstock. This not only utilizes CO₂ that would be released into the atmosphere from other plants, it further reduce CO₂ emissions by also being an energy-saving process.



UVC LEDs

UVC LEDs are small devices that sterilize water, air, and surfaces by emitting ultraviolet (UV) light that deactivates viruses and bacteria. UVC LEDs have been incorporated into a wide range of products, including water purification systems, medical devices, and air purifiers.

Unlike mercury lamps (UV lamps) which have been used in UV disinfection, UVC LEDs contribute to energy-saving as they emit the necessary light as soon as they are switched on. Another advantage of UVC LEDs is that they do not use mercury, which is an environmentally harmful substance.



Building a Circular Economy

The Asahi Kasei Group regards transitioning to a circular economy as a priority for creating a sustainable society from perspectives including sustainable use of finite resources, reduction of GHG emissions, and mitigation of the impact on the global environment and ecosystem caused by product disposal.

Accordingly, we develop technology and promote businesses in relation to recycling used plastics, using biomass materials, extending the service life of products, enhancing recyclability, and other environmental benefits.

Working to Achieve the Practical Application of Biomass Feedstock

The Asahi Kasei Group is developing technology to create basic feedstocks, such as ethylene and propylene, from bioethanol. Creating multiple basic feedstocks at a similar rate to when a traditional petrochemical feedstock (naphtha) is used, this technology enables the use of existing petrochemical complexes and manufacturing processes while reducing GHG emissions in the manufacturing process. Although there are many issues to be addressed before it can be commercialized, we are focusing efforts on developing this technology in light of its potential to make sustainable, through the use of biomass-based feedstocks, a variety of chemical products in people's daily lives.

In fiscal 2022, we obtained ISCC PLUS certification—a global system operated by International Sustainability and Carbon Certification (ISCC) to certify sustainable products—for several products as part of our efforts to promote the expansion of products using biomass feedstocks. ISCC PLUS is a certification system that tracks and ensures that biomass-based and renewable feedstocks and products are sustainable and deforestation-free in supply chains. Under this system, a third-party institution verifies and certifies that biomass and recycled feedstocks are managed properly using the mass balance approach¹ across the supply chain, including product manufacturing.

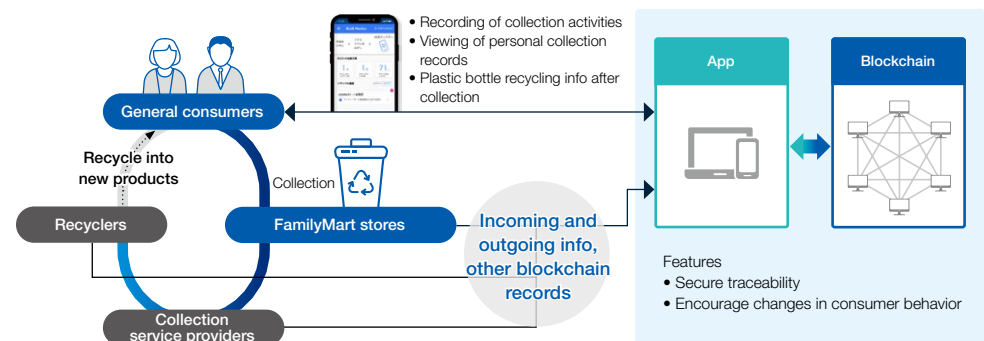
¹ A control method attributing biomass-based feedstock characteristics to a portion of the production volume of a product according to the ratio of such feedstock introduced when blending biomass-based feedstocks and petrochemical-based feedstocks to manufacture a product.

Recycling plastic as a resource

With the aim of achieving practical implementation at an early stage, PS Japan Corporation, an Asahi Kasei Group company, has entered the final planning phase to verify the chemical recycling of post-use polystyrene back to styrene monomer by thermal decomposition.

At the same time, Asahi Kasei has promoted the development of recycling technology for post-use polyethylene in cooperation with parties involved in the supply chain—including consumer goods manufacturers, molded parts manufacturers, and recycling operators—and universities. However, society-wide efforts, including by consumers, are crucial to ensuring that post-use plastics are utilized as a resource instead of discarded. To this end, the Asahi Kasei Group is developing a platform visualizing the resource loop of recycled plastics to promote consumer understanding and change behavior by displaying the ratio of recycled content in recycled plastic products and to visualize the companies involved in the recycling

chain. In September 2022, in partnership with FamilyMart Co., Ltd., ITOCHU Corporation, and ITOCHU Plastics Inc., we conducted a demonstration trial of a service utilizing a bin for collecting post-use plastic bottles at a FamilyMart store in Tokyo. The service allowed consumers using a smartphone app to track the process of plastic bottles from collection to final recycled material. Going forward, we will make use of the platform to promote further resource recycling of plastics.



Biodiversity

The Asahi Kasei Group maintains a policy of mitigating its impact on biodiversity in its business activities and endeavoring to make sustainable use of natural resources.

In April 2022, we joined the 30by30 Alliance for Biodiversity, a coalition established by government agencies including the Ministry of the Environment, companies, non-profit organizations, and other bodies, to preserve biodiversity. As part of these efforts, we are advancing preparations to apply for the Asahi Woods of Life, where we have conducted activities and research aimed at preserving biodiversity since 2007, to be recognized as an OECM² area.

² Abbreviation for "other effective area-based conservative measures" applicable to areas, other than protected areas such as national parks, that contribute to the preservation of biodiversity.




Disclosure Based on the TCFD¹ Recommendations


Awareness of Climate Change

The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report, published in March 2023, stated that the world will not achieve the Paris Agreement target of limiting temperature rises to 1.5°C compared with pre-industrial revolution levels during the 21st century, even if every country meets its GHG emission reduction targets. In addition, the G7 Ministers' Meeting on Climate, Energy and Environment, held in April 2023, emphasized the steadfast commitment of G7 countries to taking immediate, short-term, and medium-term actions over the coming critical decade. As the sense of urgency regarding continuous global warming increases throughout the world, the Asahi Kasei Group recognizes that government policies and initiatives for adapting to and mitigating global warming are accelerating.

Our Stance

Over the century since its founding, the Asahi Kasei Group has tackled social issues that change with the times, promoting its business activities while continuously transforming itself. In a major transitional period, when climate change is an issue for the entire social system, we conduct initiatives for achieving a carbon neutral society by 2050 while transforming our business portfolio and raising productivity through our [MTP](#) . We are also steadily reducing our own GHG emissions (Scope 1 and Scope 2) and working to reduce GHG emissions throughout our supply chain, including Scope 3.

Corporate Governance

The Asahi Kasei Group works to achieve Green Transformation (GX), which is regarded as an important management task and positioned as one of the core themes of management strategy (please see [page 57](#)  for a diagram and details on GX).

Strategy

Basis of analysis

We examined the impact on our current businesses and the new opportunities leading up to 2050 based on a +1.5°C scenario in which CO₂ emissions have been significantly curbed in order to rein in temperature rises (WEO, Net Zero Emissions by 2050 Scenario (NZE)²) and a +4°C scenario in which global warming countermeasures have not adequately progressed (IPCC, SSP3-7.0³).

Note: Our analysis is based on a variety of assumptions. Changes to these assumptions may result in actual risks and opportunities differing significantly from the analysis.

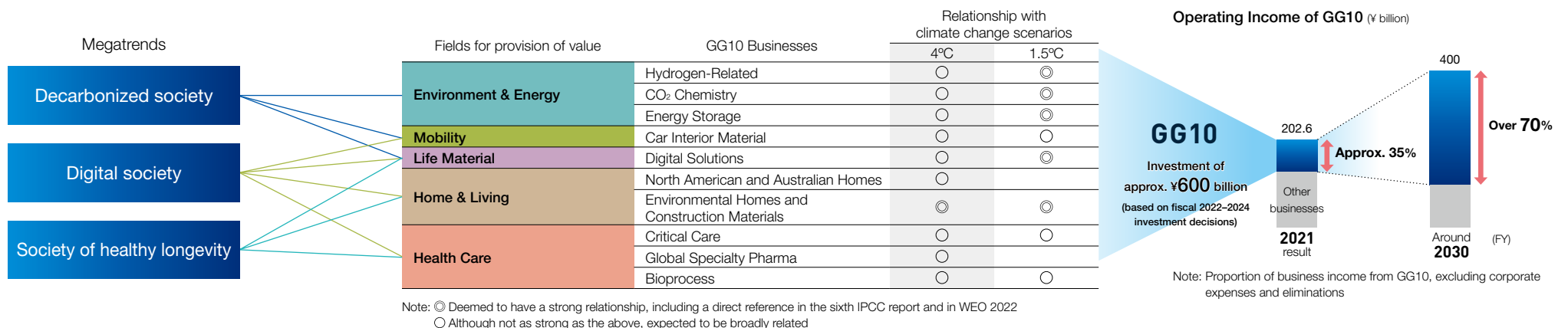
Opportunities

The Asahi Kasei Group transforms its business portfolio with a view to the transition to a carbon neutral society and other megatrends. Specifically, our MTP established “10 Growth Gears” (GG10) that are growth-driving businesses in which we will focus investments. Over the three years of the plan, we will target investments in GG10 of approximately ¥600 billion. The plan also set targets of at least doubling the volume of GHG emission reduction contributions from [Environmental Contribution Products](#)  (products and services that contribute to a reduction in GHG emissions in society) by 2030 compared with fiscal 2020 while increasing their sales ratio. We believe that the direction of our business promotion can provide various products and services as business opportunities for mitigating and adapting to climate change.

¹ TCFD: Task Force on Climate-related Financial Disclosures. The TCFD was established and its recommendations were officially announced by the Financial Services Board in 2017.

² One of the scenarios in World Energy Outlook (WEO) 2022, prepared by the International Energy Agency (IEA). NZE is a scenario for achieving global net-zero emissions by 2050 in order to limit temperature rises to 1.5°C by 2100.

³ A scenario outlined in the IPCC Sixth Assessment Report. The Shared Socio-economic Pathway (SSP) 3-7.0 assumes a scenario whereby measures to address climate change are not adopted and temperatures rise 4°C in 2100 under development marked by regional rivalries.



Opportunities	Important Changes	Main Opportunities	Major Initiatives
+1.5°C scenario	Transition to a carbon neutral society	<ul style="list-style-type: none"> Promotion of the spread of ZEH¹ and ZEH-M¹ through government policies Expansion of demand for renewable energy Increase in need for energy saving Expansion in demand for carbon-free products 	<ul style="list-style-type: none"> Decarbonization of homes and urban environments through the expansion of ZEH-compliant Hebel Haus™ and Hebel Maison™ Transition to carbon neutral energy Chemicals made with CO₂ as material Promotion of carbon neutrality and improvement of product competitiveness through measurement of carbon footprints² Energy saving and process innovation Expanded use of biomass-based raw materials Expansion of Environmental Contribution Products
	Spread of electric vehicles (EVs)	<ul style="list-style-type: none"> Increase in EV-related demand (battery components, materials for reducing vehicle weight) 	<ul style="list-style-type: none"> Development of materials for next-generation mobility Strengthening of collaboration with automobile and battery manufacturers
	Advent of a hydrogen society	<ul style="list-style-type: none"> Increase in demand for water electrolysis using renewable energy 	<ul style="list-style-type: none"> Development of system to manufacture green hydrogen and promotion of its commercialization
	Transition to a circular economy	<ul style="list-style-type: none"> Expansion in demand for materials and infrastructure compatible with a circular economy 	<ul style="list-style-type: none"> Development of material and chemical recycling technologies and promotion of their practical application Adoption of biomass feedstock Provision of long-life homes
	Expansion of the digital market	<ul style="list-style-type: none"> Growth in demand for decarbonization-related digital solutions (industry and society) 	<ul style="list-style-type: none"> Promotion of electronic components, such as current sensors and CO₂ sensors, and semiconductor- and substrate-related electronic materials businesses
+4°C scenario	Serious storm and flood damage	<ul style="list-style-type: none"> Increase in need for disaster-resilient housing 	<ul style="list-style-type: none"> Greater emphasis on resilience in home construction and urban development, such as expansion of Hebel Haus™ and Hebel Maison™
	Rise in temperature	<ul style="list-style-type: none"> Increase in need for insulation performance 	<ul style="list-style-type: none"> Provision of insulation material and homes with superior insulation performance
	Increase in heatstroke and infectious diseases	<ul style="list-style-type: none"> Expansion in demand for existing and new pharmaceuticals and acute critical care products 	<ul style="list-style-type: none"> Provision of related pharmaceuticals and medical devices

Risks

Under the +1.5°C scenario, in addition to tightened regulations through carbon pricing and other government policies primarily aimed at achieving decarbonization, we anticipate a shift in demand to materials suitable for decarbonization as a risk. We also anticipate market structure changes resulting from an acceleration in the transition to a circular economy and the emergence of innovative technologies designed to create a decarbonized society as risks.

Under the +4°C scenario, we primarily anticipate physical risks, such as intense heat, heavy rain, and flooding. In particular, we perceive damage to production sites caused by the effects of increasingly severe storms and floods and the resultant cost of such damage to be a risk for our major sites in Japan and overseas.

While the degree of these risks varies, we are advancing risk mitigation initiatives based on the view that all may manifest as the climate changes going forward.

Risks	Important Changes	Main Risks	Major Initiatives
+1.5°C scenario	Transition to a carbon neutral society	<ul style="list-style-type: none"> Rise in costs due to stricter regulations (manufacturing and raw material costs) Estimate: Current GHG emissions (Scope 1 and Scope 2) × Carbon costs = Increase of approx. ¥55 billion per year³ Changes in materials needs (decarbonization requirements, necessary specifications) 	<ul style="list-style-type: none"> Expansion in utilization of renewable energy, etc. More efficient energy use; development and commercialization of industrial processes for decarbonization Expanded use of biomass raw materials Acceleration of product decarbonization by ascertaining carbon footprint Revision of management resource allocation (including business portfolio transformation)
	Changes in market structure	<ul style="list-style-type: none"> Contraction of existing markets due to the transition to a circular economy Contraction of existing markets due to the advance of replacement technologies 	<ul style="list-style-type: none"> Development of material and chemical recycling technologies and promotion of their practical application Adoption of biomass feedstock Revision of management resource allocation (including business portfolio transformation)
+4°C scenario	Serious storm and flood damage	<ul style="list-style-type: none"> "Physical" production risks Impact on production from damage to plants or suppliers 	<ul style="list-style-type: none"> Continuous revision of BCP and reinforcement of preemptive response (review of inventory levels, study of multiple suppliers/sites, etc.)
	Rise in temperature	<ul style="list-style-type: none"> "Human" production risks Deterioration of working environment and productivity at construction sites 	<ul style="list-style-type: none"> Promotion of heatstroke countermeasures at construction sites Promotion of industrialization and utilization of IT in housing construction

¹ Net Zero Energy House (ZEH) and Net Zero Energy House Mansion (ZEH-M): Houses and apartment buildings with a net energy consumption of zero or less through advanced insulation and energy saving combined with power generation such as solar

² GHG emissions of a product from material extraction to production

³ In fiscal 2022, the Group's GHG emissions (Scope 1 and Scope 2) came to 3.68 million t-CO₂e (preliminary figure). Referencing the 2030 CO₂ price level and other criteria in WEO2022's NZE scenario, we expect a rise in costs of approximately ¥55 billion per year in the case of carbon costs of ¥15,000 per ton of CO₂ emissions.

Risk Management

The Asahi Kasei Group prioritizes the management of climate change risks, which it positions as one of its Material Group Risks.

The Asahi Kasei Group implements independently assured tracking of its GHG emissions on an annual basis. The Sustainability Committee and its subcommittee, the Global Environment Committee, share information on the tracking results and the level of progress toward achieving targets, and discuss and verify future initiatives.

The committees also verify initiatives and other efforts for reducing GHG emissions during the formulation and annual review of the MTP, linking the results to business strategies and measures. In addition, the committees monitor related matters on a quarterly and monthly basis.

For capital expenditures, we assess profitability and make decisions in light of internal carbon pricing. In July 2023, we raised our internal carbon price per ton of CO₂ emissions from ¥10,000 to ¥15,000 in order to promote further action for achieving carbon neutrality.

Metrics and Targets

The Asahi Kasei Group has positioned the following metrics as being relevant to climate change risks and opportunities.

	Target	Significance of Metric
GHG emissions*	2030: Reduce by 30% or more (compared with fiscal 2013) 2050: Achieve carbon neutrality	
GHG emissions*/operating income	(Fiscal 2022 result: 2,900 t-CO ₂ e/100 million yen)	Decline signifies reduction of carbon tax risk
ROIC	Around 2030: Achieve ROIC of 10% or more (Fiscal 2022: 4.0%)	Increase indicates progress toward becoming high earnings enterprise capable of adapting to change
Operating income of GG10	Around 2030: 70% or more of total operating income (Fiscal 2021: 35%)	Signifies growth of related businesses capable of contributing to addressing climate change

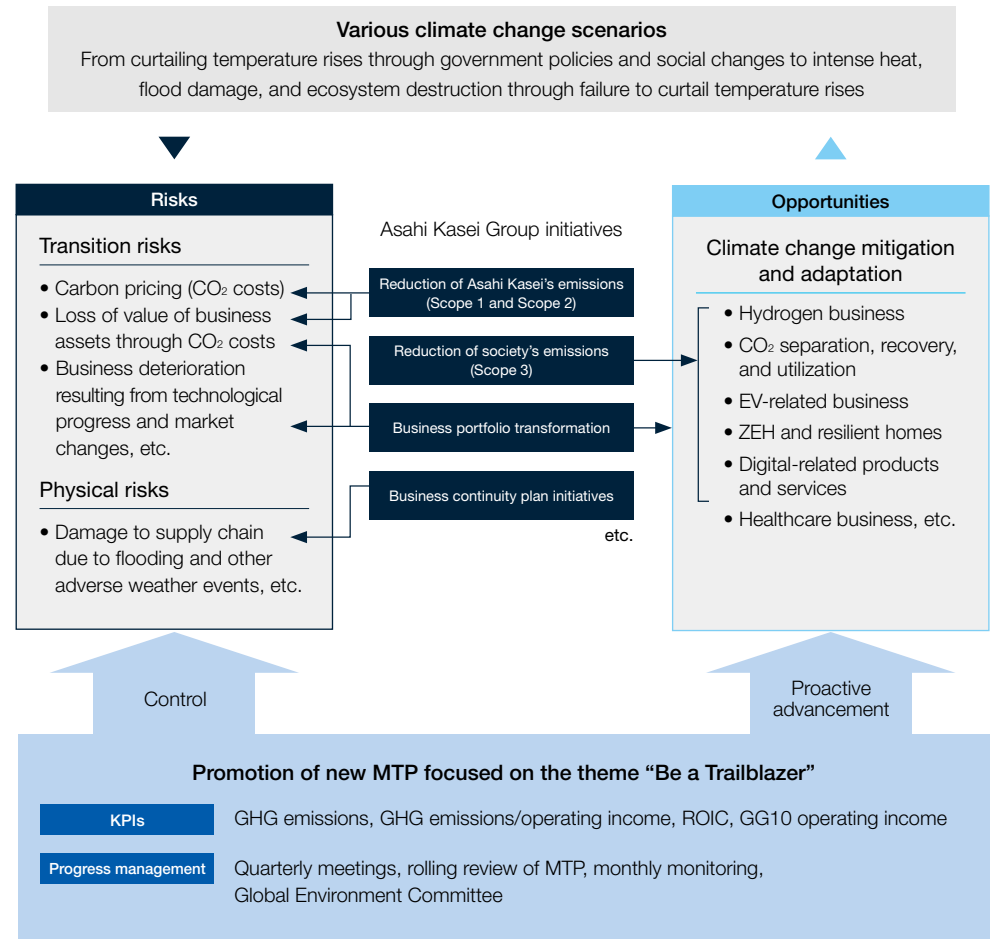
Others

Internal carbon pricing (ICP)	Make investment decisions based on ¥15,000/t-CO ₂ e and utilize in awards program
Reflection of climate change issues in executive remuneration	Reflect the level of achievement of sustainability promotion, including initiatives related to climate change, in performance-linked remuneration

Global greenhouse gas emissions by segment (ESG data) [▶](#)

* Direct GHG emissions from business activities as indicated by Scope 1 (direct GHG emissions) and Scope 2 (indirect GHG emissions from use of electricity, heat, and steam supplied by other companies)

Overview of the Asahi Kasei Group's Response to Climate Change



For more details, please see ["Disclosure based on TCFD Recommendations."](#) [▶](#)