Environmental Report 2020





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Environmental Strategy

About this Environmental Report

Editorial Policy

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The Kirin Group consists of its Japan Beer and Spirits Businesses, Japan Non-alcoholic Beverages Businesses, Oceania Integrated Beverages Business, Pharmaceuticals Businesses and Other Businesses and operates primarily in Japan, Oceania, and Asia. Approximately 65% of net sales are attributable to the Japan Beer and Spirits Businesses, Japan Non-alcoholic Beverages Businesses, and Oceania Integrated Beverages Business.

Initiatives to address the environmental issues are positioned as one key issues of CSV (the creation of value that can be shared with society), which is the core of our management strategy for the realization of sustainable growth.

The editing of this report has taken into account the characteristics of the Kirin Group's business and the positioning of its environmental approaches.

Structure of Corporate Information Disclosure

Information on the corporate activities of the Kirin Group, including this Report, discloses a diverse range of information in the interests of shareholders and investors, as well as the interests of a wide range of stakeholders in our local communities, including our customers.

Kirin Holdings CSV Website https://www.kirinholdings.co.jp/ english/csv/

Kirin Holdings Investor **Relations Information** https://www.kirinholdings.co.jp/ english/ir/library/

Kirin Group Environmental Report https://www.kirinholdings.co.jp/ english/csv/report/env/

KIRIN CSV REPORT (Integrated Report) https://www.kirinholdings.co.jp/ english/ir/library/integrated/





KYOWA KIRIN Annual Report https://ir.kyowakirin.com/en/

Reporting Period

FY2019 (January-December 2019)

Where necessary, this report also contains historical data showing trends for the past 3 to 5 years.

Organizations Covered by this Report (FY2019)

Business	Company	
Japan Beer and Spirits Businesses	Kirin Brewery, Kirin Distillery, SPRING VALLEY BREWERY, Eishogen Kirin Brewery (Zhuhai)	
Japan Non- alcoholic Beverages Businesses	Kirin Beverage, Shinshu Beverage, Kirin Beverage Value Vendor Hokkaido Kirin Beverage, Kirin Maintenance Service, KIRIN Tropicana each site of Kirin Beverage Service (Hokkaido, Sendai, Tokyo, Tokai, Chubu, Kansai) Hakodate Daiichi Vending, KIRINVIVAX, Tokai Beverage Service	
Oceania Integrated Beverages Business	Lion	
Pharmaceuticals Businesses	Kyowa Kirin, Kyowa Kirin Frontier, Kyowa Medical Promotion, Kyowa Kirin plus, Kyowa Hakko Kirin China Pharmaceutical, Kyowa Kirin Pharmaceutical Research	
Other Businesses (all companies included)	Mercian, NIPPON LIQUOR, Daiichi Alcohol, Wine Curation, Myanmar Brewery Interfood, Vietnam Kirin Beverage, AZUMA KIRIN, Four Roses Distillery Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, KYOWA Engineering , BioKyowa, Shanghai Kyowa Amino Acid, Thai Kyowa Biotechnologies, Kirin Holdings, Kirin Business Expert, KIRIN BUSINESS SYSTEM, KOIWAI DAIRY PRODUCTS, Kirin Echo, Kirin and Communications, Kirin Engineering Kirin City, Kirin Techno-System, KIRIN GROUP LOGISTICS	

Calculation Method of Environmental Data

About Calculation Method of Environmental Data $(\rightarrow P.90 \sim P.92)$

Reference Guidelines

- **GRI** Standards
- Ministry of the Environment, Government of Japan's Environmental Reporting Guidelines (FY2018 version)
- Recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD Recommendations) (June 2017)
- CDSB framework v2.2 (December 2019)
- SASB Standards (October 2018 version) Food & Beverage Sector/Alcoholic Beverages Industry and Non-Alcoholic Beverages Industry (→P.104~P.110)

Forward-looking statements in this report, including forecasts, targets, and plans, are based on the current assessments by management at the time of preparation of the report. They contain inherent uncertainty that the outcomes will differ from the statements in this report due to changes in a variety of factors. Statements about risks and opportunities are also included in the report from the perspective of proactive information disclosure, even if they do not necessarily constitute risk factors that would have a material impact on investor decisions. The Kirin Group will, upon identification and acknowledgment of various risks associated with its business, strive to strengthen its risk management structure and to prevent and mitigate those risks, and will make its best efforts to respond to risks that become apparent.

Based on the Kirin Group's Environmental Vision 2050, we will create a positive impact on society as a whole

Since Japan entered its new era Reiwa, the world has been hit by increasingly uncertain situations, including serious typhoon damage in Japan, bushfires in Australia, and the outbreak of the novel coronavirus (COVID-19). In this age of ambiguity and uncertainty, I believe it is all the more important to manage the entire group with a solid axis that will not become blurred or lost. What serves as our solid axis is CSV management, which we have been working on since 2013. In the beginning of this fiscal year, the progress and achievement status of CSV commitment was added as a non-financial target on top of financial targets to the evaluation items for executives' remuneration to further promote CSV management throughout the organization. In the area of environmental issues, efforts are underway on a global basis, including the launch of multiple international initiatives such as the Task Force on Climate-related Financial Disclosures (TCFD) after the Paris Agreement and marine plastic pollution now being discussed as a global problem. Furthermore, measures taken by companies to address environmental issues are evolving from initiatives that can be completed in-house to those that are undertaken with external stakeholders. Against this backdrop, the Kirin Group has revised its environmental vision and formulated a new long-term strategy, the Kirin Group's Environmental Vision 2050, with the aim of enhancing the resilience of society and the company. Based on this vision, we will not only reduce the negative impact that occurs at our operating sites but also create a positive impact on society as a whole. By doing so, we hope to work together with the young generations who will inherit the world and other members of society to create a prosperous world for future generations. The Kirin Group will leverage its strengths in fermentation technology and biotechnology, as well as in crafting and engineering, to contribute to solutions to social issues associated with the environment, food and well-being, and local communities.

Corporate philosophy	KIRIN brings joy to society by crafting food and healthcare products inspired by the blessings of nature and the insights of our customers.			
2027 vision	A global leader in CSV, creating value across Food & Beverages to Pharmaceuticals			
Outcomes	Create economic value (Financial targets) Create social value (Non - financial targets)			
	Value creation with Society	Value creation with Consumers		
Strategy	Organizational capabiliti	es for innovation		
Tanework	Consumer centric marketing	Technology creating trusted value		
	Diversity and Inclusion, Culture for innovation	ICT accelerating value creation		
Values "One Kirin" Values	"Passion, Integrity, Diversit	у"		

Isozaki

Corporate Philosophy

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KIRIN brings joy to society by crafting food and healthcare products inspired by the blessings of nature and the insights of our customers.

2027 Vision

A global leader in CSV, creating value across our world of Food & Beverages to Pharmaceuticals

"One KIRIN" Values

Integrity Diversity Passion

Yoshinori **Kirin Holdings** President and CEO Company, Limited

Corporate Data



Segment	Food & Beverages	Pharma- ceuticals	Health science	Company
Japan Beer and Spirits Businesses	•			Kirin Brewery
Japan Beer and Spirits Businesses	•			Kirin Beverage
Oceania Integrated Beverages Businesses	•			Lion
Pharmaceuticals Businesses		•		Kyowa Kirin
Other Businesses	•		•	Mercian Myanmar Brewery Kyowa Hakko Bio Other

Company overview

Trade Name Date of Incorporation	Kirin Holdings Company, Limited February 23, 1907 *The Kirin Group adopted International Financial Reporting Standards (IFRS) in December 2017. For details, please refer to the Financial and Non-Financial Highlights of KIRIN REPORT 2018.
Head Office	NAKANO CENTRAL PARK SOUTH 10-2, Nakano 4-chome, Nakano-ku, Tokyo 164-0001, Japan +81-3-6837-7000 [Information Desk]
Paid-in Capital	102,045,793,357 yen
Number of Employees	31,040employees on a consolidated basis (as of December 31, 2019)

Capital efficiency indicator





*Figures up until FY2018 have been retroactively adjusted to reflect changes toaccounting policies in FY2019



Environmental Strategy

Indicators and Goals

Activity

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We will solve environmental issues beyond our own value chains

In 2020, the spread of COVID-19 has significantly affected economic activities, causing Japan to declare a state of emergency and many overseas countries to take lockdown measures. Meanwhile, when we see a reduction in greenhouse gas emissions, which was said to be an urgent issue but could not necessarily be tackled by the world in a unified manner, and clear blue skies returning to major cities around the world, many of us may feel that this is like a message from nature. The IPCC Special Report on Global Warming of 1.5°C indicates that global warming is already progressing considerably and that the negative impact will be enormous if countermeasures are not taken. The scenario analysis conducted by the Kirin Group also revealed a potential significant impact on agricultural products and water resources, which are important

On the other hand, our scenario analysis also indicates that reinforcing measures to mitigate and adapt to climate change leads to the possibility of reducing negative impacts and embracing business opportunities.

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raw materials.

Our new Kirin Group's Environmental Vision 2050 established this year is a long-term strategy aimed at strengthening the resilience of society and the company under these circumstances. The most important message is "positive impact." We will not only eliminate negative impacts but also create positive impacts on society beyond our own value chains and work together with the young generations to solve environmental issues.

In 2019, the Kirin Group received a great deal of recognition for its initiatives, such as receiving the Gold Award (Minister of the Environment Award) in the ESG Finance Awards Japan. We will live up to this honor without being complacent about it and continue to demonstrate leadership in CSV management to balance the conservation of the natural environment and the sustainable growth of our business.

In Australia, our Group company Lion acquired carbon neutral certification this year and has set a target of using 100% renewable electricity for its operation by 2025. The Kirin Group as a whole aims to achieve carbon net zero throughout its value chains by 2050 and will work to promptly respond to achieve RE100 and SBT 1.5°C. In June of this year, we also agreed to and signed the *Business Ambition for 1.5°C* commitment and supports the statement Uniting Business and Governments to Recover Better. We will make containers and packaging 100% sustainable by using recycled materials and biomass by the end of 2050. In the area of biological resources, we will extend our support for acquiring Rainforest Alliance certification also to coffee plantations in Vietnam. The Kirin Group's symbol KIRIN is a mythical creature that protects nature by not stepping on insects or breaking grass. We will continue to take on the challenge of preserving our rich natural environment for future generations, just like the KIRIN does.



Senior Executive Officer at Kirin Holdings Co.. Ltd. (Head of CSV Strategy, Group Environment Manager)

Value Creation Model



https://www.kirinholdings.co.jp/irinfo/library/integrated/

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Global Trends and Kirin's Actions

Using the blessings of nature as ingredients to deliver its products to customers, the Kirin Group has been proactively addressing environmental concerns and needs from society. In 1997, the year of the Kyoto Summit, Kirin Brewery Kobe Plant was completed as a low-carbon model brewery, and it has achieved the highest level of water conservation in the industry. In 1999, we became the first company in the Japanese beverage industry to launch Water Source Forestation Activities, tree planting projects to protect the forests that nourish abundant water, one of our essential raw materials.

In 2013, we formulated our long-term strategy, the Kirin Group's Long-Term Environmental Vision, and set the then leading-edge target - "Realization of a society that is based on 100% resource circulation" - that we will achieve by 2050. We have since been accelerating our efforts in carrying out the initiatives set under the four material issues: Biological resources, water resources, containers and packaging, and global warming.

Specifically, we have been supporting tea farms in obtaining sustainable certification, adopting 100% FSC®-certified paper for paper containers, and using containers made of 100% recycled PET resin. In addition, we actively participate in international initiatives and lead the industry, such as becoming the first Japanese food company to set targets for reducing greenhouse gas emissions approved by the Science Based Targets initiative (SBTi) and to express our support for the Task Force on Climate-related Financial Disclosures (TCFD) recommendations.

Further, the Kirin Group has formulated the Kirin Group

Vision 2027 (KV2027), which is a long-term management concept started in 2019, with the aim of becoming "a global leader in CSV, creating value in domains ranging from food & beverages to pharmaceuticals" by 2027. As a long-term nonfinancial target of KV2027, we have established the "CSV Purpose," guidelines to co-create value with society and achieve sustainable growth, and set the environment as one of our four priority themes. "Kirin Group's management issues for sustainable growth (Group Materiality Matrix)" selects priority themes. We have established CSV Commitment as a medium to long term action plan for our individual businesses in order to realize the CSV Purpose and, by linking it with our business strategy, we are creating social value as a Group and driving our efforts to attaining the economic values of strengthening competitiveness and business growth.



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Governance and Risk Management

Determination of Materiality

The Kirin Group has been working to realize its Long-Term Environmental Vision by addressing a number of issues and achieving results. However, the global trends surrounding the environment are significantly changing after the Paris Agreement. The Special Report on Global Warming of 1.5° C released by the Intergovernmental Panel on Climate Change (IPCC) two years ago pointed out the seriousness of a temperature increase of 2.0° C and the importance of keeping the rise below 1.5° C.

The impact of climate change is already becoming a reality. In Japan, the 2018 West Japan Torrential Rain Disaster (the Heavy Rain Event of July 2018) caused serious damage to a wide range of areas in the region and disrupted our company's distribution network. Typhoon Faxai (Reiwa 1 Boso Peninsula Typhoon) and Typhoon Hagibis (Reiwa 1 East Japan Typhoon) in October 2019 caused serious damage, including power outages that continued in eastern Japan. Also, in Australia, home to our group company Lion, major bushfires broke out after three years of having been affected by severe drought.

The scenario analysis conducted by the Kirin Group in accordance with the TCFD recommendations also revealed significant potential impacts on agricultural products and water resources, which are important ingredients. On the other hand, we are finding that reinforcing measures to mitigate and adapt to climate change leads to the possibility of reducing such impacts and creating unique opportunities.

IPCC Special Report on Global Warming of 1.5° C

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Increase of 1.5°C between 2030 to 2052
 Significant difference in damage between a 1.5°C-rise and a 2.0°C-rise

TCFD scenario analysis

•Climate change has material impacts on agricultural products and water, but there is a certain level of resilience •Material benefits of reinforcing climate change mitigation and adaptation measures

Environmental initiative

Frequent occurrence and intensification of environmental disasters

 West Japan Torrential Rain Disaster (2018), Typhoon Hagibis (2019), Australia forest fires (2019 to 2020), etc.

Apparent physical risks of climate change

Growing seriousness of the problem of plastic waste

 Unilateral increase in accumulated volume of marine plastics
 Stocking of waste PET bottles in Japan due to China's ban on the import of waste plastics, and increasing demands for curbing emissions and promoting recycling

Environmental impact

Review of long-term environmental strategy

Against this backdrop, the Kirin Group determined the need for a new long-term strategy to enhance the resilience of society and the company.

All of the Kirin Group's businesses directly benefit from the bounty of natural capital. For example, drinks are made from agricultural products and water, poured into containers, and delivered to customers. Greenhouse gases (GHG) generated in the process bring about climate change and have a major impact on ingredient agricultural products and water. In order for the Kirin Group to continue its business, which is underpinned by the blessings of nature, it is essential to take measures to protect the environment. Resolving environmental issues not only reduces business risks, but also helps create value for society.

Based on this recognition, the Kirin Group identifies and determines material environmental issues (materiality) and comprehends risks and opportunities.

Identification of relevant issues

STEP1

STEP2

STEP3

STEP4

We examine the circumstances surrounding the Kirin Group and identify relevant issues. In formulating the Environmental Vision 2050, we identified relevant issues by referring to international standards and policies, domestic and international discussions, trends of international initiatives, results of scenario analyses based on recommendations by TCFD, as well as the seriousness of environmental impacts, including natural disasters that have occurred, and opinions obtained through workshops with investors and younger generations.

Confirmation of appropriateness

We reflect diverse dialogue with various stakeholders, including external experts and NGOs, in our internal discussions. In formulating our Environmental Vision 2050, we confirmed the appropriateness of the vision through consultation with experts and stakeholders and holding dialogue with the Group's operating companies and management teams.

Determination of materiality

By holding discussions at the executive management level, we identify risks to and opportunities for businesses and society, assess their materiality and develop action plans that include metrics. In formulating the Environmental Vision 2050, based on the issues identified and information gathered in STEPs 1 and 2, we determined the four most material environmental issues as "biological resources", "water resources", "containers and packaging" and "climate change", and identified relevant risks and opportunities.

Continual review

We continue to consider the need to review material issues, reflecting the constantly changing state of social and environmental issues and the Kirin Group's circumstances. The Environmental Vision 2050 was formulated and resolved by the Board of Directors following an exchange of opinions by the Executive Committee. Going forward, we will integrate our environmental vision with our business strategies and management plans by revising or newly setting the CSV Commitment, our medium-to-long-term action plan. In addition, we will perform periodic reviews to update issues and KPIs that need to be addressed on an ongoing basis.

Kirin Group's Environmental Vision 2050

The Kirin Group has revised its conventional environmental vision and formulated a new long-term strategy, Kirin Group's Environmental Vision 2050, with the aim of enhancing the resilience of society and the company, which was announced in February 2020. Our goal is not only to minimize negative impacts and neutralize them, but also to have a

positive impact on society beyond our own boundaries.

Under this new vision, we will expand our efforts from our value chain to society as a whole and work together with young generations who will inherit the world and other members of society to create a prosperous world for future generations.



Environmental Strategy

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Governance and Risk Management

New initiatives aimed at positive impacts

The most important message in the Kirin Group's Environmental Vision 2050 is "positive impact". The Kirin Group's goal is not only to minimize negative impacts and neutralize, but also to have a positive impact on society beyond our own framework. We aim to solve environmental issues by reaching out beyond the boundaries of the Group and also getting the next generation involved. We believe that this will also enhance the resilience of society and the company.

To this end, we will expand initiatives that had been centered on our business sites and value chains to society and widen our activities from a domestic focus to global deployment. We will also actively participate in global initiatives, such as TCFD and SBT, to lead international cooperation.



Initiatives scheduled from 2020

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Biological	 Support for coffee plantations in Vietnam to
Resources	acquire Rainforest Alliance certification (start in 2020)
Water	 Expansion of water source conservation activities in Sri Lankan tea farms and
Resources	launch of these activities in other raw material production areas
Containers and Packaging	 Lion to start container-collecting service in all states where container recycling law is introduced (by the end of 2020) Working toward 100% sustainable containers and packaging using recycled materials and biomass by 2050
Climate Change	 Lion became Australia's first large-scale carbon neutral brewery (Certified in 2020)) Lion to adopt 100% renewable electricity (by 2025) Kyowa Kirin became the first* in the pharmaceuticals industry to introduce Aqua Premium and achieve 75% renewable power at its Takasaki Plant (already introduced in 2020) RE100 (to join by the end of 2020) Raising GHG target to SBT 1.5°C (to be set by the end of 2020)

* Kirin Brewery's Toride Plant and Kirin Beverage's Shonan Plant introduced in 2017.

Efforts to create positive impacts on nature and people have already begun. As for biological resources, we are expanding our support for acquiring Rainforest Alliance certification, which we have been providing to Sri Lankan tea farms, to coffee plantations in Vietnam. As for water resources, we are considering expanding our water source conservation activities, which we are currently conducting at tea farms in ingredient agricultural production regions, to other regions and countries.

As for containers and packaging, we are aiming to establish a recycling system for PET bottles on a global basis and are developing a concrete roadmap with the aim of achieving 100% sustainable containers and packaging using recycled materials and biomass by 2050. In response to climate change, we will strive in Japan to further reduce energy consumption, shift energy from fossil fuels to electricity, and utilize electricity generated from renewable energy sources. In Australia, we are aiming to achieve 100% renewable electricity by 2025. In addition, we will raise our GHG reduction target to SBT 1.5° C standard, achieve RE100 prior to 2050, and lead to build a decarbonized society.

We will also expand the provision of environmental education and dialogue with the next generation, who are the stakeholders to be affected most by environmental issues. Under this new vision, we will work together with the young generation who will inherit the world and other members of society to create a prosperous world for future generations.

2021.

START BOOK





Supplementary teaching material on SDGs for elementary school students "SDGs Startup"



The Kiwi Pale Ale is New Zealand's first carbon zero certified beer with all emissions.





Kirin School Challenge workshops for junior and senior high school students



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Disclosure based on TCFD recommendations

Based on the recommendations released by the Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board (FSB) in 2017, the Kirin Group assesses the impacts of climate change-related issues on society and businesses, as well as the resilience of its strategies, and has been working to disclose in line with the recommendations in approximately five years. We began disclosures in 2018, and the assessment results of 2019 serve as important input for our Environmental Vision 2050. In December 2018, the Kirin Group became the first Japanese food company to support the recommendations of the TCFD.

Schedule for information disclosure

2018	•Assessment of impacts on agricultural products
2019	 Detailed examination, evaluation and presentation of measures for the impacts on agricultural products Assessment of physical risks in non-agricultural products Management discussions at the Group CSV Committee meetings
2020	 Assessment of financial impact Assessment of resilience in Environmental Vision 2050 Formulation of Environmental Vision 2050 Thorough discussions by management
2021	•Ongoing in-depth examinations •Start of disclosure in the pharmaceuticals businesses •Formal integration into the Management Committee, etc.
2022	 Ongoing in-depth examinations Deployment and disclosure throughout the Group Integration with management strategy

Governance

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To support the proactive, self-driven CSV management by the individual Group companies, the Group CSV Committee meets once a year in principle, with the meeting attended by all executives of Kirin Holdings and the presidents of major operating companies, and discusses climate change-related issues. In 2019, based on the results of the scenario analysis, top management actively discussed the risks and opportunities related to climate change. In response, an environmental strategy project was launched with the director in charge of SCM as the project owner. The Environmental Vision 2050 was discussed and drafted as part of this project, followed by discussions by the Executive Committee and deliberation by the Board of Directors.

(Details on the Kirin Group's management structure→P.75)

Strategy

The Kirin Group formulated the Kirin Group Long-Term Environmental Vision in 2013 as the long-term strategy directed towards 2050 and has been working to realize that vision. However, the global trends surrounding the environment are changing dramatically, including the launch of international initiatives related to climate change after the Paris Agreement and the emergence of the problem of marine pollution caused by plastics. In addition, scenario analyses conducted in 2018 and 2019 have revealed the significant impacts of climate change on agricultural products, such as decline in yields of agricultural products that are important ingredients and increased water stress and risk of flooding in agricultural production regions. At the same time, they have uncovered the possibility of reducing such impacts and capturing opportunities by reinforcing measures to mitigate and adapt to such impacts.

Accordingly, we revised our conventional strategy and established the Environmental Vision 2050, which was announced on February 10, 2020. The vision aims at enhancing the resilience of society and the company and providing positive impacts to society beyond the boundaries of our organization. The Environmental Vision 2050 is positioned as an important agenda item under our CSV Purpose and is incorporated in CSV management.

Details on the Environmental Vision $2050 \rightarrow P.10$
Scenario analysis→P.13~P.17
dentified risks, opportunities and responses \rightarrow P.18 \sim P.19)

Risk management

The Kirin Group facilitates risk management and has established a system to accurately recognize and steadily respond to risks that may seriously impede the accomplishment of business targets or impact business continuity. In particular, we focus on risks associated with new strategies and initiatives, as well as risks associated with significant changes in the external environment. Kirin Group companies, in conformance with the group risk management policy, identify and examine material risks, including those related to climate change. The Administrative Office of the Kirin Group Risk and Compliance Committee, which comprises Kirin Holdings internal directors and executive officers, surveys and investigates these risks. The committee deliberates on risks that have a potentially significant impact and a high likelihood of occurring, and risks common to the Kirin Group, and manages them as material risks for the Group.

On the other hand, when we look at the occurrence of large-scale natural disasters that are considered to be caused by impacts of climate change, it is not sufficient to adopt only the conventional risk management methods that determine the level of materiality of risks based on the magnitude of impact and probability of occurrence. Regarding risks that would have an extremely significant impact on our business if they were to eventuate, even though we may not know the chances of their eventuating, we will introduce new risk management systems that set scenarios and assess risks.

(Details of risk management→P.76~P.79) (Scenario analysis→P.13~P.17)

Metrics and targets

In the Kirin Group's Environmental Vision 2050 announced on February 10, 2020, we significantly raised our targets for climate change-related issues.

As for the reduction of GHG emissions, which is a mitigation measure, we have set a target to achieve net zero emissions throughout our value chains by 2050. Our adaptation measures include efforts to cultivate, expand and procure sustainable agricultural raw materials and to bring water, used as a raw material, to a sustainable state.

As for our medium-term KPIs, we plan to set numerical targets as CSV commitments and draw up a roadmap as soon as possible.

Key metrics and targets are listed→P.21
Accomplishments under GHG Scope 1, Scope 2, and Scope 3→P.72
More detailed data→P.86~P.111

Scenario Analysis

The Kirin Group began studying the TCFD final recommendations immediately after they were announced in 2017. In late June 2018, we promptly disclosed the trials, including the results of our scenario analysis, in accordance with the TCFD recommendations in the Kirin Group Environmental Report 2018. We have since been continuously striving to ensure that our disclosure complies with the recommendations.

Results of the 2018 analysis

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In 2018, we adopted the IPCC's Representation Concentration Pathways (RCP) as the main pathways, supplemented by the IPCC's Shared Socioeconomic Pathways (SSP), to develop three Group Scenarios and analyzed the impact of climate change on agricultural products that are important ingredients for the Group's businesses. As a result, we determined anew the potential for climate change to have a major impact on agricultural products. In July 2018, immediately after the disclosure of trials, the 2018 West Japan Torrential Rain

Disaster happened, causing extensive damage in the western region of Japan and disrupting the railway networks. As a result, Kirin Beverage, which had been actively pursuing the modal shift to reduce GHG emissions and address the shortage of truck drivers, experienced a

significant impact on product delivery, which was also in the peak period. In September 2018, Kirin Brewery Hokkaido Chitose Plant suspended operations due to a blackout (total power failure) caused by the Hokkaido Eastern Iburi Earthquake. It was also in 2018 that the marine plastic problem attracted close attention.

Although the risks associated with such events had been recognized even under conventional risk management, they were judged to have a large impact but a low probability of occurrence, and while measures were taken in part to reduce such risks, most of them were treated as risks to hold. The emergence of a number of natural disasters and environmental problems in 2018 prompted us to once again recognize the effectiveness of the new risk management system, which sets up scenarios and assesses risks that are unlikely to occur but would have an enormous impact on our business should they occur. Taking advantage of the experience of the 2018 West Japan Torrential Rain Disaster, the Kirin Group immediately established a manual to follow in the advent of a similar disaster and put it into use. This has helped us avoid a major impact from Typhoon Faxai (Reiwa 1 Boso Peninsula Typhoon) and Typhoon Hagibis (Reiwa 1 East Japan Typhoon) in October 2019.

Results of the 2019 analysis

In recognition of the effectiveness of scenario analysis, in 2019 we conducted a more detailed analysis with the aim of assessing the resilience of our long-term strategy, the Kirin Group Long-Term Environmental Vision, formulated in 2013.

Specifically, we studied more than 25 research papers and analyzed the impact of climate

Impact of climate change on major agricultural product yields/land suitable for cultivation

Agricultural		Kirin Group Scenario3: 40	C, unwanted world, 2050	
products	United States	Asia	Europe/Africa	Oceania
Barley		<mark>West Asia</mark> Yield▲/+ South Korea Yield+	Finland Spring wheat yield▲ Mediterranean coast (West) yield4, (East) yield+ France Winter barley and spring barley: Both yields▲	Western Australia Yield▲▲
Hops			Czech Republic Yield	
Black tea		Sri Lanka Yields dom in loulands Little linpact of temperature rise in highlands India (Assam region) For each 1° to temperature of 28° C, yields down 3.8% India (Darjeeling region) Yield A ~ ~ A ~ (Sources from tea industry, not academic papers)	Kenya Rise in altable cultivation land llajor contraction of suitable cultivating land in landhi region and western Kenya Kenya nountain regions illi realau suitable for cultivation Malawi Chitipa district: Suitable land AAA Mulanje district: Suitable land +++ Thyolo district: Suitable land ++	
Wine grapes	United States (California) Suitable land: ▲▲▲ Northwestern United States Suitable land: +++ Chile Suitable land: ▲▲	Japan (Hokkaido) Expansion of suitable land Enable cultivation of Pinot Noir Japan (Central Honshu) Suitable land expanded on the one hand, but high-temperature damage also caused	Northern Europe Suitable land: +++ Mediterranean coast Suitable land: ▲▲▲ Spain Production volumes▲to▲▲ Western Cape, South Africa Suitable land: ▲▲▲	New Zealand Suitable land: +++ Southern coastal regions of Australia Suitable land: ▲▲▲ Outside southern coastal regions of Australia Suitable land: ▲▲
Coffee beans	Brazil Suitable land for Arabica: AAA Suitable land for Robusta: AAA	Southeast Asia Suitable land for Arabica: AAA Suitable land for Robusta: AAA	East Africa Suitable land for Arabica: AA Suitable land for Robusta: AA	
Corn	Southwestern United States Yield AA United States (Iowa in mid-West) Yield A~AA Brazil, Argentine Yield A~AA	China Yield ▲▲		

Legend: Negative/positive impact of less than 10% ▲/+ From 10% to less than 50% ▲▲/++

Tottori

Nishi-Maizuru

Tsuvama

Okavama

adotsu

Damaged lines

Source: Ministry of Land.Infrastructure.

Transport and Tourism

Disruption of railway networks due to the West Japan Torrential Rain Disaster in July 2018

Shiraichi

Iwakun

Shaded are

he damaged areas

Kushigahama

Assessment of impact of carbon pricing (Excerpt from the 2019 disclosure)

In event of <u>inaction on</u> medium-term GHG emission reduction target of 30% by 2030

	Kinin Group Scenario S	Kinn Group scenari
Estimate cost of impact	2040	2040
	1,604	8,921

n event of achievement of medium-term	
GHG emission reduction target of 30% by 2030	

 Kirin Group Scenario 3
 Kirin Group Scenario

 Estimate cost
 2040
 2040

of impact (unit: 1 million JPY) 766 4,264 Kirin Group Scenario1:2°C, sustainable deveropment Kirin Group Scenario1:4°C, unwanted world

*Calculated by multiplying assumed CO_2 emissions for 2040 by carbon price forecasts.

Assessment of resilience against climate change impacts

Koch

Assessment of water risk associated with agricultural yields/production regions

Brewing technologies that do not rely on barley in categories, such as happo-shu (low-malt beer) and new genres, enables the deployment of products using alternative sugars for barley in other countries and regions.

In the event that agricultural breeds that can adapt to climate change are developed, our mass plant propagation technologies can contribute to speedy expansion of acreage.

The insights gained through the activities to support farms obtain sustainability certification can be deployed for other crops. Use of insights on diversified procurement from multiple agricultural production countries and regions.

Assessment of water risk in domestic production sites and logistics routes

Rapid restructuring of logistics system based on lessons learned from the 2018 West Japan Torrential Rain Disaster. No major impact from Typhoon Faxai and Typhoon Hagibis.

Assessment of impact of carbon pricing on electricity prices

Impact can be reduced by achieving GHG reduction targets.

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Governance and Risk Management

change in the main individual supplier countries in 2050 and 2100, based on Group Scenario 1 (2° C scenario, SSP1, sustainable development) and Group Scenario 3 (4° C scenario, SSP3, unwanted world) that were developed in 2018.

In addition, we examined water stress and water risks in agricultural production regions, identified water risks in production and distribution sites, and evaluated the impact of carbon pricing. The previous page provides an excerpt of these initiatives. Please refer to the Kirin Group Environmental Report 2019 pages 14 to 16 for further results of our analysis. The scenario analysis has further clarified the significant impacts on agricultural products and water resources, but it also reveals the potential to reduce these impacts and capture opportunities by reinforcing measures to mitigate and adapt to climate change. The results of this analysis provide important input into our new vision, the Kirin Group's Environmental Vision 2050, announced on February 10, 2020, which is aimed at enhancing the resilience of society and the company.

Results of the 2020 analysis

We estimated the financial impact based on the results of analyses in 2018 and 2019. Please note that the results of these estimations are based on the conditions of the scenarios developed to visualize the impacts on society and businesses. We performed calculations also on the marine plastic problem, although it is not a climate change issue.

14 Negative impact

As for the impact of decline in agricultural yields, we estimated the cost impact associated with barley, hops, black tea leaves, and wine grapes, which are important ingredients for alcoholic and non-alcoholic beverages businesses in Japan, based on the calculation conditions disclosed in published papers.

We found that the cost impact of raw materials was approximately 7 times greater in Group Scenario 3 (4 $^{\circ}$ scenario) compared with that in Group Scenario 1 (2 $^{\circ}$ scenario, SSP1, sustainable development). The results of the trial calculations show that in order to mitigate the financial impact of decline in agricultural yields, it is necessary to also take measures to mitigate the temperature rise at a high level.

In calculating estimates on water risks and water stresses associated with natural disasters, as well as on the impacts of infectious diseases on operations and logistics, since there is a lack of appropriate insights, we made assumptions based on past cases and other factors for each scenario and estimated the impact should such assumptions become a reality.

Regarding water risk, we performed calculations in Group Scenario 3 (4°C scenario) based on the assumption that damage equivalent to that of Kirin Brewery Sendai Plant, which was affected by the Great East Japan Earthquake, would occur. As for the impact of flooding on modal shift, we estimated based on the assumption that damage due to modal shift caused by flooding would occur in the same way as in the past under the same scenario. The impact of infectious diseases on operations was estimated based on the assumption that the brewery would cease production at its peak under the same scenario. Impact of water stress was estimated based on the assumption that plants with high water stress in Australia would cease operations at their peak.

Since there is a lack of appropriate insights about the difference in the degree of impact in Group Scenario 1 (2° scenario) and Group Scenario 3, we performed calculations based on the assumption that the impact in Group Scenario 1 would be about one-third of that in Group Scenario 3.

In addition, Graph 6 (page 15) shows the impact of carbon pricing estimated in 2019, and the results of estimating the external cost of the problem of ocean plastics based on the share in the domestic soft drinks market based on published papers.

The vertical axis shows the magnitude of difficulty for society and businesses to return to their original state when a risk occurs, the horizontal axis shows the magnitude of the negative impact on society, and the size of the circle reflects the approximate magnitude of the financial impact on the Kirin Group. As a result of the calculations, the cost impact was approximately 1 to 8% of operating revenues. However, the impact on the decline in agricultural yields is greater because it continues to be affected. Regarding the impact of the spread of infectious diseases due to climate change, we expect that depending on the outcomes of the impact of COVID-19 spreading in 2020, there will be a need to change the calculation method.

Positive impact

As for opportunities due to climate change, we performed calculations regarding "impact of

5 Increase rate of population at risk under Kirin Group Scenario 3 (4°C scenario) in 2050

Item	Mal	aria	Dengue fever				
Summary	One of the three ma diseases in the wor tuberculosis and Al are fever, anemia, a	ajor infectious Id along with DS. Main symptoms nd splenomegaly.	An acute febrile infection caused by the dengue virus. Major symptoms include fever, headache, muscle aches and skin rashes.				
Occurrence status	Many infected peop subtropical and tro been reported that million people work annually, and an es people die each ye vector, Anopheles r found in Japan. Cas also been noted in	ble mainly in pical regions. It has approximately 220 dwide are affected timated 435,000 ar. The mosquito nosquito, is also ses of onset have Japan.	It is endemic throug and subtropics and most commonly in Sc Asia, and Central an but also in Africa, At Pacific islands. Case been noted even in years. The main vect Aedes aegypti (not Japan), but it can al by Aedes albopictus south of Honshu.	hout the tropics has been reported butheast Asia, South d South America, ustralia, and South s of onset have Japan in recent tor mosquito is normally resident in so be transmitted s, which lives in the			
Analysis results Rate of increase in population at risk from present *1	Climate change + GDP taken into consideration	Only climate change taken into consideration	Aedes aegypti	Aedes albopictus			
Asia Pacific high income countries *2	-4.0% 4.0%		0.4%	-1.2%			
Southeast Asia *3	-76.8% 73.		0.4%	-1.1%			
Australia	-50.0%	0.0%	51.9%	27.1%			

*1 The data represents the rate of increase for malaria in the number of people at risk in 2050 from the base years (1961 to 1990), and for the rate of increase for dengue fever in the number of people at risk in 2050 from the present. Both calculated at 4°C.

*2 Japan, Korea, Singapore, Brunei

*3 ASEAN countries, Myanmar, Vietnam, etc.

infectious diseases," "impact of heat stroke" and "cost reduction through investment in energy conservation and renewable energy."

The effects of infectious diseases and heat stroke caused by climate change may lead to expanding the market for plasma lactic acid bacteria (Lactococcus lactis strain Plasma), which directly activates plasmacytoid dendritic cells that act like the "commander-in-chief" of the immune system, and "Kirin Sekai-no-Kitchen-Kara SALTY LITCHI" a heat stroke prevention product.

Table 5 shows the results of an analysis of the impact of infectious diseases performed based on the Scenario *4 on WHO's health impacts of climate change.

We examined the effects of heat stroke based on the National Institute for Environmental Studies' climate change observations and predictions data *5. According to the RCP 8.5 scenario (equivalent to Group Scenario 3, 4°C scenario), the number of heat-related excess deaths in Japan between 2080 and 2100 is estimated to be nearly 4 to 10 times or more than in the base period of 1981 to 2000. In this estimation process, we calculated the number of persons taken to hospital by ambulance in Japan due to heat stroke, which is considered to be highly correlated to temperature.

In the RCP 8.5 scenario for 2050, the number of heat stroke sufferers taken to hospital by ambulance is expected to be approximately 2 to 4 times higher than that in the base

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years (1981 to 2000). Assuming, based on these results, under the Kirin Group's Scenario 3 (4 $^{\circ}$ scenario) that the market for heat stroke preventing non-alcoholic beverages would correlate accordingly, we estimated that the domestic market would expand by approximately 94.0 billion to 188.0 billion yen.

Regarding cost reduction through investment in energy conservation and renewable energy, we reflected the energy cost reduction of 1 billion yen-level disclosed in the news release dated June 25, 2019, on acceleration of efforts to reduce GHG emissions, promote further energy conservation, and shift energy to electricity, in our result.

Graph 7 shows these results. The vertical axis shows the degree of contribution to increasing the resilience of society, the horizontal axis shows the size of positive impact on society, including customers and local communities, and the size of the circle reflects the approximate magnitude of the financial impact on the Kirin Group.

*4 World Health Organization (2014) Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s.

https://apps.who.int/iris/handle/10665/134014
*5 S-8 Comprehensive Research on Impact Assessment and Adaptation for Climate Change 2014 Report

https://www.nies.go.jp/s8_project/scenariodata2.html#no3

6 Negative impact on businesses



Z Potential to capture business opportunities

Environmental Strategy

Assessment of resilience in our long-term environmental strategy

Based on the scenario analysis described above, we conducted an assessment of resilience for our long-term strategy Kirin Group's Long-Term Environmental Vision announced in 2013, and the results are reflected in the Kirin Group's Environmental Vision 2050 announced in 2020.

Biological resources

In the Kirin Group's Long-Term Environmental Vision announced in 2013, we defined the goal to be achieved in 2050 as "Make sustainable use of biological resources." In our CSV Commitment, we continued to work on supporting Sri Lanka tea farms to obtain the Rainforest Alliance certification on top of responding to FSC and RSPO.

The results of the scenario analyses conducted in 2018 and 2019 predicted significant reductions in barley and hop yields in both Group Scenario 1 and Group Scenario 3. As for wine grapes, while some production regions are expected to see a significant decline in agricultural yields, there are new areas where a yield increase is expected. We found that there is a possibility of black tea leaves also being affected. The expected increase in procurement costs due to changes in the yields of these major raw materials came out to be about 5% in Scenario 1 and over 30% in Scenario 3. However, if global warming continues, it will be difficult to recover the condition.

We believe that our mass plant propagation technology in addition to our accomplishments and brewing technologies that do not rely on barley and use alternative sugars in categories

and new genres will be a major strength for the Kirin Group. This technology has the potential to contribute to the expansion of cropping areas in a short period of time if agricultural breeds resistant to global warming are developed. Moreover, our support for farms to obtain sustainability certification. which we have been promoting in Sri Lanka since 2013, is characterized by the fact that it aims to improve the sustainability of agricultural production areas from where we procure raw materials on the whole through support for farms to acquire the certification. Considering that the impact of global warming will lead to a decrease in agricultural yields in the entire production area, we can say that this is an initiative

such as happo-shu (low-malt beer)

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Social impact of supporting the acquisition of Rainforest Alliance certification





This farm began training in 2013 and acquired the certification in 2014.

that enhances the resilience of society and the company, compared with activities that merely procure certified products.

Figure 9 shows the social impact estimated for a certain farm that acquired the Rainforest Alliance certification in Sri Lanka. This farm began training in 2013 and acquired the certification in 2014. We can see from the graph that, along with the acquisition of certification, the profit per unit of tea leaf weight and the salaries of farm workers increase, while the morbidity rate of farm workers decreases. While this is data from the specific farm, it shows that support for acquiring the certification has positive financial and social impacts on the farms and their workers, making raw material production areas more sustainable. As a result, it was confirmed that the initiatives under our Long-Term Environmental Vision demonstrate a certain level of resilience. At the same time, we have determined that in order to further enhance resilience and bring about a positive impact on society, we need to strategically work on our initiatives by also incorporating into our vision such activities as contributions by leveraging our strength in mass plant propagation technologies, efforts to reduce food waste, which is our KPI added after the announcement of the Long-Term Environmental Vision, and our support for farms to obtain sustainability certification that contributes not only to enabling the Kirin Group to secure sustainable procurement but also to giving a positive social impact to agricultural production regions. These activities are reflected in our targets: "Cultivate, expand and procure sustainable agricultural raw materials" and "Stand by the side of farmers to make raw material production areas sustainable" under the Environmental Vision 2050. (For FSC→P.29, P.47)

 Information on RSPO→P.29

 Information on Sri Lankan tea farms→P.32

 Information on mass plant propagation technologies→P.28

Water resources

In the Kirin Group's Long-Term Environmental Vision announced in 2013, we set our goal for 2050 as "We make sustainable use of water together with our communities," and have implemented various examinations and initiatives toward achieving this goal. In an effort to identify the water risk to production sites, we conducted detailed surveys on three elements - water stress, water risk, and water pollution - based on WRI Aqueduct and other tools and information released by the government twice in 2014 and 2017. The results of these surveys showed that while there was no significant water stress in Japan and Myanmar, serious water shortages would continue into the future in Australia. Furthermore, in the scenario analysis performed in 2019, assessments were made around 2040 based on Group Scenario 3. As a result, we found that water stress and water risk would rise in many ingredient agricultural production regions.

In Japan, we have been pioneering the initiative and leading the industry in carrying out Water Source Forestation Activities in the basin regions of our production sites since 1999. At the same time, our breweries have managed to reduce water consumption rates by nearly 50% (compared to 1990 levels). Also, in Australia, we have been reducing water consumption by a remarkably high rate.

Furthermore, as a measure to deal with water resources in agricultural production areas,

Environmental Strategy

Governance and Risk Management

Water stress in major agricultural production regions (2040, equivalent to Kirin Group Scenario 3)



source : World Resources Institute

we launched an initiative in Sri Lanka in 2018 with the aim of protecting water sources on tea farms in five locations. We have also been running an education program to teach the approximately 15,000 residents living in the vicinity of these water sources about the importance of water and why we need to protect them.

On the other hand, Australia faced serious water shortages in various parts of the country in 2018 and 2019. In Japan, the country's logistics networks were significantly affected by the 2018 West Japan Torrential Rain Disaster. Also in Sri Lanka, which is a production region for tea leaves, record rainfall in 2017 caused landslides and massive flooding in urban areas, killing a number of people. Some tea farms from which we procure tea leaves also suffered serious damage. Natural disasters such as drought and heavy rain, which are considered to be caused by climate change, are becoming more common all over the country. Given these circumstances, we have determined that, in order to further increase resilience,

we must work on our initiatives in a strategic manner by also incorporating more concrete initiatives, such as our measures to reduce the impact of natural disasters on the logistics networks and our efforts to conserve water resources in raw material production regions, in our vision. These efforts are reflected in our goals of "Bring water, used as a raw material, to a sustainable state" and "Solve problems with water in a way that suits the characteristics of basin regions where our business bases are located" under the Environmental Vision 2050.

Information on assessment of water risks→P.41
(Information on Water Source Forestation Activities→P.38
ater source conservation activities in Sri Lankan tea farms→P.42

Climate change

In the Kirin Group's Long-Term Environmental Vision announced in 2013, we stated, "We keep

Information on w

the CO₂ emissions of the value chain within the Earth's natural CO₂ absorption ability in cooperation with all the people associated with our value chain," and set our KPI to reduce the GHG emissions from the entire value chain by half from the 1990 level by 2050. In the CSV Commitment, the Kirin Group set reduction targets (GHG emission reduction of 30% compared to 2015 levels for combined Scope 1 and Scope 2 emissions and the same 30% reduction for Scope 3 emissions by 2030) that were the first targets by a Japanese food producer to be approved by the Science Based Targets initiative (SBTi), and our operating companies have been steadily reducing GHG emissions to achieve the targets.

Scenario analyses in 2018 and 2019 have revealed that climate change has a significant impact on biological and water resources and a negative financial impact on the Kirin Group. As global warming progresses it will be difficult to restore temperatures and the impact will continue. It is necessary not only to reduce the financial impact through "adaptation" measures for biological and water resources, but also to actively contribute to "mitigation." On the other hand, findings from the scenario analysis in 2020 have indicated that we can anticipate future cost reductions by investing in renewable energy and expansion of businesses related to health foods that can help to prevent infectious diseases and heat stroke caused by climate change.

Based on the above, we have concluded that in order to contribute to mitigating global warming, it is necessary to set even more raised targets and implement measures to reduce GHG emissions, and that we need to lead to build a decarbonized society in order to expand the potential of business opportunities in response to climate change and to ensure the trust of society and customers in the Kirin Group.

These initiatives are reflected in our goals of "Realize Net-Zero GHG emission from the entire value chain" and "Lead to build a decarbonized society" in the Environmental Vision 2050.

In the scenario analysis conducted last year, we confirmed that our goals, targets, and directions for initiatives set under the conventional Long-Term Environmental Vision are effective and have a certain level of resilience. However, the circumstances surrounding the environment, such as climate change and the marine plastic problem, have changed significantly since the time we established the Long-Term Environmental Vision and the areas in which we must exercise corporate responsibility have also expanded significantly. The results of the scenario analysis also show that issues faced by society and businesses are interrelated in a complex manner, and that it is necessary to aim for the sustainability of both society and businesses by transcending the simple dichotomy between the environment and economy.

Against this backdrop, in 2020 we formulated the Environmental Vision 2050 in a way that considerably raises our targets from our previous long-term strategy. We believe that our efforts to realize our Environmental Vision 2050 will enable us to minimize the risks and financial impacts identified in the scenario analysis, enhance resilience by having a positive impact on society and businesses, and develop our businesses in a sustainable manner. Specific performance metrics will be set in the CSV Commitment going forward.

Identification of risks and opportunities

The risks and opportunities related to material environmental issues that are believed to affect the Kirin Group's business and the strategies for addressing them are as follows. We have assumed short-term (within three years), medium-term (until 2030), and long-term (until 2050) periods in which these risks and opportunities will manifest.

ld	lentificatio	n of risks ar	nd	0	opor	tuni	ties	The risks and opportunities related to material enviro business and the strategies for addressing them are a medium-term (until 2030), and long-term (until 2050)	onmo as fo peri	ent ollc iod	al is ws. s in	sues that We have a which the	are believe assumed sh se risks an	ed to affec Nort-term (V d opportui	t the Kirin Group's within three years), nities will manifest.	Messa Top M					
Theme	Scenario	Major risks	Time S	period M L	Negative impact on society	Negative impact on businesses	Possibility of difficulty in recovery	Major opportunities	Tim S	ne pe	eriod	Resilience of society	Positive impact on businesses	Positive impact on customers and society	Strategies for addressing risks and opportunities	ge from anagement					
Biolc	Decrease in yields of main ingredient agricultural products in the 2°C/4°C scenarios	Agricultural products: price hike, quality deterioration, concerns about stable supply, and transferring opti- mal production regions	•	• •	†††	† †	†††	Securing of stable supply/Differentiation/Improvement of reputation through Kirin's original mass plant propagation technologies Brewing technology using alternative sugars that does not rely on barley Stable supply/Strengthening relationships with agricultural production regions by supporting the acquisition of sustainable farm certification/Improvement of	•	•	•	1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1	1 1 1 1 1 1	Cultivate, expand	Enviro Strate					
gical resc	Regulations on the use of petro- leum-based fertilizers/chemical pesticides	Agricultural products: poor growth, quality deterioration, pest spread, and price hike, concerns about sta- ble supply, and transferring optimal production regions		• •	1 1 1	† †	†††	reputation through KI'n's original mass plant propagation technologies Stable supply/Cost reduction by providing appropriate guidance on the use of fertilizers and pesticides through the support for acquiring sustainable farm certification/Strengthening relationships with agricultural production regions by supporting the acquisition of sustainable farm certification/Quality improvement	•	•	•	t t	† τ	† †	and procure sustain- able agricultural raw materials Stand by the side of farmers to make raw	nmental gy					
ources	Decrease in domestic farmers/ expansion of idle lands	Difficulty in supplying unique agricul- tural ingredients (hops, grapes for Japan Wine)	•	•	t	t t	111	Community revitalization by promoting environmentally-friendly agriculture in agricultural production regions / Stable supply	•	•		t t t	Ť	1 1 1	material production areas sustainable	an					
	Interest in ecosystems/human rights	Reputation risk against procuring agricultural products inconsiderate to ecosystems/human rights	•	•	† † †	† †	111	Anticipation for ethical consumption	•	•	•	1 1 1	1 1 1	↑ ↑ ↑		d Goa					
	Water stress at production sites	Suspension of manufacture due to wa- ter shortage/decline in water quality		• •	$\uparrow \uparrow \uparrow$	1 † †	t t t	Cost reduction through water conservation	•	•		1 1 1	1	↑ ↑ ↑		SIL					
	water stress at production sites	Reputation risk against water use during droughts		• •	$\uparrow \uparrow \uparrow$	111	† †	Improvement of reputation for water conservation considerate to local communities	•	•	•	1 1 1	1 1 1	<u>↑</u> ↑↑							
	Water risk in domestic produc- tion sites/logistics sites/logis-	Suspension of manufacture and			111	111	111	Continually improved BCP and execution capabilities	•	•		111	1	111		Act					
X	tics channels	transport due to floods, etc.						Source Forestation Activities and clean-up activities in basins	•	•	_	<u>↑</u> ↑	<u>↑</u> ↑	↑ ↑		ivity					
Iter	tions at production sites	water shortage/wastewater restriction	•	• •	111	111	1 † †	Cost reduction through water conservation	•	•		111	t	111							
Resou	Water risk/water stress in ingre- dient agricultural production	Rise in prices of agricultural prod-			111	ттт 	TTT	Stable supply through measures to conserve water resources in ingredient pro- duction regions / Strengthening relationships with agricultural production regions by supporting the acquisition of sustainable farm certification/Improvement of reputation through Kirin's original mass plant propagation technologies		•	•	1 1 1	↑↑	↑ ↑	Solve problems with water in a way that suits the charac- teristics of basin	9					
rces	regions ucts/co	ucts/concern about stable supply											Stable supply through measures to conserve water resources in raw material production areas/Strengthening relationships with agricultural production regions by supporting the acquisition of sustainable farm certification/Improve- ment of reputation through Kirin's original mass plant propagation technologies	•	•	•	1 1 1	↑↑	↑ ↑	regions where our business bases are located	0
	Water intake restrictions in agricultural production regions	Poor growth/decline in quality of agricultural products/rise in prices/ concern about stable supply	•	• •	tττ	†††	tττ	Stable supply through provision of water-saving agricultural technology in raw material production areas/strengthening relationships with agricultural produc- tion regions by supporting the acquisition of sustainable farm certification / Improvement of reputation through Kirin's original mass plant propagation technologies	•	•	•	1 1 1	Ť Ť	† †		Rij					
Conta	Large price fluctuations in the oil market under the 2°C/4°C scenarios	Concerns about supply of raw materi- als for PET bottles		• •	t t t	†††	†††	Stable procurement of plastic containers that are not affected by the oil mar- ket by increasing the use of recycled resin		•	•	1 1 1	1 1 1	↑ ↑ ↑	Develop and dis-	overna sk Ma					
iners and	Deforestation in the 2°C/4°C scenarios and inconsiderate ag- riculture, forestry, and livestock industries	Reputation risk/concerns about sta- ble supply of raw materials for paper containers and packaging	•	• •	t † †	111	† †	Stable supply of paper products with FSC certification / Anticipation for ethical consumption	•	•	•	1 1 1	1 1 1	↑↑↑	ble containers and packaging	nagem					
d Pac	Expansion of the marine plastic	Population risk against PET bottles /						Stable procurement of plastic containers by increasing the use of recycled resin and inedible resin	•	•	•	1 1 1	1 1 1	↑ ↑	cycling system to make containers and	nd ent					
ckagir	problem/lack of resource circu- lation system	concerns about stable supply of recycled resin		• •	t † †	† † †	† †	Reduced use of container materials through our original light-weight packaging technology/Cost reduction	•	•	•	111	111	↑	packaging sustaina- ble						
~								Improvement of reputation for seriously addressing the marine plastic problem	•	•	•	111	111	<u>^ 1 1 1</u>							
Clin	Widening of regulations on carbon pricing under the 2°C/	Rise in fuel procurement costs		• •	τt	† †	† †	Cost reduction through early achievement of GHG reduction targets Elimination of the impact of carbon pricing through energy transition from						<u> </u>	Realize Net-Zero	nviri ata					
nate	4°C scenarios Targets under the Paris Agree-	Various effects under the 4°C scenario						natural gas and heavy oil to electricity or renewable energy Market expansion and sales expansion of non-alcoholic beverages, tablets, and			•			TT	GHG emission from the entire value	onn					
C C	ment not achieved	or beyond			111	111	111	lactic acid bacteria products that help prevent infectious diseases and heat stroke		•	•	TŤŤ	TŤŤ	ΤŤ	chain	nen					
hange	Increase in renewable energy facilities	resulting from environmentally-incon- siderate construction/operation of renewable energy facilities		• •	τt	tτ	tτ	Improvement of reputation through ethical use of renewable energy	•	•	•	t t t	1 1 1	↑ ↑ ↑	Lead to build a de- carbonized society	tal					

Strategies for addressing material environmental issue

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We believe that we will be able to reduce climate-related and other risks, enhance resilience, and capture business opportunities by raising our target level from our previous Long-Term Environmental Vision to the new Environmental Vision 2050 and implementing concrete measures that take advantage of the Kirin Group's strengths, such as research and development capabilities, engineering capabilities, and the partnerships we have built with international NGOs and in raw material production areas.



Environmental Strategy

> Indicators and Goals

> > Activity

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Governance and Risk Management

Environmental Data

CSV Commitment

The Kirin Group has formulated 19 commitments under the CSV Commitment that clarify the medium to long-term image we are aiming for through our business. Among those 19 commitments, there are four that deal with social issues related to the environment, which have target years between 2020 and 2030 to meet our Long-Term Environmental Vision. Five other commitments related to community engagement will also solve social issues related to the environment. Now that our new long-term strategy, Environmental Vision 2050, has been formulated and announced in 2020, we plan to revise the CSV Commitment sequentially.

Kirir	n Group's Environmental Vision 2050	SDGs Target	Our Commitment	Our Approach	Our Achinvement	Goals for 2021
	Cultivate, expand and procure	Target 2.3 Target 8.9 Target 15.4 Target 17.16 Target 17.17	2.2.d More sustainable production of raw materials We will support Sri Lankan black tea farmers through such long-term initiatives as facilitating the acquisition of Rainforest Alliance certification, and expand the use of certified tea leaves.	 We will help producers of black tea leaves by facilitating the acquisition of Rainforest Alliance certification, in order to ensure the sustainable procurement of tea leaves. We will expand the use of Rainforest Alliance-certified tea leaves over the long term. 	Number of small farms assisted to obtain Rainforest Alliance certification	10,000 farms (in 2025)
4	Stand by the side of farmers to make raw material production areas sustainable Attainment target: A society that values sustainable biological resources.	Target 15.4 Target 17.16 Target 17.17	3.3 Actions regarding biological resources We will protect the natural environment and preserve the ecosystems surrounding our business sites as well as areas producing raw materials.	 We will promote our efforts related to biological resources at major material production sites. We will strive to secure resources that may lead to deforestation in a sustainable manner. 	 ①Use of FSC-certified paper or recyled paper for office paper ②Use of FSC-certified paper for paper containers and packaging*1 ③Actions regarding sustainable palm oil KH KB KBC ME 	①100% (in 2020) ②100% (in 2020) ③100%*2
		Target 2.4 Target 12.3 Target 17.16 Target 17.17	3.5 Reduction of food waste We will reduce the amount of product waste generated stemming from factory shipment to delivery to our partners.	 We will reduce inventory excess (which leads to waste) through more accurate supply and demand predictions. We will reduce product waste by implementing thorough quality control. 	Rate of product waste reduction KB KBC ME	75% (in 2025, compared with 2015)
	Bring water, used as a raw material, to a sustainable state Solve problems with water in a way that suits the characteristics of basin regions where our business bases are located Attainment target : A society that values sustainable water resources.	Target 3.9 Target 6.4 Target 17.16 Target 17.17	3.2 Actions regarding water resources We will reduce water use in production activities and continuously preserve water sources.	 We will promote water saving at our plants. We will investigate major hydrographic vulnerabilities at our production sites. We will continue to conserve water sources at our production sites. 	 1)Water consumption reduction rate in 2020 2)Amount of water use in 2030 MBL KKC 	MBL ①25% (in 2020, compared with 2015) KKC ② 30% (in 2030, compared with 2015)
	Develop and disseminate sustainable containers and packaging Build a resource-recycling system to make containers and packaging sustainable Attainment target : A society that circulates containers and packaging in a sustainable way.	Target 12.2 Target 12.4 Target 14.1 Target 17.16 Target 17.17	3.4 Actions regarding containers and packaging We will continue to reduce the weight of containers and packaging while relying less on non-renewable resources and increasing the sustainability of materials.	 We will strive to maintain the 3Rs and resource circulation for containers and packaging. We will increase use of sustainable materials for our containers. We will introduce Life Cycle Assessment (LCA) and select container raw materials at an early stage of container / product development. 	Oconversion rate of PET bottle resin to recycled resin Recyclability of container material Recycled material ratio for containers and packaging materials KB KBC ME LN	KB KBC ME ① 50% (in 2027) Image: Comparison of the second se
	Realize Net-Zero GHG emission from the entire value chain Lead to build a decarbonized society Attainment target : A society that has overcome climate change.		3.1 Actions regarding climate change We will work to further reduce Green house gas (GHG) emissions through various initiatives, including the introduction of renewable energy.	 We will promote the introduction of renewable energy. We will promote energy conservation. 	①Renewable energy ratio for plant purchased electric power ②Install solar power generation facilities ③Reduction ratio of GHG emission (Scope 1 and 2) ④Reduction ratio of GHG emission (Scope 3)	KB (150% (in 2030) LN (210MW (in 2026) KG (330% (in 2030, compared with 2015) (430% (in 2030, compared with 2015)

KH Kirin Holaings KG KIRIN Group KB Kirin Brewery KBC Kirin Beverage ME Mercian KKC Kyowa Kirin+Kyowa Hakko Bio LN Lion MBL Myanmar Brewery

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Key CSV Issues

Community Engagement

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- *1 6-can packs, gift boxes, drink boxes, cardboard cartons for products
- *2 Using Book and Claim model, which is a model for the trading of certificates approved by the Round Table of Sustainable Palm Oil

- 2.2.a We will work on improving the quality and stable procurement of Japanese hops and brew unique beers that can only be made with them while contributing to the revitalization of key producing areas. 2.2.b We will drive development of Japanese wines to ensure their global recognition and contribute to revitalizing key producing areas and local communities, which are the foundations of growing grapes and making wines.
 - 2.2. We will create highly sustainable conditions for procuring Myanmar rice for brewing while fulfilling our social responsibilities to the region.
 - 2.2.d We will support Sri Lankan black tea farmers through such long-term initiatives as facilitating the acquisition of Rainforest Alliance certification, and expand the use of certified tea leaves.
 - 2.2.e We will develop long-term, sustainable mutually beneficial partnerships with our raw material and packaging suppliers, which build a favorable demand for our product and ensure sustainable returns and the creation of value through the supply chain.

Key Targets

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Environmental Strategy

Indicators and Goals

Activity

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Progress (The end of 2019)

Theme	We will create together	Indicators	Targets	Achievements
		Number of small-scale farms assisted to obtain Rainforest Alliance certification KBC	10,000 small farms (2025)	120 small farms
		Number of water source conservation sites in Sri Lanka KBC	5 sites (2020)	3 sites
Biological	A society that values	Number of persons participating in education programs for valuing water in Sri Lanka KBC	15,000 persons (2020)	150 persons
resources	biological resources	Use of FSC-certified paper or recycled paper for office paper KH KB KBC ME	100% (2020)	99.6%
		Procurement of sustainable palm oil KG	100% (2020)	100%
		Reduction of food waste KB KBC ME	-75% (2025, compared with 2015 levels)	- 48% (2018)
Water	A society that	Rate of reduction of water consumption rate MBL	- 25% (2020.compared with 2015 levels)	- 27%
resources	water resources	Rate of reduction of water use volumes KKC	-30% (2030,compared with 2015 levels)	-23%
		Sustainable containers and packaging using recycled materials and biomass KB KBC ME	100% (2050)	1.9%
	A society that circulates containers and packaging in a sustainable way	Ratio of usage of recycled resin for PET bottles KB KBC ME	50% (2027)	1.9%
		Recycle rate of container and packaging materials 💷	Over 90% (2030)	>95%
Containers		Percentage of recycled materials used in container and packaging materials 💷	Over 50% (2030)	47%
packaging		Use of FSC-certified paper for 6-can packs KB KBC ME	100% (2020)	100%
		Use of FSC-certified paper for gift boxes KB KBC ME	100% (2020)	100%
		Use of FSC-certified paper for drink boxes KB KBC ME	100% (2020)	100% (beverage) ,98% (Alcoholic)
		Use of FSC-certified paper for cardboard cartons for products (KB) (KBC) (ME)	100% (2020)	100%
		GHG emissions from the entire value chain KG	Net-Zero (2050)	5,190 thousand tCO ₂
		GHG emission reduction rate – Scopes 1 +Scopes 2 KG	-30% (2030, compared with 2015 levels)	- 8.5%
Climate	A society that	GHG emission reduction rate – Scope 3 KG	- 30% (2030, compared with 2015 levels)	- 12.7%
change	climate change	Ratio of renewable energy in plant purchased electric power KB	50% (2030)	15%
		10MW (2026)	0.7MW	
		Carbon neutral certified brewer LN	Carbon Neutral (2020)	100% (May 2020)

KG Kirin Group KH Kirin Holdings KB Kirin Brewery KBC Kirin Beverage ME Mercian KKC Kyowa Kirin+Kyowa Hakko Bio LN Lion MBL Myanmar Brewery

Message from Top Management

Environmental Strategy

External Evaluation

The Kirin Group conducts transparent information disclosure to its investors and other stakeholders. As such, we have been selected for and rated by the following global indices.





Gold Award (Minister of the Environment Award) in the ESG Finance Awards Japan

Selected for the following indices







CDP "climate change" category "A-List"



"SDGs Management" highest overall ranking 5-star "★★★★★" (Deviation value of 70 or above) in the Nikkei SDGs Management Survey 2019



Sompo Sustainability Index



CDP Supplier Engagement Rating "Leader Board"



The Kirin Group Environmental Report 2019 and the KIRIN CSV REPORT 2019 received the Special Jury Prize (Award of the Jury Committee Chair in the 23rd Environmental Communication Awards)

MSCI 🔅

MSCI Japan ESG

Select Leaders Index







Fuji-Sankei Group Award in the 26th Global Environment Awards

Kirin School Challenge Kirin School Challenge won the won the Encouragement Judges Committee Encourage Award Award in the Career at the FY2017 Corporate Awards Education Awards for Youth Experience Activities

·央部 第16回 グルン教育パートナーシップ会員

Judge's Special Award in the 6th Ikimono Nigiwai Corporate Initiatives Contest

Yokohama Plant won the Minister of Land, Infrastructure, Green Cities Awards and Green Social Contribution Award

Ranked No. 1 in WWF Japan's

"Ranking for Corporate

Measures Against Global

Warming in the Food Sector"

Transport and Tourism Award under the Excellent Green Logistics Commendation Program



Logistics Environmental Grand Prize at the 18th Logistics Environmental Award



King of Beasts Award in WWF Japan's "Business & Diversity Katte-ni Award"





Indicators and Goals

Activity

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The middle-sized bottle Kirin Namacha Decaffeinated Tea also received WorldStar Drink won WorldStar Packaging Awards

Japan's lightest aluminum can won the 41st Kinoshita Prize

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^{*}Pictures include images of products when various initiatives were still in process. Current products may vary.

Performance highlight (The end of 2019)

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Environmental Strategy

Indicators and Goals

Activity 😵

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Biological Resources

We will create together

A society that values sustainable biological resources

Cultivate, expand and procure sustainable agricultural raw materials Stand by the side of farmers to make raw material production areas sustainable

Basic Thinking

Biological resources, particularly agricultural products, are the most important and basic raw materials for the Kirin Group. However, our scenario analyses based on the TCFD recommendations have confirmed the possibility that climate change will have a significant impact on agricultural yields and the quality of agricultural products. It is also essential to have consideration for the environment and human rights at the farms and regions where we procure products. Therefore, we are working to solve the problems of ecosystems and local communities where raw materials are produced in an aim to build a society that uses sustainable biological resources.



Environmental Strategy

Overview of Approaches

The Kirin Group established its Declaration of Support for Biodiversity Conservation in 2010 and conducted an assessment to confirm the risks of agriculture to the environment, human rights, and other factors. Based on the results of that assessment, we selected paper and palm oil, which are believed to have a major impact on their production regions, and black tea leaves from specific regions that we are highly dependent on for supply, and developed action plans for those ingredients. Under these plans, we are using sustainability-certified ingredients and assisting farmers to obtain sustainability certification. In addition, based on our Long-Term Environmental Vision announced in 2013, we have been conducting ecological surveys and carrying out revegetation activities for rare and native species toward environmentally-friendly agriculture in growing hops in Japan and grapes for Japan Wine. Moreover, we were able to confirm by conducting the scenario analysis required by the TCFD recommendations starting in 2018 the possibility of significant declines in yields of major agricultural products caused by climate change. In light of this, we clearly declared to strive to cultivate, expand, and procure sustainable agricultural raw materials and contribute to making raw material production areas sustainable under our new long-term strategy, Environmental Vision 2050, announced this year. As the first step, we are also extending assistance for obtaining sustainable farm certification, which we have been providing for Sri Lankan tea farms, to coffee plantations in Vietnam.

(For policies on biological resources $\rightarrow P.87 \sim P.88$)

Highlights of Outcomes

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Challenges	Progress
Cultivate, expand and procure sustainable	We have almost completed switching to FSC-certified paper or recycled paper for office paper (copy paper, envelopes, business cards and other printed materials). (Paper containers and packaging initiatives-+P.47)
agricultural raw materials	For palm oil, we have continued our 100% use of certified palm oil (primary and secondary raw materials) according to RSPO's Book & Claim method. With regard to our mass plant propagation technologies, the usefulness of our bag-type culture vessel system technology, which makes effective use of water, was reconfirmed in the "research on a pest free farm system and emergency backup system using bag- type culture vessel technology" in the lunar surface base project led by the Ministry of Education, Culture, Sports, Science and Technology. As for food waste, we established reduction targets for Japan (75% reduction from the 2015 level in 2025). As well as promoting resource recycling, we continue to promote the use of "year-month labeling" for best-before periods of non-alcoholic beverages in Japan.
Making raw material production areas sustainable	As for tea leaves, we have been supporting large tea farms in Sri Lanka in obtaining the Rainforest Alliance certification since 2013 and, as of the end of 2019, 87 large farms acquired the certification. This is equivalent to approximately 30% of the certified farms in Sri Lanka. Since 2018, we have also been supporting small farms in obtaining sustainability certification. In addition, we have started supporting small coffee plantations in Vietnam in obtaining the Rainforest Alliance certification since 2020. We have conducted ecological surveys that reveal that converting idle farming land into vineyards for Japan Wine would lead to the restoration and creation of quality grasslands, and have launched revegetation activities with the participation of employees and local residents.



Progress





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Cultivate, expand and procure sustainable agricultural raw materials

Mass plant propagation technology

Having been long using plants such as hops and barley as ingredients for beer, the Kirin Group's start of research efforts on related technology goes back to the 1980s and our original technology established for mass propagation of plants is currently attracting growing attention from various fields as a technology that can resolve social issues.

Our unparalleled mass plant propagation technology is original and globally unprecedented in that it consists of four elemental technologies: Stem propagation technique (organ culture method), sprout propagation technique (PPR method), embryo propagation technique (somatic embryo method), and potato propagation technique (micro tuber method).

Plant propagation is normally performed using seeds, cuttage,

etc., but the cultivation period is limited and the growth rate is considerably low depending on the plant. However, Kirin's mass propagation technology that we developed through our own research makes it possible to significantly increase the number of quality plants with the same characteristics as the parent plant regardless of the season.

Kirin's scenario analyses based on TCFD recommendations conducted in 2018 and 2019 show that climate change has a significant impact on yields of many agricultural products used as raw materials. Mass plant propagation technology is also useful for the mass propagation of new varieties, endangered species

and useful plants, as well as for mass propagation aimed at promoting the spread of new varieties that have been developed in response to environmental changes. At one time, our technology faced the risk of elimination due to the withdrawal from the agribio business, but it is now positioned as one of Kirin's core research areas.

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bag-type culture vessel system

Bag-type culture vessel technology

Kirin's mass plant propagation technology is not limited to use in research and development, but has been established as a technology that can be used in practical applications. This is our bag-type culture vessel system. Stainless steel and glass tanks are not suitable for the practical production of plant seedlings because they have a high risk of microbial contamination on top of being very expensive. The resin film bag-type culture vessel system developed by Kirin offers the advantages of high production and operational efficiency, lightweight, low cost, high operational safety, and flexibility in adjusting production size. In addition, a solution containing nutrients necessary for plant growth is aerated inside a small bag to allow plants to grow, making it easier to use water more effectively than in soil cultivation and to create a virus/pathogen-free environment. The bag-type culture vessel system was developed from research on the micro tuber method for potato propagation and has been enhanced for use in other propagation technologies. For two years from 2014, the Kirin Central Research Institute was involved in the Ministry of Agriculture, Forestry and Fisheries project, "Dramatic Improvement of Production of Seeds and Seedlings of Bursaphelenchus Xylophilus - Resistant Black Pine for Regeneration of Coastal Forests in the Tohoku Region."* We remain engaged in the regeneration of the coastal protection forests that suffered devastating damage from the tsunami in 2011. In 2017, black pine seedlings produced using technology developed by the Kirin Central Research Institute were planted in the grounds of the Kirin Brewery Sendai Plant on a trial basis. In 2018, the Institute conducted a study of those seedlings together with the students of Miyagi Prefecture Shibata Nourin High School, who assisted with the development. The Institute also participated, together with the Kirin Brewery Sendai Plant, in tree-planting activities organized by Miyagi Mori-no-Kai, conducting new trial plantings in disasteraffected coastal areas of Higashi-Matsushima.

The Kirin Central Research Institute will continue its research and

development with the aim of contributing to the early regeneration of the coastal protection forests.

* Agriculture, Forestry and Fisheries Industry/Food Industry Science and Technology Research Promotion Project (lead institution: Forest Tree Breeding Center, Forestry and Forest Products Research Institute, Forest Research and Management Organization)

Contribution to the lunar farm

The Kirin Central Research Institute took part in the lunar surface base project led by the Ministry of Education, Culture, Sports, Science and Technology launched in 2017, which included industry-academia collaboration research on a pest free farm system and emergency backup system using bag-type culture vessel technology.

Experiments were conducted to examine the growth potential of lettuce plants as a source of vitamin C, potato seed potatoes as a source of carbohydrate, and soybean seedlings as a source of protein in a low-pressure environment. In addition, nutrient composition and material balance evaluations were conducted. As a result, growth patterns similar to those under atmospheric pressure on the earth could be reproduced.

We plan to continue developing this technology through industryacademia collaboration, and make proposals to JAXA and other space agencies on the lunar surface farm where the research is currently conducted.



Cultivation of asexual embryos



Trial planting of seedlings cultivated from asexual embryos

Kirin Brewery Sendai Plant

Top Manage

Rate of RSPO certification through Book & Claim method

100%

Primary raw materials and

secondary raw materials

Paper and Printed Materials / Palm oil

Use of sustainable paper and printed materials

Because the Kirin Group uses large quantities Office

of paper for primary and secondary containers for shipping our products, in 2013, we developed our Guidelines for the Procurement of Sustainable Biological Resources and an Action Plan, and have since pursued the use of paper that will not

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since pursued the use of paper that will not FSC-certified paper harm precious forests, including the tropical or recycled paper rainforests.

We also use large quantities of paper for purposes other than containers and packaging, so in the Action Plan, which was revised in February 2017, we declared a target of switching to FSC-certified paper or recycled paper for all office paper by the end of 2020.

To date, we have switched to FSC-certified paper for business cards, envelopes and copy paper, and from 2019, progress is being made in the adoption of FSC-certified paper for some of the paper bags and paper cups for tastings that have the KIRIN logo printed on them.

These efforts are leading to the conservation of precious forests and to addressing the problem of climate change.

Paper containers and packaging initiatives→P.47 Policies regarding biological resources→P.87~P.88







Kirin product catalog

Use of sustainable palm oil

The Kirin Group uses palm oil as an ingredient in some of its products, but because the quantity we use is very small and it is difficult to procure physically certified oil, we use the Book & Claim method approved by the Roundtable on Sustainable Palm Oil (RSPO) for the procurement of

In-house tools

certified sustainable oil. In accordance with our Action Plan for the Sustainable Use of Biological Resources, we have been using this method for the total volume of primary raw materials every year since 2013 and the full volume of secondary raw materials as well from 2014.

In March 2018, we became an associate member of the RSPO. We will continue to promote the use of sustainable palm oil.

Reply postcards

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Reducing of food waste

Reducing losses from disposing of soft drinks

Kirin Beverages is taking concrete action to change to labeling the year and month as the best before date for soft drinks. By so doing, we expect to see significant effects on cutting losses from disposing of products. Also, we can cut environmental loads on the supply chain (CO₂ emissions from transporting between distribution centers and transportrelated activities, etc.) and reduce

inefficiencies (e.g. storage space in distribution warehouses and loading and unloading tasks at stores) as well, by changing how to manage product delivery, storage, and display in stores based on the new best-before labelling.

We also closely exchange information on retail sales and demand fluctuation factors with plants and distribution centers to improve demand projections and continue to reduce disposal losses. In addition, we will move forward with efforts to reduce disposal losses by strictly managing sales volume targets. Implementing these steps, we will prevent valuable biological resources and containers and packaging from going to waste.

For change to the best-before labelling \rightarrow P.67

Recycling

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Recycling spent grains from Beer Mashing as Livestock Feed

Kirin Brewery Myanmar Brewery

Production processes for beer and happo-shu (low-malt beer) generate spent grains after extracting flavor during the mashing process. Because such spent grains contain residues of nutritious substances, they are efficiently used as livestock feed for cattle or for growing mushrooms.



Reduction target of food waste

(75% reduction from

the 2015 level in 2025)

-48%

Kirin Brewery

Kirin Beverage

Mercian

Effective use of spent grains to livestock feed

Developing food products from brewer's yeast

Lion continues to supply brewer's yeast for use as an ingredient in the Australian fermented food, Vegemite.

Research into use of BSG Kirin Holdings

Prevention of disease in dairy cattle and other livestock and reducing the use of antibiotics are major challenges for the dairy industry. The Kirin Central Research Institute has discovered that lignin glycoside, which is contained in brewer's spent grain (BSG), that is the barley husks that remain after the barley milling process, and BSG itself, which is used to feed livestock, are effective in increasing immunoreactivity in cattle. The Research Institute is pursuing further research into these findings.

Re-use of wine grape lees Mercian

The grape lees from wine-making are turned over in a compost heap on the company vineyard for a year to make compost, which is used as organic fertilizer.



Re-use of wine grape lees

Recovery of phosphoric acid Kyowa Hakko Bio

Kyowa Hakko Bio Yamaguchi Production Center (Hofu) has installed a facility to recover phosphoric acid from fermentation wastewater. Previously, the recovered cake, which consists largely of calcium phosphate had been disposed as industrial waste, but in 2008, the Production Center started drying some of the cake and selling it as fertilizer material.

Protection of endemic species in biotopes at manufacturing plants

Using biotopes set up in the grounds of our manufacturing plants, we are protecting species that are endemic to the plants' respective areas and providing consumers with the opportunity to engage with nature.

At the Kirin Brewery Yokohama Plant, in an endorsement of the "Yokohama b Plan," the city's biodiversity action plan, we built a biotope in the Plant grounds in the summer of 2012. The Yokohama Plant, which is part of a widespread network of ecosystems, is pursuing initiatives to enrich the local ecosystem as a whole. Also, since 2012, the Plant has conducted "Tours to Experience the Blessings of Nature" every week from spring through fall, in collaboration with the Tsurumi River Catchment Network, a NPO which is highly conversant with the region's natural environment. The Kirin Brewery Kobe Plant has been cultivating local endangered species, including the fish species, Hemigrammocypris rasborella (golden venus chub), and Pogonia japonica, a species of orchid, in the biotope set up in 1997. This biotope functions as a "refuge biotope" for the protection and cultivation of local endangered species. The Kirin Brewery Okayama Plant has been pursuing a program for the artificially breeding of the Parabotia curtus or "kissing loach," which is a designated natural monument (protected species), since 2005. The fish population having increased with the cooperation of stakeholders

and local elementary schoolchildren, they were released into the Plant's biotope in 2016 and are now being bred and displayed on the Plant grounds.



Biotopes in the Kirin Brewery Okayama plant

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Message from Top Management

Environmental Strategy

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Governance and Risk Management

Stand by the side of farmers to make raw material production areas sustainable

Hop Fields

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Status of Japan-grown hops

Hops grown in Tono in Iwate Prefecture are the main ingredient of Kirin's Ichiban Shibori Toretate Hops Draft Beer. The harvested hops are snap-frozen in their raw state to -50° C before being ground for use in beer production. It is precisely because the hops were grown in Japan that this product has been made possible. Moreover, with the expansion of the craft beer business, the importance of distinctive, Japan-grown hops is increasing.

However, due to the aging of the farming population and a lack of successors to take over the farms, the production volume of Tono hops has fallen to a quarter of its peak, and there is a possibility that it could disappear completely in ten years' time. In response to this situation, Kirin, which purchases 70% of Japan's hops crop, is pursuing a range of initiatives to increase the value of Japan-grown hops.

700 Production volume (t) 647 Number of farms 600 538 500 400 ³⁶⁹ 354 300 202 200 133 101 79 100 1989 1993 1998 2003 2016 Source: Data Regarding Hops (2016), Iwate Prefectural Government

Hops production volumes and number of farms

Hops Fields Living Species Survey

We have been conducting an ongoing living species survey in the Tono hops fields since 2014. In 2015, the survey confirmed the presence of 104 insect species and 19 bird species. This rich diversity

of living species in the hops fields is attributable to the existence of windbreak forests that protect the hops plants, which grow to a height of 5 meters, from the effects of the wind. The combination of the windbreak forests and underbrush is nurturing a wide diversity of living creatures. This has made it clear that human innovations for the cultivation of hops have nurtured and protected the diversity of living species in the area surrounding the hops fields.We have held Living Species Observation Events since 2016, inviting local elementary schoolchildren to participate and having them get a feel for the rich nature of Tono and the fact that hops fields are part of Tono's nature.

Initiatives for increasing the value of Japan-grown hops

In Tono, Kirin and the City of Tono have launched the TK (Tono x Kirin) Project to take maximum advantage of the appeal of hops and revitalize the region. Project activities include the Hops Harvest Festival, which it is hoped will nurture civic pride in the crop.In 2018, Kirin invested in the agricultural corporation BEER EXPERIENCE CO., LTD. to accelerate the realization of Tono City's "Beer Village Concept," and contributed to social value in a form of revitalizing local economies through the sustainable production of Japanese hops, especially rare hop MURAKAMI SEVEN bred by Kirin and increasing the brand value of such Japanese hops. At the same time, we will lead the investment to development of the craft beer category through stable procurement of Japanese hops and external sales to craft breweries.





Diverse forms of life inhabit the wind-breaking forests planted to protect the hops and the underbrush planted to prevent drying of the ground.



Living Species Observation Event



Tea farms

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Assistance to obtain Rainforest Alliance certification

Kirin Gogo-no-Kocha is the No. 1 tea drink brand in Japan, selling approximately 1.3 billion bottles a year. Ever since its launch over 30 years ago, tea leaves harvested in Sri Lanka have been used as ingredients. When we conducted a biodiversity risk assessment in 2010-2012, we learned that approximately 25% of Sri Lankan tea leaves imported by Japan were used for *Kirin Gogo-no-Kocha*. In order to continue producing tasty and safe tea drinks, we have been supporting willing Sri Lankan tea farms to obtain Rainforest Alliance certification since 2013. *Source: 2011 Tea Statistics, Japan Tea Association

Supportiing Growers Obtain Rainforest Alli ance Certification



As of the end of 2019, 87 large tea farms, or approximately 30% of the large tea farms certified by the Rainforest Alliance in Sri Lanka, were certified with Kirin's support.

In the training for obtaining certification, tea farms are guided to preserve forests, investigate and protect wildlife, and carry out waste-sorting and recycling. They also learn how to prevent the loss of fertile farm soil due to heavy rainfall during the rainy season by planting grass with deep roots on the steep slopes of farms, and ways to reduce pesticides and fertilizers. As a result, tea farms become environmentally friendly and can enhance their agriculture level as they improve the quality of tea leaves while reducing production costs. This also contributes to improving the skills of farm workers, and safety management and living standards, enabling the farms to carry out more sustainable agriculture. Meanwhile, Kirin can continuously



procure high-quality and safe tea leaves that are sustainable. Furthermore, in an effort to achieve even higher levels of sustainability, some farms have begun conducting research aimed at significantly increasing yields and undertaking the challenge of pursuing chemical-free cultivation, as initiatives beyond the certification criteria requirements.

(Social impact→P.16)

Engagement with raw material production regions→P.82)

Assistance for small farms and conservation of farm water sources

Based on what has been achieved so far, we launched three new initiatives in 2018 to further increase the sustainability of tea farmers.

OExpansion of training programs for large farms

We will expand our support to more farms and further increase the percentage of our Sri Lankan suppliers that are highly sustainable farms.

OCommencement of assistance for small farms to obtain certification

In Sri Lanka, many small, family-run farms exist. There are said to be several hundreds of thousands of such small farms in Sri Lanka.The tea leaves grown on these small farms are collected by government-qualified collectors and sold on to the large



Target number of residents in the education program to learn about the importance of water 15,000 (2020)





Establishing methods for distinguishing between harmless and noxious weeds, and only removing the weeds that have an adverse impact on the tea bushes will make it possible to grow tea without the use of chemical pesticides. This will reduce the costs of farm chemicals and improve farmer earnings, while also increasing the safety of the tea leaves.

farms in the vicinity, before being processed in the factory and shipped. Tea leaves from small farms can sometimes account for as much as half or more of the tea leaves processed in the large farms' plants.As such, in order to further enhance the sustainability of black tea leaves and production regions, we began assisting small farms to obtain certification in 2018.We plan to have assisted 10,000 small farms to obtain certification by 2025.

OCommencement of activities for the conservation of water sources for tea farms supported by the Kirin Group

For details, see "Conservation activities for water sources on tea farms" on (P.42)



A state of the seminar in Sri Lanka. In the certification of small farms, multiple farms join up to form teams and decide on the team leader. Local trainers first educate these leaders, who then educate the other farms in their team on the certification criteria to obtain the certification.

Coffee farms

Assistance to obtain Rainforest Alliance certification

ietnam is the world's second largest coffee bean producer after Brazil. About 30% of the coffee beans Kirin Group imported in 2019 were grown in Vietnam, which are used in *Kirin FIRE*. On the other hand, most coffee plantations in Vietnam are small, and there are some farmers who suffer from reduced yields, or end up using more chemical fertilizers than necessary, because they cannot improve their traditional farming methods due to a lack of appropriate educational opportunities. In 2019, we conducted a scenario analysis of the impacts of climate change in 2050 and 2100 and found that coffee bean yields will likely be significantly affected in many countries and regions. To enhance the sustainability of agricultural production regions

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together with the farms and ensure the stable use of high-quality ingredients in the future, the Kirin Group decided to extend support for obtaining Rainforest Alliance certification, which we have long been providing to tea farms in Sri Lanka, to





Support activities

In 2020, we are supporting small plantations in Da Lat Province in south-central Vietnam, which is the largest coffee bean producing region in Vietnam. With an altitude of about 500 meters and an average temperature of around 25 to 27 ° C, this area is said to be suitable for coffee cultivation. The majority of local plantations are small with a cultivation area of about 1 to 1.2 ha. Since small plantations do not have adequate educational opportunities, it is difficult for them to improve cultivation methods on their own. For example, many farmers cut down trees in the plantation believing that more sunlight will increase productivity. However, in reality, severe sunlight will exhaust coffee trees and drain fertile soil when it rains heavily. Training to support plantations in obtaining certification includes teaching them the benefits

of planting acacia and fruit trees as shade trees to protect coffee trees from strong sunlight and heavy rain, as well as to maintain soil moisture and reduce irrigation water during the dry season. Shade trees also bring extra income to small plantations. In addition, by learning to appropriately use the minimum necessary amount of chemical fertilizers and pesticides, plantations will be able to conserve soil functions and reduce the cost of purchasing them, thereby increasing profits and also protecting workers' health.

Supporting small plantation owners in attaining various knowledge on agriculture and acquiring certification in this way contributes to improving their capabilities and enabling farmers to increase their agriculture level by becoming able to more rationally use natural resources and flexibly respond to environmental changes such as climate change while reducing production costs and increasing the quality of their coffee.

Major activities scheduled for 2020

- Analysis of conditions at small plantations by Rainforest Alliance agronomists and formulation of action plans.
- Grouping small plantations and selecting leaders.
- Training on sustainable agriculture for group leaders.
- Training for small plantations by trained leaders.
- Self-assessments by groups followed by development and implementation of improvement plans.

Vineyards

34

Vineyards as vast, good-quality grasslands develop ecosystems

Grassland is a typical example of nature that is protected by human intervention.Grasslands are said to have covered 30% of Japan's national land area 130 years ago, but they have dwindled to just 1% today.However, the ratio of endangered plants per unit area is extremely high (Graph on the right), and grasslands play an important role in conserving biodiversity. In a full-scale ecosystem survey conducted with the participation of researchers from the National Agriculture and Food Research Organization (NARO), the presence of 168 species of insects and 288 species of plants, including endangered species, that appear in the Red Data Book of the Ministry of the Environment, was confirmed at Mariko Vineyard, a Mercian-managed vineyard in Ueda City, Nagano Prefecture. Many rare species, including endangered species, have been found in Jyonohira Vineyard in Katsunuma-cho, Yamanashi Prefecture.

A vineyard cultivated in hedgerow style, with grass grown under the vines, can play a role as a vast good-quality grassland with proper undergrowth cutting, enabling not only highly fertile plants but also native and rare species to inhabit it. In 2019, in order to also investigate the effects of grass growing on grapes themselves, we began conducting a preliminary study of spiders, soil organisms, and birds in the vineyards. In response to the expansion of the market for Japan Wine, Mercian, whose history dates back to the establishment of Dainihon Yamanashi Wine Company, Japan's first private-sector winery, plans to expand its company-managed vineyards. Converting idle farming land into vineyards for Japan Wine will not only contribute to the expansion of the business. It will also



create valuable grasslands and lead to the expansion of Japan's traditional rural Satochi-Satoyama landscapes.



Surveys in the process of converting idle farming land into vineyards

At the Tengusawa Vineyard in Koshu City, Yamanashi Prefecture, NARO and the Kirin Group are conducting a rare joint research project on a global basis to study changes in the ecosystems as a piece of idle land is converted into a hedgerow-style vineyard. In 2016, the land was still idle. Only an extremely small number of insect and plant species were found in the Tengusawa Vineyard, due to damage from deer eating the vegetation. Since the area was fenced and reclaimed in 2017, the landscape has

The process of converting idle and devastated land into vineyards in Tengusawa Vineyard



Rare species discovered

Mariko Vineyard





Argyronome laodice japonica Leonurus japonicus

Vincetoxicum pycnostelma



changed to one like a vineyard, and we are seeing how the ecosystem has become richer during this process. In our research on insects, we use butterflies as an indicator, and the number of species quickly increased to 16 in 2019 from 13 in 2018. We will continue to conduct surveys over the next several years to test the hypothesis that vineyards cultivated in hedgerow style, with grass grown under the vines, on idle lands will enrich the ecosystem.

Governance andEnvRisk ManagementDate

Message from Top Management

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Revegetation activities

In 2016, under the guidance of NARO, our employees began participating in activities to regenerate rare and native species and confirmed that native species have already taken root. In 2019, native species with blooming flowers were there to stay, and the field became like a flower garden in autumn. Furthermore, we began along with an international NGO Earthwatch Japan and its volunteers, an activity to revegetate Sophora flavescens, which is not a rare species at the national level, but is the sole grass used for feeding Shijimiaeoides divinus, an endangered IA (CR) butterfly. Volunteers are asked to bring Sophora flavescens back and raise them at home, and we will eventually plant them at the Mariko Vineyard.



Top left: Rare and native species regeneration activity Top right: Flowering native species were stayed Bottom: Sophora flavescens revegetation activity

Expansion of book donations to elementary schools

Good quality tea leaves from Sri Lanka are essential for *Kirin Gogo-no-Kocha*. In 2007, the year following the product's 20-year anniversary, we launched the Kirin Sri Lanka Friendship Project to further strengthen ties with Sri Lankan tea farms and continue seeing stable production of tea leaves. In this project, we donate, on a continual basis, bookshelves and books to each of the schools that the children of the tea farm workers attend, with the aim of raising the educational level of children who will lead the next generation and to contribute to the stability of farm management. We have already made donations to about 180 schools and plan to continue to increase the number of schools to which donations are made.



Vending machines for the support of the Borneo Green Corridor



On the Malaysian island of Borneo there has been a notable loss of tropical rainforests due to the expansion of oil palm plantations where raw materials for palm oil are produced. A certified NPO corporation Borneo Conservation Trust Japan launched the Ongaeshi Project with the aim of conserving Borneo's biodiversity that has been rapidly deteriorating behind people's life styles, which are becoming more convenient and richer thanks to palm oil. When beverages are purchased from Kirin's support-Borneo vending machines, a portion of the owner's profits are applied to the support funds of the project. As a unique form of support that allows anyone to easily contribute to biodiversity conservation activities, these support-Borneo vending machines have been installed in approximately 200 locations throughout Japan, including offices, schools, buildings, zoos, and construction sites.

Gov Risk

Environmental Strategy

Indicators and Goals

Activity

Biological Resources

Water Resources

We will create together

A society that values sustainable water resources

Bring water, used as a raw material, to a sustainable state Solve problems with water in a way that suits the characteristics of basin regions where our business bases are located

Basic Thinking

For the Kirin Group, as well as being a basic raw material, water is also an essential resource in growing the agricultural products that are our ingredients. In addition, water is an indispensable resource for washing our production equipment. However, our scenario analysis based on the TCFD recommendations shows that water resources in the locations and basins of our business sites and in raw material production regions are significantly affected by climate change. The Kirin Group recognizes that water resources are shared resources and are closely related to the society, culture, and human rights of people living in basins. We are also aware that water resources and regions have different risks associated with water. With this recognition, we are taking appropriate measures based on the circumstances of each region.


Overview of Approaches

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The Kirin Group has been continuously working to achieve sustainable use of water resources through such measures as major water savings by using a cascading system of water use and installing advanced industrial water treatment equipment. We are also continuing to lead the industry in forest conservation activities to protect water sources at our breweries in Japan. Kirin Brewery has reduced its water consumption rate by approximately 50% compared to 1990 levels, and has achieved the world's highest level of water conservation in Australia, where water stress is high. At the same time, we have long understood that water resource issues vary from country to country and region. In 2014, we identified the amount of water used in the upstream of our value chain and conducted water risk surveys at our global business sites. The results were disclosed in 2015. Subsequently, in 2017, we conducted water risk assessments in the basins that the Kirin Group's 44 business locations in nine countries rely on, and in the production regions of our major agricultural ingredients. In 2019, we identified water risks in greater detail in major agricultural production regions as part of our scenario analysis. The Kirin Group's new long-term strategy called Environmental Vision 2050, announced this year, calls for solving problems with water in a way that suits the characteristics of basin regions where our business bases are located. Already, in 2018, we began water source conservation activities in Sri Lankan tea farms as well as providing education programs to residents in basins there about the importance of water. We are also considering expanding these initiatives to other raw material production regions. Related Information→P.94~P.95



Lightights of Outserves

2015

5.498 \rightarrow 5,428

2019

2015

2019

2.67m³/kL → 3.26m³/kL

2015

969

 \rightarrow

2019

1,170

2015

4.73m³/kL → 3.43m³/kl

2019

nigningrits of Outcorr	ies			
Challenges	Progress			
Bring water, used as a raw material, to a sustainable state	In 2019, Kirin Brewery reduced its industrial water usage use by 64% and its water consumption rate by 49% compared to 1990 levels. The same year, the Kyowa Kirin Group worldwide including Kyowa Hakko Bio reduced its industrial water usage by 23% and its water consumption rate by 26% compared to 2015 levels. Although Myanmar Brewery's industrial water usage rose by 21% compared to 2015 in 2019, its water consumption rate fell by 25%. We continued our Water Source Forestation Activities in 12 locations across Japan, with 1,192 people participating.			
Solve problems with water in a way that suits the characteristics of basin regions where our business bases are located	In 2018, we began activities to conserve water sources in tea farms in Sri Lanka. Water sources in highlands are the source of many rivers in coastal cities, making our activities important for all surrounding basins. In Japan, we were able to minimize the impact of Typhoon Faxai and Typhoon Hagibis in 2019, despite the severe damages they inflicted on the country, because we had been quick to prepare a counter-disaster manual based on the lessons learned from our previous experience with the disruption of the distribution networks caused by the 2018 West Japan Torrential Rain Disaster. Furthermore, in 2019, we proceeded with our efforts as part of the scenario analysis to identify water risks and water stresses in major raw material production regions in more detail.			
Progress				
Kirin Brewery ———	— Kyowa Kirin Group worldwide — including Kyowa Hakko Bio			
Water usage	Water consumption rate	Water usage	Water consumption rate	
-64%	-49%	-23%	-26%	
$\begin{array}{c} 1990 \\ 34,900 \\ thousand m^3 \end{array} \xrightarrow{2019} 12,509 \\ thousand m^3 \end{array}$	1990 2019 10.44m³/kL → 5.30m³/kL	$\begin{array}{c} 2015 \\ 52,682 \\ thousand m^3 \end{array} \begin{array}{c} 2019 \\ 40,696 \\ thousand m^3 \end{array}$	$\begin{array}{c} 2015 \\ 14.5 \\ thousand m^{3/} \\ billion yen \end{array} \rightarrow \begin{array}{c} 2019 \\ 10.7 \\ thousand m^{3/} \\ billion yen \end{array}$	
Lion ———		Myanmar Brewery ——		
Water usage	Water consumption rate	Water usage	Water consumption rate	
-1%	22%	21%	-27%	



Bring water, used as a raw material, to a sustainable state

Water sources

Activities to protect the blessings of water

Our Water Source Forestation Activities, which began as an activity to protect the water sources of our manufacturing plants, began in the forest of the Tanzawa district of Kanagawa Prefecture, which is the water source for Kirin Brewery Yokohama Plant in 1999. This initiative, which was a pioneering initiative in the industry, has since been adopted in 12 locations across Japan. Under medium and long-term agreements with the local governments and other relevant parties that manage the water source forests, the program includes tree planting, undergrowth cutting, pruning, and thinning. Today, many of the forests are bright, luxuriant forests. In some locations, some of our customers have volunteered to take part in the activities. In 2019, 1,192 people took part in activities for a total of 15 times.

Special tour to encounter forests and water

Kirin Distillery has conducted a special tour, called "Water and

Forests Classroom" twice a year or so since 2014, in conjunction

with the magazine, Randonnée. This initiative gives participants

the opportunity to develop a better understanding about the



Kirin Kiso-river water source forest



Voices of Stakeholder

forests and water.

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Forest creation consists of planting, protection and nurturing, and taking advantage of resources. Teaching people who live in cities about forests through cutting work, and giving them hands-on experiences of making things from the thinned wood - all of these things lead to forest creation. We work with the Kirin Group on the Water and Forests Classroom, a reader-participation activity sponsored by Randonnée magazine, and other activities. With the aim of forest creation that anyone can participate in, we will continue to cooperate with the Kirin Group in the pursuit of our activities.

Tsuchi ni Kaeru Ki Forestation Society (NPO)





Actual records of Water Source Forestation Activities in FY2019

Number of implementations	Number of participants	Locations
15	1,192	11

C

Manufacturing

Water conservation measures according to risks

Reducing the amount of water used in manufacturing plants is a major challenge. The Kirin Group has pursued water conservation through recycling and others in addition to initiatives such as using water only when and as much as needed. Meanwhile, focusing on the water risks in the basin regions around our manufacturing plants, we have conducted surveys to identify the degree of risk and are installing and operating watersaving equipment according to the level of risk.



CIP equipment

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External washer

Cascading industrial water

Much of the water used in manufacturing plants is used for washing and sterilizing processes of equipment and pipes. In addition to the establishment of frameworks and mechanisms for the confirmation and assurance, from a quality perspective, that washing is being performed, water flow rate and velocity are strictly controlled to ensure that water is not wasted. We also actively pursue the re-use of water, depending on the purpose. Specifically, the rinsing water used in the final step of the pipe and equipment washing process is still relatively clear, so it can be used again for the initial process of pipe washing. In this way, we have implemented a cascading system of water use that repeatedly uses water that has been used in washing, according to the quality of the water. In actuality, considerable knowledge on how to use this equipment is needed to achieve the right volume balance of recoverable water and water used and the timing of recovery and use, and to guarantee that the equipment and pipes are being washed properly.

The Kirin Group is achieving a high level of water conservation by sharing various know-how and ideas, giving feedbacks on outcomes and taking other steps for improvement, thereby accumulating such know-how and ideas as technologies.

Advanced water treatment equipment

Lion is committed to exploring innovative ways to improve water management within the communities it operates. In 2009, Lion commissioned a water recycling plant for its Castlemaine Perkins Brewery – setting out to halve the water used in brewing their classic brand, *XXXX Gold*. A decade on, the brewery is approaching world class standards in water management and is continually pushing the boundaries of conservation. The two main uses for water in brewing are water used in making the beer itself – plus water used in the brewing process, which is Cascading rinse water for washing tanks



Flow of sophisticated water processing facility at the Kobe Plant



used in non-product related processes, such as cleaning, cooling and pasteurising. In 2009, Lion partnered with the Queensland Government to install a reverse osmosis plant, to recover waste water and minimise our reliance on mains-fed town water. In 2019, the plant generated more than 240 million liters, the equivalent of 96 Olympic-sized swimming pools. On average the brewery recycled approximately 4.7 million liters of water per week in 2019. Vitally, the plant enables *XXXX Gold* to be produced at a ratio of 2.5 liters of water for every liter of beer produced – which is approaching world class levels of water efficiency.

This technology is being shared within the Kirin Group, and is now in use at Kirin Brewery's Kobe Plant. 0

Wastewater

Wastewater treatment

It is our obligation as a company that uses water as a raw material to ensure that our wastewater is returned to nature in pristine condition. In the Kirin Group, the water that we have finished using is purified to voluntary standards that are stricter than those required by law, before being released into rivers and sewers. (State of wastewater \rightarrow P.95)

State of wastewater quality→P.101

In the anaerobic treatment process used to treat wastewater, a biogas, with methane gas as its main constituent, is obtained. This gas is used to generate electricity at boilers and co-generation systems.

This is a renewable energy derived from plant-based raw materials, such as malt, so is a CO₂-free energy.

State of wastewater biogas→P.64

Environmental protection activities in basin regions around manufacturing plants

The various manufacturing plants of the Kirin Group are conducting a range of environmental protection activities, particularly riverside clean-up activities in cooperation with local governments and NGOs.

The Kirin Brewery Yokohama Plant, in cooperation with an NPO, Tsurumi River Basin Networking, continues to conduct beautification campaigns at nearby Tsurumi River, Living Species Observation Events and others.

Kirin Brewery, Kirin Beverage, Mercian, Kyowa Kirin, and Koiwai Dairy Products are also engaged in local environmental beautification and environmental protection activities, focusing on the rivers they draw water from and other nearby rivers.



Environmental protection activity in Tsurumi River basin regions

Coastal clean-up activities

A group of 36 people, consisting of employees of Mercian's Fujisawa Plant and their families, participated in the 43rd Zero Trash Clean Campaign - Beach Clean Up Kanagawa 2019, a clean-up activity on the Katase Coast in Fujisawa hosted by the Fujisawa City and the Kanagawa Coastal Environmental Foundation in May 26, 2019. The Plant supports the goals of this initiative, namely to "conduct a clean campaign to protect the beautiful natural surrounds of the Katase Coast, so that the beaches can be widely loved as a place of rest and relaxation for all," and participates in the campaign every year. It will continue to widen the circle of volunteers, to take care not to discard trash and call on everyone to be involved in the beautification of the environment on the Katase Coast.



Clean-up activity on Katase Coast in Fujisawa

Environmental Strategy

Indicators and Goals

Solve problems with water in a way that suits the characteristics of basin regions where our business bases are located

Water Risk Assessment

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The results of the water risk assessment of Kirin Group business locations and the value chain water risk assessment conducted in 2017 are as follows. For the assessment, we used WRI Aqueduct and WWF-DEG Water RiskFilter to simplify the surveys, and took information published by administrations, etc. into consideration.

Forty-four major production sites in Japan, the United States, China, Thailand, Vietnam, Myanmar, Australia, and New Zealand were surveyed.



С

Conservation activities for water sources on raw material production areas

Conservation activities for water sources on tea farms

In the assessment of water risks in the value chain conducted in 2017 and the scenario analysis conducted in 2019, it has become evident that climate change will cause water stress and flood risks to increase in ingredient agricultural production regions in the future. However, it is not easy to respond to water resource issues in the upstream of the value chain. Therefore, the Kirin Group decided to address this issue beginning

with Sri Lanka, where we have been providing assistance for obtaining sustainable tea farm certification, and where we have developed strong partnerships with local tea farms and NGOs. In the tea farms on the Sri Lanka highlands, there are many areas where the tea bushes are planted on steep slopes. The rain, instead of penetrating into soil, flows straight down such slopes which as a result are believed to have lower water

source cultivation function compared to that of the mountains and hills where native forest remains.

However, in places with good conditions of soil beds and others, rain that falls near the summit and on the tea farm penetrates the ground, and numerous springs gush up in sections of the tea farm. These places are known as

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Conservation of tea farm

water sources

5 locations (2020)

60%

3 places

Tea bushes planted on steep slopes

micro watersheds. Micro watersheds on tea farms can be found in the highlands of central Sri Lanka, and, in almost all cases, they are headstreams of rivers flowing through coastal cities. For this reason, while they occupy only a tiny area, they are very precious water sources.

In this initiative, five micro watersheds are selected from tea farms. that we have assisted to obtain certification, and we will fence off these micro watersheds to protect them from being used for other purposes. Also, with the objective of bringing vegetation

Mechanism of micro watersheds



diversity to single-cropping tea farms, we intend to plant native and endemic species of trees around the micro watersheds. This also serves to ensure that soil that flows down the slopes during torrential rainfall does not flow into the water shed.

Education programs for valuing water

Due to the history of Sri Lankan tea farms, going back to when the plantations were first established, many people still live on the vast tea farms who make a living by doing work that has nothing do with the tea farms themselves. These residents have been generally allowed to use empty plots that are not being used to grow tea for their living. For this reason, there have been cases in which these

Target number of residents in the education program to learn about the importance of water 15.000(2020)



150 persons

residents, not recognizing the water sources, which are called micro watersheds, as water sources, have converted those areas to vegetable patches or grazing pasture, or have cut down the trees around the watersheds for firewood.

Therefore, in order to protect the water sources, instead of merely fencing off to keep the tea farms' residents away, there is a need to educate them that those areas are the water sources we should protect.

In this initiative, we plan on conducting an education program to teach the approximately 15,000 residents living in the vicinity



A micro watershed surrounded fenced off

A stream inside a tea farm

of these five water sources about the importance of water and about what kind of functions micro watersheds have. Furthermore, at some farms, efforts are made to incorporate our educational programs as part of the curriculums of day care centers and elementary schools attended by children of teapicking workers.

In the future, we will also consider offering support on water risks to other raw material production regions.

Contribution to water-efficient agriculture

The bag-type culture vessel system technology Kirin developed for the practical application of mass plant propagation technology is expected to be applied to water-efficient agriculture.

With the resin film-based bag-type culture vessel system, a solution containing nutrients necessary for plant growth is aerated inside a small bag to allow plants to grow, making it easier to use water more effectively than in soil cultivation. Therefore, this system may be applied to cultivation in dry areas, for example.

We will continue to apply this mass plant propagation technology as a means to solve various social issues.

(Mass plant propagation technology \rightarrow P.28)

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Water Graphs

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(Related Information→P.94~P.95)

Water use and consumption rate (water use/sales revenue) of entire Group



Water use and consumption rate (water use/sales revenue) of Kyowa Kirin Group worldwide including Kyowa Hakko Bio



Water use and consumption rate (water use/production volume) of Kirin Brewery



Water use and consumption rate (water use/production volume) of Lion



Cyclical water use and cyclical use ratio (cyclical use/ (tap water use + cyclical use)) of entire Group

Re-used water Recycled water -O- Cyclical use ratio



Environmental Strategy

Indicators and Goals

Activity

Y

Water Resources

Containers and Packaging

We will create together

A society that circulates containers and packaging in a sustainable way

 Develop and disseminate sustainable containers and packaging Build a resource-recycling system to make containers and packaging sustainable

Basic Thinking

While containers and packaging are essential to protect the quality of products for delivery to our customers, it is also true that used containers and packaging account for a high percentage of household waste. To address this issue, the entire industry has promoted 3R (reduce, re-use, recycle) and achieved a high recycling rate. However, it cannot be said that all materials are recycled and we need to also consider the sustainability of containers and packaging materials. The Kirin Group continues to reduce the weight of containers and packaging, and is promoting the sustainable use of containers and packaging by increasing the ratio of recycled resin used in PET bottles and adopting FSC-certified paper for containers.



Environmental Strategy

Indicators and Goals

0

Overview of Approaches

Taking advantage of our strength in maintaining the Institute for Packaging Innovation in-house, the Kirin Group has achieved the lightest packaging in Japan for many types of containers and packaging.Further, we have achieved a high rate of recycling in Japan through the promotion of 3R (reduce, re-use, recycle), with the participation of industry organizations and the community. In Australia, we are responding to the newly enforced container deposit scheme and we have been appointed as a consortium coordinator for the management and operation of the container deposit scheme in certain states.

To address the challenge of plastic waste, in February 2019, we established the Kirin Group Plastic Policy, and have launched initiatives to meet the target of increasing the percentage of recycled plastics in our PET bottles for the Japan market to 50% by 2027 declared in this policy. We are also promoting the use of FSC-certified paper containers. Kirin Brewery and Kirin Beverage had completed replacing all of their paper containers with FSC-certified paper by the end of 2019. Under our new long-term strategy, Environmental Vision 2050, announced this year, we declared to work toward 100% sustainable containers and packaging that use recycled materials and biomass by 2050.

45

bottles

cans

Material mix of containers and packaging in 2019, by weight Kirin Brewery Kirin Beverage Mercian 24.8% 21.6% 42.0% Glass Aluminium Steel cans PET bottles Cardboard for

Packaging

Highlights of Outcomes

Challenges	Progress
Develop and disseminate sustainable containers and packaging	In response to The Kirin Group Plastic Policy, PET bottles made from 100% recycled PET was adopted for 430 ml <i>Kirin Nama-cha Decaf</i> , which bears the R100 mark to indicate that it is made from 100% recycled PET material. (We have been using PET bottles made from 100% recycled PET material for some of the packaging of our <i>Kirin Gogo-no-Kocha Oishii Muto (sugar-free)</i> since 2014.) For paper containers, we had achieved 100% use of FSC-certified paper for 6-can packs, gift boxes, cardboard cartons for products and drink boxes, and approximately 98% for alcoholic beverage boxes by the end of 2019.We have also been working to reduce the weight of containers by developing and adopting the lightest weight in Japan for our returnable glass beer bottles of all sizes and 2.0-liter PET bottles.
We will build a resource-recycling system to make containers and packaging sustainable	In addition to maintaining the reuse system for returnable beer bottles, we are promoting the recycling of containers and packaging in Japan and maintaining a high recycling rate worldwide by taking initiatives such as various activities through recycling organizations, support for voluntary collection of aluminum cans, adoption of easy-to-sort containers and packaging, and activities to raise consumer awareness. We are also studying ways to achieve our 2027 target for a system to recycle PET bottles. In Australia, we are responding to the newly enforced container deposit scheme and we have been appointed as a consortium coordinator for the management and operation of the container deposit scheme in certain states.



Develop and disseminate sustainable containers and packaging

The Sustainability of raw materials

Plastic Policy

The convenience of plastic has made it a popular material for many different products, containers, and packaging. With such a vast range of types and applications of plastics, collection and recycling rates vary depending on the type of plastic used, and it could not be said that all plastics are being efficiently circulated. Plastic waste discarded into the environment is finding its way into the oceans, causing global concern about the potential for marine pollution and adverse impacts on ecosystems.

The issue of plastic waste has become one of the major environment-related social issues. Kirin Holdings established the Kirin Group Plastic Policy in February 2019 with the intention of finding a solution to this issue. In the Policy, to further promote resource circulation of PET bottles, we declared a target of increasing the percentage of recycled plastic in PET bottles for the Japan market to 50% by 2027. We also declared that we would consider the introduction of PET bottles made with plastic derived from inedible plant material. with the aim of moving away from petroleum resources. The Kirin Group will promote the sustainable use and resource circulation of plastics by identifying the essential challenges that plastics pose and swiftly pursuing appropriate actions regarding the plastic containers and packaging that the Group provides. Plastic Policy→P.88

Sustainable use of PET bottles

意味は肥厚し

再生PET#描中 00%使用しています。

KIRIN

With the establishment of safe methods for recycling PET plastics, Kirin Beverages is promoting initiatives to use recycled PET materials in its PET bottle production. This method, known as "mechanical recycling," involves washing the bottles before processing them at high temperatures in a condition close to a vacuum state. This volatilizes and removes the impurities stuck inside the plastic, restoring the molecular weight, which is decreased in the recycling process, to a level suited to bottle formation.

Kirin Beverages began using PET bottles made from 100% recycled PET material for some of the packaging of its Kirin Gogo-no-Kocha Oishii Muto (sugar-free) product in February 2014. This bottle uses 90% fewer petroleum resources and achieves a reduction in CO₂ emissions of 50~60% than regular petroleum-derived PET materials.

In mid-June 2019, this bottle was adopted for 430 ml Kirin Nama-cha Decaf. which bears the R100 mark to indicate that it is made from 100% recycled PET material.

The R100 bottle used for Kirin Nama-cha Decaf won the President of Japan Packaging Institute Award at the Japan Packaging Contest 2019 sponsored by the Japan Packaging Institute in 2019 and the WorldStar Award in the beverages category at the 2020 WorldStar Packaging Awards Competition sponsored by the World Packaging Organization (WPO) in 2020.



Adoption of FSC-certified paper for containers and packaging

The Kirin Group established its CSV Commitment in February 2017. As the first stage in concrete approaches, we revised the 2013 Action Plan for the Sustainable Use of Biological Resources and announced our goal of switching to FSC-certified paper for all of our paper containers and packaging by the end of 2020. This indicates that we have entered a new stage of pursuing the sustainability of container and packaging materials themselves, and it is positioned as an important approach that deals with the dual challenges of "biological resources" and "containers and packaging" mentioned in our Environmental Vision 2050.

A major feature of this approach is that it targets 6-can packs, gift boxes, drink boxes and cardboard cartons for products, which covers all of our paper containers. This is the first declaration of its kind to be made by a Japanese manufacturer. In non-alcoholic beverages, as of May 2016, before this declaration, Kirin Beverages had adopted FSC-certified paper for all of its 250-ml drink boxes for the *Tropicana 100%* range, and was displaying the FSC label on the boxes. After the declaration, it extended the use of FSC-certified paper to its

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Tropicana 900-ml drink boxes in March 2017, and to its *Kirin Gogo-no-Kocha Summer Citrus Tea* in May the same year. It continued to progressively adopt FSC-certified paper for other products, and at the end of October 2018 FSC-certified paper was applied for 6-can beverage packs and cardboard cartons. By the end of November 2019, 100% use of FSC-certified paper was achieved for all paper containers of Kirin Beverage's products.

In alcoholic beverages, 100% use of FSC-certified paper for 6-can beer packs of all sizes was achieved by the end of November 2017, and certified paper was adopted for the *Kirin Ichiban Draft Set* gift boxes in October the same year. By the end of March 2019, 100% use of FSC-certified paper was achieved for all paper containers used by Kirin Brewery, including gift boxes and cardboard cartons. FSC-certified paper is also used for over 98% of paper packs for alcoholic beverages, the remaining type of packaging, and Mercian expects to achieve 100% use of FSC-certified paper on all paper packs for alcoholic beverages by the end of 2020.



FSC-certified paper targets and status of achievement

The status of achievement of targets as of the end of March 2020 is as follows.

FSC-certified paper targets and rate of achievement

Туре	Target	Target Year	Rate of FSC-certified paper	Rate of FSC labeling
6-can packs for beer	100%	End of 2017	100%	adout 93%
6-can packs for non- alcoholic beverages	100%	End of 2017	adout 97%	adout 78%
Gift boxes	100%	End of 2020	100%	adout 70%
Drink boxes for non- alcoholic beverages	100%	End of 2020	adout 98%	adout 75%
Drink boxes for alcoholic beverages	100%	End of 2020	adout 89%	adout 9%
Cardboard cartons for non-alcoholic beverages	100%	End of 2020	100%	adout 70%
Cardboard cartons for beer and RTD products	100%	End of 2020	100%	adout 60%
Cardboard cartons for wine and Shochu products	100%	End of 2020	100%	0%

For policies on biological resources→P.87~P.88)

FSC logo displayed on top of 6-can beer packs and cardboard cartons for products

The Kirin Group is pursuing the display of the FSC-certified label to give consumers a real sense of the importance of protecting the forests. In May 2017, we became the first brewery in Japan to sell 6-can packs of beer displaying the FSC-certified label. Since October the same year, we have begun progressively displaying the label on the underside of other 6-can packs and it now appears on the underside of almost all of our 6-can packs.

We have also started displaying the label on the spout and sides of drink boxes for non-alcoholic beverages, with the label already visible on almost half of these products.

Further, starting with January 2019 shipments, the FSC logo is being displayed on the top of 6-can packs and cardboard cartons for alcoholic beverages. Now it is possible to see the logo on most products on store shelves. C

Reduce

Corner-cut cartons

Our "corner-cut cartons" were developed by Institute for Packaging Innovation and introduced in 2004. The beveled corners have reduced the weight of the carton and, because the carton has eight sides, making it stronger, the cardboard thickness has been reduced, resulting in a 10.9% reduction in the weight of the carton compared to conventional cartons.

Smart-cut cartons

The smart-cut carton, which we introduced in 2015, is based on the corner-cut carton technology. In addition to the reduction in weight, the corners of the long edges at the top of the carton have been cut to fit the space created by the lids of the 204-diameter can, which are smaller than the rest of the can. This has resulted in a 16% weight reduction compared to the corner-cut carton.

Institute for Packaging Innovation developed the smartcut carton in conjunction with a container and packaging manufacturer, with whom the Laboratories have obtained a joint design registration.

6-can pack

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Innovations have been incorporated into various parts of the 6-can pack to make it more lightweight, as well as achieving ease of carrying and removing from the shelf. For example, a new cut-out section has been included at the sides of the pack to match the can edge (Kirin patent), and a "can bottom lock structure" is used to stabilize the bottoms of the can with paper. These innovations have resulted in a reduction in packaging material of 4 grams, or 8%, per 500-ml 6-can pack, while also improving the pack's can-holding power.



Lighter Cans

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At Kirin Brewery, by reducing the diameter of the can ends and narrowing the top and bottom edges of the can body to reduce the weight of the can, as well as thinning out the walls of the can body, for our 350-ml aluminum cans, the current 204-diameter can end has achieved a weight reduction of approximately 29% compared to the old 209-diameter can end. This means an annual saving in aluminum resources* of approximately 19,000 tonnes. (*Kirin data from 2015 production volumes)

Further, working with can manufacturers, we developed Japan's lightest aluminum can with thinner can ends and bodies in 2016. The overall weight of the can has been reduced by approximately 5% (0.8 grams) from 14.6 grams to 13.8 grams. This represents a weight reduction of 33% (6.7 grams) from the 209-diameter can end. In steel cans for beverages, the weight of the diamond-cut

IRIA

350 ml aluminum cans

Large bottle

-21%

605g→475g

130g reduction

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190-gram steel can used for FIRE Hikitate Bito (low-sugar) coffee was reduced by 17% compared to the 2008 level in 2011.

Japan's lightest returnable glass bottles

As well as being light in weight, returnable glass bottles need to be durable enough to maintain their returnable functionality and strong enough to ensure consumer safety and peace of mind.

To meet this challenge, Institute for Packaging Innovation made excellent use of innovations such as a ceramic coating that forms a thin film on the bottle's outside surface, an impact-resistant shape design, and a bottle mouth design that meets the conflicting requirements of being easy to open and able to be sealed tightly and that is also strong enough not to chip, achieving Japan's lightest returnable glass beer bottles in all sizes, large, medium, and small.

Transitioning weight of the 350 ml aluminum cans



bottles

about

930t

reduction

Previous

Liahtest

in Japan

*Calculated on

assumption of 10

million bottles a vear

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1.5 mm

less than

previous bottles

One of Japan's lightest PET bottles

The Kirin Group's Institute for Packaging PET bottle for Innovation has continued their technological development efforts with the aim of reducing the weight of PET bottles.

the 2.0-liter water -55%

In particular, the weight of the PET bottle for the 2.0-liter Kirin Alkali Ion Water was reduced from 63 grams prior to June 2003 to just 28.9

grams in 2015, with a further reduction to 28.3 grams achieved in 2019, making it the lightest in Japan.

Simply making the bottle walls thinner would make it difficult to maintain the strength of the bottle, so a design was developed that achieved both appropriate strength and ease of holding. Innovations were also incorporated that made it easy even for a small child to crush the bottle after the contents have been drunk.In April 2019, we moved forward with further weight reductions by making modifications to the bottle's screw top, including making the screw threads narrower and the screw portion shorter. These efforts will result in reductions of PET plastic use of approximately 107 tonnes and CO₂ emissions of approximately 375 tonnes.



In 2016, Lion Pty Limited also succeeded in reducing the weight of its one-way bottles from 205 grams to 190 grams.



Environmental Strategy

Institute for Packaging Innovation

Institute for Packaging Innovation develops and evaluates technologies related to packaging lines and packaging and containers used in the Kirin Group's alcoholic and non-alcoholic beverages businesses. The Research Laboratories is one of the few research laboratories owned by a Japanese beverage company for the development of packaging and containers for the company's own use. It leverages the technologies it has accumulated in areas such as glass bottles, cans, PET bottles, cardboard cartons, and other paper packaging over many years to provide the necessary technical assistance to bring products to market. It promotes the creation of technical "seeds" that will enrich our customers and society through new packaging and containers. The Laboratory is as well equipped as a small factory, with machinery to fill glass bottles.





Recycling

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Recycling of PET bottles

The Kirin Group promotes the recycling of PET bottles as a member of the Council for PET Bottle Recycling. Under the Council's Third 3R Promotion Voluntary Action Plan (FY2016-FY2020), we are working toward a target recycling rate of 85% (base year: FY2004).

Recycling of cans

Kirin Group is pursuing the adoption of aluminum cans, which have a high rate of recycled metal. We have also joined the Japan Aluminum Can Recycling Association, and we are providing assistance for the collection of used aluminum cans as a way to promote their recycling. Under the Third 3R Promotion Voluntary Action Plan (FY2016-FY2020) of Japan Aluminum Can Recycling Association and Japan Steel Can Recycling Association, we are working toward a target recycling rate of 90% (base year: FY2004) for both aluminum and steel cans.

Empty aluminum cans that have been discarded at the breweries are recycled by the can manufacturers and used entirely for aluminum beer cans.

Recycling of glass bottles

Old returnable glass beer bottles that can no longer be reused and one-way bottles which are used only once are turned into cullet, for use primarily as the raw material for making new glass bottles.

With the aim of the 100% recycling of empty glass bottles, we are pursuing uses for cullet made from colored glass, which cannot easily be re-used for glass bottles. We are finding other applications for colored cullet, including in building materials such as tiles and blocks and road paving materials.





Containers and Packaging (Lion)

Consistent with Lion's strategic goals to increase recycled content and recyclable packaging there were several initiatives completed in 2019 that continue to reduce the environmental footprint of our packaging.

By changing bottle supplier for *5 Seeds Cider* and *Tooheys Extra Dry* from a Middle-East based supplier to a local Adelaide supplier, a significant carbon emission reduction has been achieved for West End Brewery through the avoidance of international movement of bottles from the Middle-East to Adelaide.

Plastic packaging for plastic label reels has been removed which avoids the use of 65,000 plastic bags per year. Stretch film was also transitioned from 20um film to 15um film, reducing annual plastic usage by 100 tonnes. Carton board grade at Burnie now has greater recycling content with an increase from an average of 42% to 100% in the lids of shelf ready cartons. This results in a reduction of approximately 263 tonnes per year of cardboard. Cartons weights have also been reduced by approximately 3.4% to 10% (dependent on board grade), resulting in a reduction of 23.5 tonnes of cardboard use per year.



Other Recycling initiatives

PET bottles

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Clear PET bottles used for easier recycling.

Aluminum cans



Cans with a high percentage of recycled metal used as much as possible.

Outer case cartons



Cardboard suitable for recycling.



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Reuse

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Re-use of glass bottles

In Japan, glass bottles have been collected and re-used over and over since the Meiji Era (1868-1912), long before the word "3R" was coined.

Returnable glass bottles that come back to the factory are washed thoroughly inside and out to make them as clean as a new bottle. After the bottles are stringently checked for scratches and cracks with an empty bottle inspection machine, they are put back into product service and filled with beer. When handled carefully, returnable glass bottles last for an average of about eight years. This means they are used around 24 times.

Bottles that have small scratches or fine cracks or that are too old to be of service any longer are crushed and turned into a material called cullet, which is used as the raw material to make new bottles.



For Kirin Brewery and Kirin Beverage returnable bottle collection rates→P.58

Other Reuse initiatives

Returnable bottle (alcoholic beverages)



Returnable bottle (soft drinks)



Large commercial draft barrels (stainless steel)



With the Society

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Consumer awareness stickers affixed to empty container recycling boxes for vending machines

The Japan Soft Drink Association, of which Kirin Beverages is a member, issued a Soft Drink Business Plastic Resource Reclamation Declaration on November 29, 2018. As one of the initiatives under this declaration, from May 2019, the Association rolled out a campaign to attach 500,000 stickers to the empty container recycling boxes placed next to vending machine, to make consumers aware that these boxes are solely for the collection of empty containers for recycling purposes. The soft drinks industry aims to reduce any contaminants from the PET bottle recycling chain to ensure that 100% of the bottles can be used effectively.

Voluntary collection of aluminum cans

As a member of the Japan Aluminum Can Recycling Association, the Kirin Group is engaged in the recycling of aluminum cans. In addition, it also supports the activities of can manufacturers to collect used cans. More than 40,000 tonnes of aluminum cans are collected via these activities, all of which are recycled back into new cans, which Kirin uses for its products.

Bags for recycling provided by Kirin Brewery

Collection of used containers at vending machines

For vending machines installed by Kirin Beverage, the company conducts a comprehensive operation, from proposal and refilling of merchandise to service and repair of the vending machines. In addition, as an environmental initiative, it collects the empty containers and even cleans the area around the vending machines.



Easily separated containers and packaging

In consideration of ease of trash separation, we endeavor as far as possible to use single materials in our containers and packaging or make it easier to separate them into single materials. Also, to raise awareness about the recycling of containers and packaging, we provide containers and packaging that are easy to separate. We also take into consideration the ability to recycle the materials without problems at general waste processing facilities.



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Consumer awareness activities

We are engaged in a number of 3R awareness-raising activities on the internet. These include the Kirin's Containers and Packaging and 3R website, which is the most informative website about recycling in

the industry, and the KIRIN KIDS website for children. We also deal with the theme of 3R for containers and packaging at our Kirin School Challenge workshops for junior and senior high school students.

We also use Eco Panda, an environmental-awareness mascot character that made its first appearance to coincide with the launch of the "pecology bottle," an environmentally-friendly, resource-conserving, easily crushable container, to conduct awareness-raising activities aimed at children junior and senior high school students.

We have also conducted awareness-raising activities at a variety of events, including exhibiting our R100 PET Bottle for the *Kirin Nama-cha* Decaf which used 100% recycled PET plastic, and our Japan's-lightest 2.0-liter PET bottle used for Kirin Alkali Ion Water at the G20 Innovation Exhibition and PR for International Media Center (IMC) during the G20 Osaka Summit.



Kirin School Challenge (FSC logo image)

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Let's!

G20 Innovation Exhibition



The Adopt Program is a method of community beautification in which residents "adopt" a section of a neighborhood and participate in cleanup activities. The Beverage Industry Environment Beautification Association (BIEBA) brings together six beverage manufacturing industry bodies to conduct promotions and activities aimed at the beautification of communities. Kirin Brewery and Kirin Beverage participate in BIEBA as members of their respective industry bodies, the Brewers Association of Japan and the Japan Soft Drink Association, providing support for activities in this Program.



Main activities of the Beverage Industry Environment Beautification Association

Support for education

BIEBA grants awards to schools that are actively engaged in the education and practice of community beautification. It also produces and supplies community beautification education guides for teachers.





Littering prevention campaign

BIEBA places "No Littering" stickers on roadside signs and vending machines to call for the prevention of littering.



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Australia's Container Deposit Schemes and Lion's Initiatives

Lion plays an active role in Australia's Container Deposit Schemes, holding majority ownership of Marine Stores, a Recovery Coordinator in South Australia and the Northern Territory. Lion is also a part of the joint venture which coordinates the NSW Container Deposit Scheme, Exchange for Change (EfC). In Queensland, Lion is a member of the Container Exchange Limited (CoEx), appointed as the Product Responsibility Organisation to administer and run the Queensland scheme.

Australia has Container Deposit Schemes operating within

five of its eight states, with future schemes announced for all the remaining states in Australia. Western Australia's implementation is expected in June 2020. Victoria's implementation in 2022/23 and Tasmania's in 2022. New South Wales has returned more than three billion bottles and cans in

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just over 2 years of the scheme being in place. An average of 7 million drink containers per day are being returned in New South Wales. There are currently 640 return points operating across the state.

The Queensland Container Refund Scheme commenced on 1 November 2018 with more than 230 points return points in operation.

The South Australian scheme continues to operate, this scheme is reporting a return rate of beverage containers sold of approximately 76.4%.

In the first year of the Australian Capital Territory scheme operating, there has been greater than 26 million containers returned and recycled. New return sites continue to be expanded to increase volumes of containers being recycled. The Northern Territory scheme continues to operate and in the 2018 – 2019 report their return rate has increased by 10%, bring the total return rate to 84% of containers sold. New Zealand has announced that a Container Return Scheme is being developed for introduction across New Zealand to address the issue of beverage containers entering landfill. A fit for purpose scheme will be designed based on schemes operating in other markets that meets New Zealand's geographical location needs and recycling requirements. The scheme's design is due to be presented to the New Zealand Government in August 2020.

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Graphs for Containers and Packaging







Trends in weight reduction of cartons and 6-can packs



Returnable beer bottles lighter transition



- Large bottle - Medium bottle - Small bottle







Kirin Beverage trends in sale and collection of returnable glass bottles



■ Sale ■ Collection • • Collection rate

Environmental Strategy

Indicators and Goals

Activity

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Rate of PET bottle recycling in Japan



Rate of aluminum can recycling in Japan



Rate of steel can recycling in Japan





We will create together

A society that has overcome climate change

Realize Net-Zero GHG emission from the entire value chain Lead to build a decarbonized society

Basic Thinking

The KIRIN Group, based on the scenario analysis conducted on TCFD recommendations, reaffirmed that climate change associated with global warming will have a serious impact on the biological resources and water resources that are important raw materials for the Kirin Group. Given these analysis results, we set an ambitious target to "realize Net-Zero GHG emissions from the entire value chain" in its new Environmental Vision 2050, which far exceeds the target of the previous Long-Term Environmental Vision. We will lead to build a decarbonized society.



Overview of Approaches

In 2009, the Kirin Group declared the lofty target of halving our CO₂ emissions from its entire value chain by 2050 compared with those of 1990. In 2017, we set new GHG reduction targets for the total of Scope 1 and Scope 2 emissions, and Scope 3 emissions, by 30% compared with those of 2015 by the end of 2030, and we have been taking action toward the target. This target is the first food industry case in Japan approved by Science Based Targets initiative (SBTi).

We have been working actively to reduce GHG emissions from our entire value chain. In the upstream of our business, we introduced the in-house production of PET bottles and the domestic bottling of imported wine. In our production, we converted the fuel from oil to gas and introduced advanced technologies such as co-generation and heat pump. In the downstream logistics, we propelled modal shift and joint deliveries with our competitors. In the introduction of renewable energy, we are promoting use of wastewater biogas to generate electricity and purchase of CO₂-free electricity derived from hydroelectric power generation. In Australia, we are aiming to realize its production with 100% renewable electricity by 2025.

In Environmental Vision 2050, our new long-term environmental strategy we announced this year, we commit to "realize Net-Zero GHG in the entire value chain" by 2050. We will raise our GHG reduction target to SBT 1.5° C standard, achieve RE100 prior to 2050, and lead to build a decarbonized society.



Target

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Progress



Highlights of Outcomes

Challenges	Progress			
Realize Net-Zero GHG emission from the entire value chain	Kirin Brewery is steadily installing heat pump systems in the aim of shifting our energy sources from fossil fuels to electric power. Kyowa Kirin has introduced hydroelectric power. The Kirin Group has made steady progress toward meeting the GHG emissions reduction targets set in its CSV Commitment, achieving an 8.5% reduction in combined Scope1 + Scope2 emissions, and 12.7% reduction in Scope3 from the 2015 levels in 2019. Kirin Brewery set a target of increasing the ratio of renewable energy in power purchased by its breweries to 50% by 2030. The ratio in 2019 was 15%. Lion acquired its first large-scale carbon neutral certification in Australia in May 2020.			
Lead to build a decarbonized society	The Kirin Group has signed <i>the Business Ambition for 1.5°C</i> and <i>Uniting Business and Governments to Recover Better</i> in response to the efforts for the 1.5°C future and promoting green recovery. Fermentist, a craft brewery in New Zealand, has launched Kiwi Pale Ale, the country's first carbon-free certified beer. Fermentist is working to reduce GHG emissions from its production process and utilize offset program for the balance to realize carbon neutral throughout the lifecycle of the product, from fertilizers used to grow crops to refrigeration at the homes of consumers.			
	Kirin Holdings is the first company in Japanese food industry which supports the Task Force on Climate-related Financial Disclosures (TCEF) recommendations			

Trends of GHG emissions against medium-term targets

1.500

1 0 0 0

500



Value chain upstream

Responses at tea farms

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Scenario analysis also shows that the effects of climate change increase water risk and water stress in many agricultural producing countries and regions.

At the tea farms in Sri Lanka, in recent years, they have unusual heavy rainfall in the rainy season more frequently due to the effects of climate change. In the key tea production region of Uva Province, many human lives were lost due to landslides. In the training for Rainforest Alliance certification, farmers are taught how to prevent fertile soil from being washed away by erosion caused by rain. Specifically, they are taught to plant grasses whose roots sink deep into the soil and crawl the ground on slopes. In addition to preventing landslide disasters caused by heavy rainfall, this serves as a response to the problem of climate change.

> (Assistance to obtain Rainforest Alliance certification \rightarrow P.32) (Conservation activities for water sources on tea farms \rightarrow P.42)

In-line blowing aseptic filling machine

An in-line blowing aseptic filling machine forms PET bottles from materials known as preforms and fills bottles under aseptic conditions. Kirin Beverage introduced Japan's first inline PET blowing aseptic filling machine to Nagano Tomato (currently Shinshu Beverage) in 1997, and subsequently installed a high speed in-line PET blowing aseptic filling machine at the Shonan Plant in 2000. Although installation of the machine increases CO₂ emissions from the plant, using preforms allows us to process greater loads on trucks compared to using empty PET bottles; therefore, it significantly enhances transport efficiency. Installation consequently contributes greatly to reducing CO_2 emissions from the value chain as a whole and to cutting costs. Furthermore, in 2003, we installed a preform molding equipment on the beverage manufacturing line at Kirin Distillery ahead of other players in the industry.

Ocean Transportation in Large Bags and Bottling in Japan

Mercian ships some of the wine it imports via ocean transportation in specially designed, large 24 kiloliter bags (equivalent to about 32,000 750 liter bottles) with low oxygen permeability and bottles the wine in Japan.

Compared to importing bottled wine, this method lets Mercian reduce CO_2 emissions during ocean transport by roughly 60%. In addition, bottling wine in Japan allows us to use Ecology Bottles (made with at least 90% recycled glass) and lightweight bottles, which contributes to making effective use of resources and reducing CO_2 emissions during shipment within Japan.

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Specially designed large bags

Environmental Strategy

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Manufacturing

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GHG reduction initiatives in manufacturing processes

Kirin Brewery reduced its GHG emissions by about 70% over a 25-year period from 1990 to 2015 by applying its leading technological capabilities in the global beer industry and carrying out numerous forward-looking initiatives. The company is now taking on the challenge of applying even more technological innovations to achieve the Kirin Group's GHG emission reduction target (Scope 1+2, 30% reduction by 2030 compared to 2015 levels).

As a means to achieve this, we are aiming to shift our energy sources from fossil fuels to electric power. Both electric power and fossil fuels are currently used as energy sources at our breweries. Comparatively, the largest amount of GHG emissions comes from fossil fuels, which are used to generate heat. Therefore, in order to reduce GHG emissions, we need to improve energy efficiency and reduce the amount of energy consumption. At the same time, we believe that shifting the energy mix to electric power, and, furthermore, using electricity generated by renewable energy sources are the most effective ways of reducing GHG emissions.

Heat pump systems are a key technology for reducing GHG emissions. We have been able to both save energy and shift to electric power by installing heat pump systems. Simply installing equipment, however, will not necessarily produce results. Before installation, it is essential to analyze the entire heat flow of the production process and optimize it through advanced designs. The Kirin Group has accumulated leading engineering capabilities, and our team made use of that experience while aiming to put in place a production system that realizes the world's lowest amount of GHG emissions. Through these efforts, we expect to reach our GHG emission reduction target before 2030. Moreover, reducing annual energy costs by 1 billion yen appears to be achievable. n 2019, we introduced a heat pump system to our wastewater treatment facilities and began operating the system at our five plants in Japan. Wastewater from each process of beer production is discharged outside the plant through a wastewater treatment process. Wastewater is treated with microorganisms, and the temperature of wastewater must be kept constant in order to maintain the activity of microorganisms. In the past, steam was used for heating in winter when the water temperature was low, and the water was released in a warm condition after microorganism treatment. By introducing a heat pump system, we can recover waste heat from discharging water and reuse the heat in the heating process before the microorganism treatment. This initiative enables us to eliminate the use of steam and we expect to reduce GHG emissions by approximately 2.0% annually.

In the future, we will expand the use of heat pumps in other processes such as cleaning and sterilization.

Kirin Brewery will continue applying its technological strengths with a view to realize the world's best energy system.



Fuel shift and cogeneration

A significant proportion of the fuel used in breweries is used in the boilers that generate steam. We have shifted to natural gas, which generates less CO₂ than heavy oil. This fuel shift has been completed in all of Kirin Brewery's and Kirin Beverage's manufacturing plants. We are also achieving more efficient boiler operations through the installation of high efficient boilers. We have introduced cogeneration systems to provide some of the plants' heat and electricity.



Cogeneration

Improvement of the refrigeration system

At some of the plants of Kirin Brewery, we reduced energy consumption through improving the efficiency of refrigerating systems. We applied cascade refrigeration system as key technology to improve the efficiency, the system cools in phases in a process that involves a considerable temperature difference, or making operational improvements.

Wastewater biogas

In our beer breweries, we have introduced anaerobic treatment facilities to purify the wastewater generated by the manufacturing process. Unlike conventional aerobic treatment, anaerobic treatment does not require electricity for aeration. Also, the anaerobic microorganisms generate biogas as a by-product of the treatment process. This biogas, the main component of which is methane, can be used in biogas boilers and cogeneration systems. Derived from plant-based raw materials such as malt, biogas is a renewable energy and a CO₂-free fuel.

Construction of highly efficient production facilities at Myanmar Brewery

To meet skyrocketing demand, Myanmar Brewery has made major expansions at its manufacturing facilities. Its highefficiency 100,000 kL line began operation in the beginning of 2018. Kirin Holdings allocated skilled engineers into Myanmar business. They collaborated with Kirin Engineering, one of our group companies, which provides engineering service to food industry and has a good reputation for its high quality of work. Kirin Holdings utilize these engineering experiences and expertise to support Myanmar Brewery's strategy to maximize return on capital projects.

Currently, with the rapid economic development in Myanmar, there are concerns about tightening of the energy supplydemand balance in the future. Contributing to solve this social issue, we are reducing energy consumption in our production processes by taking advantage of the Japanese Government's Joint Crediting Mechanism (JCM) financial assistance scheme



t Reduction of steam used the wort boiling process by half

to introduce the latest energy-saving equipment with a track record in the domestic business. In this way, the Kirin Group aims to achieve sustainable growth in Myanmar while contributing to both Myanmar's economic growth and the reduction of its environmental footprint.

Wort

pre-heater

Heat

Heat

exchanger recovery tank

Distribution

Promoting Modal Shift in Transportation of Goods

The Kirin Group promotes rail freight with lower CO_2 emissions. Furthermore, Kirin Group is actively pursuing a modal shift of switching from truck transport to rail and ocean transport for mid-to long-distance shipments (400 to 500 km or more). Although truck transport is efficient when transporting various types of beverages over a relatively short distance to the warehouse of our business partner, rail transport causes lower CO_2 emissions in long-distance shipments. We have also developed special cartons (registered as utility model) that are less likely to rub together during long-distance rail transport. These are just some of the initiatives we are continuing to take in pursuing a modal shift as we work to reduce CO_2 emissions and maintain and improve quality during shipping at the same time.

Joint delivery

The Kirin Group has positioned the logistics area as a noncompetitive sector and is actively engaging in initiatives in this area.

In 2017, together with other companies in the industry, we established a joint delivery center in Kanazawa City, Ishikawa Prefecture, and launched joint transport by rail container from plants in the Kansai area. Neither of the companies has manufacturing plants on the Japan Sea side, so products had to be transported by truck over long distances - of 200 km - from their plants on the Pacific Ocean side. This was inefficient and placed a great burden on the truck drivers. Joint transportation using rail containers has not only significantly reduced CO₂ emissions but also shortened distances between the plants and the terminals and between the terminals and the destinations with a significant alleviation of driver's burden, which is helping to solve the social issue of truck driver shortage. A similar initiative has also been launched in Hokkaido by four sector peer companies including Kirin Brewery.





Joint delivery in Hokkaido



Joint collection of beer pallets

In a joint initiative by the Japan's four major breweries, we are expanding the joint collection of beer pallets.

The joint collection of beer pallets began in the Tohoku area in November 2018 and has been expanded to the Tokyo metropolitan, Tokai, and Kyushu areas from July 2019. It will be progressively expanded to other areas from November 2019 until it becomes a nationwide initiative. Against a background of labor shortages in the logistics area, including a shortage of drivers for truck transport, the aims of the joint beer pallet collection initiative are to reduce our environmental footprint through streamlining of logistics and to alleviate the operational burdens of both the manufacturers and their customers.

With the area expansion in July, improvements in loading efficiency for collection vehicles and shorter collection distances have promoted further reductions in CO₂ emissions. It is estimated that this will result in an annual reduction in total CO₂ emissions by the four breweries of approximately 4,778 tonnes (approximately 47% compared to usual emissions).





- *1 Restricted to customers that have dealings with multiple companies and a transaction scale of at least a certain level (total of around 10,000 beer pallets a year from members of the Association for Joint Use of Beer Pallets)
- *2 One company will represent the four beer companies and collect the pallets. None of the other companies will collect them.
- *3 The representative will tally up the pallets of the four beer companies and manage the collection with the customer.

One of the four

Improving loading efficiency

Using a truck allocation system that has master data for the precise loading capacities of each truck, the Kirin Group is working to transport our products with the most efficient combinations of trucks and cargo.

Further, Kirin Beverage compensated the capacity reduction for large carbonated drink containers (1.5 L) by changing its shoulder shape and changed the body diameter of the PET bottles from 92.5 mm to 89.5 mm. This means that the number of cases loaded on one pallet has been increased from 40 (10 cases x 4 stacks) to 60 (15 cases x 4 stacks), improving the loading efficiency to 1.5 times.



Reducing the weight of containers

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Between 1990 and 2019, Kirin Brewery and Kirin Beverage reduced CO₂ emissions from container manufacturing by a total of 4.21 million tonnes* by reducing the weight of containers and packaging. Making containers lighter leads to reducing CO₂ emissions in the manufacturing process of containers and packaging and improving loading efficiency, which also leads to reduction of CO₂ emissions.

*Calculated based on the Carbon Footprint Product Category Rule (Certified CFP-PCR Number: PA-BV-02) applied to the actual container usage of Kirin Brewery and Kirin Beverage from 1990 to 2019.

Vendor-managed warehouse

The soft drinks manufactured and sold by Kirin Beverage are produced at plants throughout Japan and cover a wide range of beverages, including tea, coffee, carbonated drinks, and sports drinks. Because raw ingredient production plants and warehouses are extremely limited in number in contrast to product manufacturing plants, long distance shipments are increasing. Since raw ingredients are transported when necessary, and in the amounts necessary, in accordance with the plans of product manufacturing plants, even small amounts of raw ingredients are transported over a long distance, which has become an inefficient practice.

In an aim to mitigate the risk of not being able to transport due to an unavailability of trucks and to optimize transportation efficiency, we started a trial operation of raw materials procurement and distribution system using a raw materials warehouse (vendor-managed warehouse) adjacent to Kirin Beverage's in-house plants Shonan Plant and Shiga Plant, from October 2019. By setting a vendor-managed warehouse, raw ingredient suppliers can transport the desired amount of raw ingredients when they need to, thereby maximizing efficiency. In addition, this has made it easier to cope with sudden changes in manufacturing plans, and contribute greatly to improving the responsiveness of manufacturing plants.

In April 2020, we increased the number of applicable raw ingredients to more than 200 types at 20 plants nationwide, including subcontract plants, and the system is in full operation. Given full-scale operation, we are expecting to reduce CO_2 emissions by at least 1,000 tonnes per year (reduction rate of approximately 80%) and to cut the number of long-distance*1 transport trucks by at least 4,000 vehicles (reduction rate of approximately 63%)*².

- *1 Defined as 100 km or more
- *2 Estimated based on the raw ingredient transportation results in 2017, only for raw ingredients that are assumed to make use of vendormanaged warehouse.





and warehouses

plants

Sale

Vending machines

Heat pump-style vending machines pump up the waste heat generated when cooling products and use it for heating to warm up the products. This allows reduction in power consumption compared to conventional vending machines by cutting down the power used by the heaters.

Kirin Beverage was the first in the

industry to introduce heat pump-style vending machines in 2006, and from 2012, almost all newly installed vending machines for cans and PET bottles are of this type. As of April 2020, more than 80% of installed vending machines have been switched to this type.

About heat pump

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The latest heat pump-style vending machines are equipped with a compressor that uses an inverter to delicately control the operation (variable speed of rotation) according to the atmospheric temperature and the temperature of the products in the machine. Further, some types offer higher energysaving performance, such as with heating functions not only by using the waste heat released by the cooling chamber as previous models did, but also by capturing the heat from outside the machine, and by improving hot and cold insulation performances with the heavy use of vacuum insulation materials. These vending machines have evolved to the point where power consumption can be reduced by about 40% compared to 2013. Installation of the new models began in 2015, and we are aiming for 70% of new machines installed in 2020 to be new models.

LED lighting

Conventional fluorescent lighting is being replaced with high energy-saving LED lighting to reduce power consumption and achieve energy conservation.

Trend in power consumption



Change to the best-before labelling

Kirin Brewery will change its labeling of manufacture date on cans and bottles of beer, happo-shu (low-malt beer), new genres, and non-alcoholic beer-taste beverage from the conventional "year, month and early/middle/late month" of manufacture to "year and month" for products manufactured from October 1. 2020 onwards.

This change in labeling alleviates the need for managing by periods within a month and improves the efficiency in managing in-house product storage and shipping operations as well as streamlines inventory management and store display operations of distribution companies, thereby leading to increasing efficiency in the entire supply chain.

Kirin Beverage is also working to shift to labeling the "year and month" as the best before date on soft drinks.

Soft drinks→P.30



*Illustrated image (The printing may be different at the time of release on October 1, 2020.)

Switching business vehicles to hybrid cars

Kyowa Kirin is proceeding with switching business vehicles to hybrid cars. The company started serially switching from the conventional certified low emission vehicles in 2009, and by the end of 2019, all company-owned vehicles are hybrid vehicles. By cutting back fuel used in sales activities in this way, the company is achieving reductions in CO₂ emissions.

Activity

P Ŏ

Natural energy

Natural energy introduction targets

Kirin Brewery has set a target of increasing the ratio of renewable energy in the power purchased at its plants to 50% in 2030 and has started taking action to achieve that. Lion is aiming to realize its production with 100% renewable electricity by 2025. Lion acquired its first large-scale carbon neutral certification in Australia in May 2020. Ratio of renewable energy in purchased power at plants of Kirin Brewery End of 2019

15%



hydro-electric power

Green Heat and Green Power Certificates

The Kirin Group has started the introduction of the Green Heat Certificate at Kirin Brewery's Kobe Plant, which is equivalent to the heat consumption of fossil fuel, and the Green Power Certificate at Chateau Mercian, which is equivalent to the entire electricity consumption.

We have also been sponsoring the Yokohama City Wind Power Generation Project which Yokohama City promotes using the Green Power Certification System, as a Y (Yokohama)-Green Partner since 2007, supporting the promotion of the use of natural energy. So far, the power generated by this project has been used by Kokoniwa, the communication space at Group Head Office, Spring Valley Brewery Tokyo and the Earth Hour hosted by WWF.

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CO₂-free hydroelectric power

Since April 2017, Kirin Brewery's Toride Plant and Kirin Beverage's Shonan Plant started using CO₂-free hydroelectric power in a portion of purchased power. The plants are taking advantage of Aqua Premium, the Japan-first option offered by TEPCO Energy Partner to supply only hydroelectric power. By using hydro-electric power, which does not emit CO₂ at the time of power generation, they will contribute to global warming countermeasures. This is the first example of the use of this option by any factory in Japan, not just in the food and beverages industry.

In 2019 results, CO₂-free hydroelectric power accounted for approximately 71% of purchased power at the Toride Plant and approximately 34% at the Shonan Plant.

In January 2020, Kyowa Kirin's Takasaki Plant also began using CO₂-free hydroelectric power, which is the first case in the pharmaceuticals manufacturing business.



Kirin Brewery Toride Plant

Ratio of hydro-electric power 71%



Yokohama City Wind Power Plant (Hama Wing)

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Solar power generation

Manufacturing plants, including those of Kirin Brewery and Kirin Beverage, have installed solar-power generation equipment in their factory tour facilities and other locations. As part of the Kanagawa Prefectural Governments' Thin-Film Solar Cell Promotion and Expansion Project, Kirin Brewery Yokohama Plant installed a thin-film solar cell in 2016. The Kirin Brewery Yokohama Plant, Kyowa Hakko Bio, and Shinshu

Beverage have leased parts of their premises and building roofs to companies that build large-scale solar power generation facilities, contributing both to effective use of company assets and to dissemination of natural energy.



Yokohama plant

Status of installation of solar power generation facilities→P.100

Initiatives taken by Lion

Lion announced that it became Australia's first large-scale carbon neutral certified brewer in May 2020. This builds on existing strong commitments and strong performance in direct carbon emission reduction across our entire supply chain. The strategy employed has been to firstly assess our footprint through measurement of our carbon emissions, reduce our emissions through implementation of energy efficiency and renewable energy projects, and offset the remaining emissions where there is no direct control to reduce or avoid emissions. This initiative has reduced GHG emissions by 28% from 2015 levels. Lion has also announced its commitment to source 100% of its electricity from renewable energy by 2025. This will be achieved through continuing to investigate opportunities for renewable energy utilization at our breweries and further Power Purchase Agreements (PPAs). In 2019, a solar photovoltaic system was completed and operation has started at Castlemaine Brewery, a leading beer *XXXX Gold* brewery in Brisbane, Queensland. Between June 2019 and December 2019 the solar panels have reduced carbon emissions by 517 tonnes.

A solar photovoltaic system is also planned for Little Creatures Geelong in Victoria, the system is 650 kW and is expected to reduce Little Creatures Geelong's carbon emissions by 955 tonnes per year (25% of CO₂ emissions from electricity). The installation and commissioning of this system is planned for July 2020.



Castlemaine Perkins Brewery

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Kyowa Hakko Bio

Kirin Holdings signs the *Business Ambition for 1.5*° and *Uniting Business and Governments to Recover Better*

On June 24, 2020, the Kirin Group signed the *Business Ambition for 1.5° C* commitment letter jointly issued by the three parties - UN Global Compact (UNGC), Science Based Targets initiative (SBTi) and We Mean Business - requesting companies to set targets that will limit the rise in global temperature to 1.5° C.

Also, on the same day, we signed the *Uniting Business and Governments to Recover Better* statement, which requests companies that have set SBTi targets or declared their intention to set SBTi targets. This is a declaration of our agreement to the statement requesting governments of countries to support the activities of UNGC and SBTi as well as to maintain the current pace of climate change initiatives when considering economic aid in response to the COVID-19 pandemic.

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There has been a growing trend, primarily in Europe and the United States, toward a "green recovery" in which measures to rebuild the economy and society damaged by COVID-19 do not cause the risk of the emergence of new infectious diseases or the spread of infectious diseases, but rather promote reconstruction in a sustainable and resilient manner while also contributing to building a decarbonized society, a circular economy, and conserving ecosystems. As we face an age in which society and businesses are interrelated in a complex manner, it is necessary to overcome the simple dichotomy between the environment and the economy and aim for the sustainability of both society and businesses. In February of this year, the Kirin Group newly established its long-term strategy, Kirin Group's Environmental Vision 2050, with the aim of enhancing the resilience of society and the company. In the area of climate change, we have set forth the target of achieving net zero GHG emissions in the entire value chain by 2050. The aforesaid signatures are part of these efforts. The Kirin Group will lead to build a decarbonized society.

Participation in the "consortium for promoting the use of electric vehicles"

On May 1, 2020, the Kirin Group became a member company of the consortium for promoting the use of electric vehicles (hereinafter, the Consortium), which aims to promote the penetration of electric vehicles for business use. As climate change, which is considered to be a consequence of global warming, advances worldwide, specific measures are required to realize a decarbonized society. In light of this situation, there is anticipation for the use of electric vehicles as a measure to reduce GHG emissions in the transportation sector, which accounts for approximately 20% of emissions in Japan. On the other hand, there are some problems that cannot be solved by a single company in the implementation of electric vehicles for business use. The Consortium aims to promote the introduction and use of electric vehicles, solve social issues, and realize a sustainable society by having companies and organizations share issues and work together to solve them. The Kirin Group will lead to build a decarbonized society through its business activities as set forth in its Environmental Vision 2050. By participating in the Consortium, we will study highly practical electric vehicles suitable for our business operations, share insights across industries, and promote initiatives to realize a sustainable society.

New Zealand's first carbon zero certified beer

The Fermentist's *Kiwi Pale Ale* in Christchurch is New Zealand's first carbon zero certified beer with all emissions from its entire lifecycle considered, from the fertilizer used to grow the grain to the refrigeration at the consumer's home. The approach taken was to assess and reduce the beer's carbon footprint and then offset the remaining footprint that could not be reduced. The offsets purchased are supporting native forest restoration in the Hinewai Reserve on the Banks Peninsula on the east cost of New Zealand's South Island. The *Kiwi Pale Ale* uses Southern Cross and Motueka hops balanced with 100% New Zealand malt, helping reduce the carbon footprint by avoiding emissions associated withthe transport of raw materials in the supply chain.



SPRING VALLEY BREWERY TOKYO

SPRING VALLEY BREWERY TOKYO is an all-day dining establishment with a brewery that opened in Log Road Daikanyama in April 2015, where patrons can enjoy craft beer made on premises. 100% of the restaurant's electricity needs are met by green power* using Green Power Certificates issued by the Yokohama City Wind Power Generation Project.





SPRING VALLEY BREWERY TOKYO, where patrons can enjoy craft beer

Environmental mark program

Japan Network for Climate Change Actions (JNCCA) developed and rolled out an environmental mark program for schoolchildren and after-school care centers to help children discover that there are many environmental labels around; children work together in finding environmental marks attached to various products and services and find out what the marks are for, which gives them an opportunity to think about global warming and other environmental problems. We are working with JNCCA to promote the environmental mark program in anticipation that elementary school children who will lead the next generation become aware of the various environmental marks on the Kirin Group's products as well, understand and take interest in various environmental issues including climate change, deforestation, and sustainable agriculture, and encourage changes in their lifestyles going forward, such as environmentally friendly purchasing and 3R promotion activities, in order to build a decarbonized society.





Decarbonization Challenge Cup

The Kirin Group supports the Decarbonization Challenge Cup which is held with the aim of building a decarbonized society for the next generation by announcing activities on global warming prevention undertaken by various organizations as a means of sharing knowhow and information to build collaboration and motivation for further activities.



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Activity

Climate Change

GHG data

(Independent Assurance Report→P.111) Related Information→P.96~P.100

Value chain greenhouse gas emissions*				(Unit:tCO2e		
		2015	2016	2017	2018	2019
Direct emissions from corporate activities (Scope 1 + Scope 2)		964,392	959,070	943,194	927,337	881,943
Scope 1 (Emissions from use	of fuel)	366,286	365,680	370,340	375,096	368,169
Scope 2 (Emissions related to power and steam)	o purchase of	598,106	593,391	572,855	552,241	513,774
Indirect emissions (Scope 3)		4,560,065	4,087,271	4,222,803	3,972,378	3,982,794
Raw materials (Category 1)		2,811,940	2,626,854	2,557,411	2,331,798	2,306,915
Transport - Upstream (Catego	ory 4)	384,873	374,510	363,123	364,936	405,309
Transport - Downstream (Cat	egory 9)	979,569	787,665	941,234	920,313	929,111
Product use/disposal (Categ	ory 11, 12)	178,557	80,111	158,309	150,569	154,227
Other (Category 2, 3, 5, 6, 7,	8, 10, 13, 14, 15)	205,126	218,131	202,727	204,761	187,231
Emissions from entire value chain (Scope 1 + Scope 2 + Scope 3)		5,524,457	5,046,341	5,165,998	4,899,715	4,864,737
* The emissions are calculated in the same range as the target approved by SBTi. (Calculation boundaries-P.S				daries→P.91)		

Trend in value chain greenhouse gas emissions*





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GHG Graphs

Related Information→P.96~P.100

Total direct emissions (Scope 1+2) and intensity (emissions/sales revenue)



Direct emissions (Scope 1+2) and intensity (emissions/production) of Lion



Direct emissions (Scope 1+2) and intensity (emissions/sales revenu of Kyowa Kirin Group worldwide including Kyowa Hakko Bio



Direct emissions (Scope 1+2) and intensity (emissions/production) of Kirin Brewery





Biogas generation and power generation by Kirin Brewery's

Biogas power generation Biogas generation



Energy use by business (2019)



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Governance Risk Management



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Corporate Governance System

Basic View on Corporate Governance

In line with the Kirin Group Corporate Philosophy and "One KIRIN" Values that are shared across the Kirin Group, the Kirin Group believes that achieving the "2027 Vision" outlined in the Kirin Group's Long-Term Management Vision, Kirin Group Vision 2027 (KV2027) will lead to the Kirin Group's sustainable growth and to greater corporate value over the medium to long term. Accordingly, the Kirin Group establishes a corporate governance system that is capable of effectively and efficiently reaching that goal. We also believe that cooperation with all of our stakeholders is indispensable in order to put the Kirin Group Corporate Philosophy into practice and turn the "2027 Vision" that is based on this philosophy into a reality, and respect the stakeholders' respective viewpoints. We will disclose information promptly to our shareholders and investors in a transparent, fair and consistent fashion, will proactively engage in constructive dialogue with shareholders and investors, and fulfill our accountability with integrity.

Remuneration system for executives

Kirin Holdings revised a new remuneration system for executives in March 2017 with the aim of providing stronger incentive for executives to achieve business plans and to further promote medium and long term value sharing with shareholders and investors. Remuneration levels are reviewed each year versus those at other major domestic corporations and using data gathered by third-party research agencies.

The performance evaluation benchmark for stock-based compensation with transfer restrictions was changed from ROE to ROIC upon the launch of 2019 MTBP. Non-financial indicators were added in 2020.

(Details are shown on Page 53 to 63 of the KIRIN CSV REPORT 2020)

KIRIN CSV REPORT 2020

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https://www.kirinholdings.co.jp/english/ir/library/integrated/2020/
 Kirin Holdings Company,Limited Corporate Governance Policy
 https://www.kirinholdings.co.jp/english/ir/policy/pdf/e_governance_policy.pdf
 Table on Compliance with the Corporate Governance Code
 https://www.kirinholdings.co.jp/english/ir/governance/pdf/governance_code.pdf



Group CSV Committee activity report

The Group CSV Committee meets once a year, in principle, to proactively and independently promote CSV throughout the Kirin Group. Chaired by the president of Kirin Holdings and comprised of the presidents of the Group's main operating companies, the committee deliberates on long-term CSV strategies.



Tasks in 2019

- Addressed progress made in FY2018 and future issues
- Aimed to be a global leader in CSV and worked toward enhancing the resilience of management
- Complied with environmental, social and governance (ESG) criteria
 Exchanged views based on the Task Force on Climate-related Financial Disclosures (TCFD) recommendations
- Attended a lecture by an expert from outside the Group

Facilitation of risk management

The Kirin Group establishes and facilitates risk management systems to ensure that it can accurately identify and address risks with the potential to seriously impede the accomplishment of its business targets or impact its business continuity. Serious risk areas have been defined that include risks related to new strategies or initiatives and risks arising from major changes in the operating environment.

In the process of developing annual business plans, the Group companies identify material risks based on factors of the Group's internal and external business environment including natural environment and take appropriate measures. Kirin Holdings, while presenting the Group risk management policy, checks whether each Group company has identified potential risks, determines material risks for the Group and monitors the risk response plan and its implementation to facilitate risk management for the entire Group.

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Process of determining material risk

Group companies, in conformance with the Group risk management policy, identify and examine the quantitative and qualitative risks associated with their business activities. The Group Risk and Compliance Committee Administrative Office (Kirin Holdings Corporate Strategy Department) surveys and investigates all risks. The Committee defines material risk to the Group as risk considered to have a potentially significant impact, a high likelihood of occurring, or widespread ramifications.

Business risk impact and countermeasures

The Kirin Group identifies material risks to the Group through a quantitative evaluation of each risk based on the potential impact and probability of occurrence and also incorporating qualitative evaluation. Risks determined to have a significant potential impact are designated as material risks for the Group.





The Group communicates the material risks to the executive management of Kirin Holdings and each Group company, establishes clear roles for each company and department, and prescribes risk reduction measures. In addition, the Group regularly monitors the risk conditions and the progress with countermeasures and when necessary reviews the status of the material risks.

Crisis management and business continuity plan

The Kirin Group has a structure in place to properly take measures in the event of a crisis. The Group Risk and

Compliance Committee shares information with each of the domestic and overseas Group companies to provide support and maintain group-wide preparedness.

In particular, since the Great East Japan Earthquake in 2011 we have maintained preparedness for large earthquakes and other assumed disasters and have enhanced our business continuity plan (BCP) by re-examining expected events that might occur and the scope of disaster preparedness.

Specifically, we reassess our business continuity plan and provide disaster training accordingly, as well as implement measures to reduce procurement risks.

Environmental Management System

Promotion of the Environmental Management

The Kirin Group's Environmental Vision 2050 was approved by the Board of Kirin Holdings and announced publicly in 2020. To

create shared value with society and promote sustainable growth, we selected "the environment" as one of the key issues in our Efforts CSV Purpose developed as the guideline toward for the Long-Term Management Vision, 2050 KV2027. And, in formulating the Kirin Group's Environmental Vision 2050, we set a new purpose for the environment: Enrich the sustainable Earth for future generations through positive impact. All companies in the Group share the Kirin Group's Environmental Policy, which was established in 2008, and the Kirin Group's Environmental Vision 2050, which was formulated in 2020.

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To realize the goals of the Kirin Group's Environmental Policy, Kirin Group's Long-Term Environmental Vision 2050, CSV Purpose, and CSV Commitment, Group companies gather the opinions of stakeholders in an appropriate manner, identify and assess the risks and opportunities related to the environmental

Enrich the Earth with Positive Impact

CSV Commitment



activities of their businesses, and take necessary action from medium to long-term perspectives.

Under the Principle for Kirin Group's Global Environmental Management (KGEMP), which were established as a requirement of the Group's environmental management system, each Group company builds and manages its own environmental management system that best suits the nature of its own business, region, and other characteristics and is based on the international standard, ISO 14001.

Group Materiality Matrix

The Kirin Group has organized its priority themes with a view to continue developing sustainably with society into the future in the "Kirin Group's management issues for sustainable growth (Group Materiality Matrix: GMM)". Based on social issues related



designated the fulfillment of its role as a responsible alcohol producer along with health and well-being, community engagement, and the environment as four key CSV issues.

to its businesses, the Group

(Kirin Group's Environmental Vision 2050→P.10

KV2027 https://www.kirinholdings.co.jp/english/ir/private/future.html **Our CSV Purpose** https://www.kirinholdings.co.jp/english/csv/purpose/ Our CSV Commitment @https://www.kirinholdings.co.jp/english/csv/commitment/

Kirin Group's Environmental Vision 2050 Toward achieving KV2027 🙊 KIRIN °∓ ⊘ H finan M finan 15 Au _____ s toward eradicating the harmful as of operation (Zero Harmful Drink • *** **CSV** Purpose

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Environmental management Structure

Under the KGEMP, a Group general environmental manager has been appointed as the chief executive officer for all Group environmental matters. As of April 2020, this role is held by the Senior Executive Officer of Kirin Holdings Company, Limited with responsibility for CSV strategy. The KGEMP also requires the appointment of a general environmental manager, who has responsibility and authority for environmental matters in each business. In addition to monitoring to ensure that the company and its constituent companies are conducting their environmental activities appropriately, the general environmental manager conducts management reviews, identifies issues for improvement, and gives necessary directions to the relevant departments. In the event of an environmental crisis, the general environmental manager will have full authority to resolve the crisis. The KGEMP stipulates that each company complies with laws and regulations and

other rules relevant to the business's environmental activities, and strives to reduce its environmental load as well as prevent pollution under its own environmental management system. Each company will also conduct internal environmental audits to ascertain the appropriateness and legal compliance of their systems and confirm how well targets are being met. The results of these audits will then lead into management reviews. The management of environment-related processes is integrated with company management processes in a manner suited to the companies' respective regions. CSV goals, including those for the environment, are incorporated into the goal-setting for each organization and individual, and the degree to which those goals are reached is reflected in the evaluated performances of the organizations and individuals.



Environmental audits

Each of the operating companies in the Kirin Group complies with ISO 14001 and other environmental management system standards. Internal auditing is conducted in each business location and constituent company, and the environmental management divisions in the head offices of each Group company conduct auditing of business locations and constituent companies. These audits lead to improvements in the individual companies' environmental management systems. Furthermore, on an entire Group basis, Kirin Holdings Company Ltd.'s CSV Strategy Department is contracted by Kirin Holdings to conduct environmental audits according to criteria established by the Group. These audits lead to improvements in each company's environmental management system and are fed into to management reviews.

In Japan, to guarantee further transparency and independence, an outside consultant has been contracted to perform a strict environmental legal audit, beginning in 2009. By 2014, the consultant had traveled around to all production sites in the Group companies. It has since embarked on a second round of audits, beginning in 2015, with several sites being audited each year.

Status of compliance with environmental laws and regulations

Each business location is thorough in its management of legal requirements through a ledger, and also works exhaustively to prevent environmental pollution by establishing voluntary management targets that are more stringent than those required by the legislation. A system for the reporting of environmental accidents has also been established within the Group, in which hiyari-hatto (near-miss) examples in addition to accidents that occurred are shared within the group and countermeasures extended to other sites. Internal environmental audits are used to check the status of initiatives taken toward achieving environmental targets, see how environmental accidents and hiyari-hatto (near-miss) cases are shared with operating companies and business sites, and confirm the status of legal compliance.

Appropriate management of waste

The Kirin Group is working toward its declared goal of the implementation and firm establishment of thorough appropriate management of waste. To this end, we established the Kirin Holdings Waste Management Rules and are promoting the appropriate treatment of waste within the common Group systems.

Specific measures include the standardization of contract templates and contractor audit programs which define its frequency and contents, and the preparation of a list of staff in charge of waste management so that all the staff involved in such work can be educated using standardized textbooks. Further, the information on all waste disposal contractors for the Group is managed collectively, so if in the unlikely event that a problem arises, the details about the contractor, its permits, the waste it is being contracted to handle, and other details can be searched and confirmed immediately. The operations are being standardized in this way so that anyone who is newly assigned to waste-related work will be able to perform it with certainty.

Recycling rate 100%

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The Japanese alcoholic and non-alcoholic beverages businesses (Kirin Brewery, Kirin Beverage, Kirin Distillery) have set a recycling rate target of 100% for their plants and have continued to achieve that target.

Four plants, including the Kirin Brewery Yokohama Plant, first achieved a recycling rate of 100% in 1994, and in 1998, all plants achieved 100%, the first time in the beer industry.

Preventing Air Pollution

The Kirin Group strives to comply with all laws and regulations relating to air pollution in the various countries in which we operate. We have established voluntary standards that exceed those required by environmental legislation and are working to reduce our emission of atmospheric pollutants. For example, for transport in Japan, we are pursuing the introduction of vehicles that comply with the NOx & PM Act in metropolitan areas. We are also increasing the load capacity per vehicle by switching to larger trucks and reduce the total number of trucks.

Preventing Water Pollution

The Kirin Group thoroughly complies with laws and regulations for preventing water pollution in each of the countries where we operate and minimizes wastewater loads by setting our own strict control values, which go beyond those required by environmental laws.

Preventing Soil Contamination

When selling assets, the Kirin Group conducts thorough investigations of soil contamination, addressing them where necessary.

Chemical substances

The Kirin Group manages its chemical substances appropriately based on the Act on Confirmation, etc. of Amounts of Release of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR Act) and other relevant legislation. The Kyowa Kirin Group has set targets for volatile organic compounds (VOC), which, due to the nature of its business, make up the majority of the chemical substances it releases, and is taking action to reduce them.

Polychlorinated biphenyl (PCB)

Managing appropriately and disposing progressively according to the law.

Asbestos

Managing and isolating appropriately and treating progressively according to the law.

Environmental Strategy

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Sustainable Procurement

To fulfill its social responsibility, the Kirin Group established the Kirin Group Sustainable Procurement Policy in September 2017. Listening to the opinions of our suppliers and other stakeholders, we will strive to facilitate their understanding of this policy and work with them to realize it.

Two-way communication with suppliers

The Kirin Group promotes sustainable procurement and, to fulfill its social responsibility in all processes in the value chain, it places importance on two-way communication with its suppliers.

The Japan Alcoholic and Non-Alcoholic Beverages Business asks new suppliers to submit a Supplier CSR Confirmation based on the six categories of the code of conduct stipulated in the Kirin Group Supplier CSR Guidelines, which were revised under the UN Guiding Principles on Business and Human Rights,

and requires them to comply with the Code of Conduct. In line with the human rights risk assessment by country

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conducted in accordance with the Kirin Group's Human Rights Policy, we implemented human rights due diligence of the coffee supply chain in Laos in 2018.

Further, in 2019, we adopted the CSR/Sustainable Procurement Self-assessment Questionnaire developed by Global Compact Network Japan to check the status of our major suppliers' approaches to sustainable procurement once a year. The outcomes of these assessments are fed back to the supplier by the responsible staff and, if necessary, we conduct further investigations and request corrections. Meanwhile, to ensure fair business practices, we periodically conduct a supplier satisfaction survey to seek feedback from suppliers to the Kirin Group and obtain their opinions about the Kirin Group's procurement activities. In April 2019, we also put in place a supplier hotline on our website as a whistleblowing window for addressing compliance matters related to procurement transactions.

Through these initiatives, we are working to carry out open and fair business practices and ensure compliance.



Kyowa Kirin's approaches

Kyowa Kirin has established the Kyowa Kirin Group Procurement Basic Policy and has prepared the Kyowa Kirin CSR Purchasing Guide Book. It has also established the Supplier Code of Conduct with which it asks suppliers to cooperate. At Kyowa Kirin, we also conduct CSR questionnaire surveys each year to analyze the current situation of CSR initiatives in the supply chain and identify issues. From 2019, we also began conducting the CSR questionnaire survey for foreign suppliers. We are also providing opportunities for suppliers to deepen understanding of CSR procurement activities by holding briefing sessions on CSR procurement and organizing supply chain participant meetings to exchange information on issues for the entire supply chain and measures to solve such issues.

Lion's approaches

Lion has released our Supplier Responsible Sourcing Code in line with the International standards, including the International Bill of Human Rights and the International Labour Organisation's (ILO) Declaration on Fundamental Principles and Rights at Work. This code supports the implementation of Lion's Procurement Policy, specifically the following three principles:

 Promoting human rights and ethical sourcing
 Promoting sustainable sourcing
 Building strong commercial outcomes and productive partnerships.

Lion has continued to roll out the SEDEX self-assessment questionnaire to our key suppliers.

As of the end of 2019, 75% of Lion's key suppliers have taken risk assessments through the questionnaire, to meet the CSV commitment target of achieving 100% by 2021.

Environmental Education

Environmental Training

To mitigate environmental risk, the Kirin Group conducts an ongoing program for environmental training for its employees. This systematized training consists of training for environmental staff and training by job grade, including new employees. The training conducted at the Technical Talent Development Center has also been opened to Kirin Group companies in Japan. In 2019, 5 people underwent the wastewater treatment course, and basic classes on topics such as wastewater treatment and waste management were delivered as part of new employee training.

Further, the Kirin Holdings CSV Strategy Department conducts systematized industrial waste training, which was held five times and 285 people underwent in 2019.



Scenery of environmental training

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Raising Environmental Awareness within the Company

In-house communications, specifically employee newsletters and the intranet, are used to expand the depth and breadth of interest in and understanding of the environment among Kirin Group employees. At Group headquarters, videos presenting Kirin's environmental initiatives are screened on digital signage to deepen understanding among employees.



Experiential Program

The Kirin Group conducts a CSV Experiential Program for Confronting Social Issues, a CSV training program that gives employees the opportunity to focus on social issues. In 2019, programs were held to promote understanding of examples of the Creating Shared Value that Kirin engages in with society. We plan and implement these programs that give participants the chance to experience first-hand actual operations and interactions with the local community in Tono in Iwate Prefecture, with which Kirin has had a connection in hops cultivation for more than fifty years, and in Ueda in Nagano Prefecture, where Mercian operates its own vineyard, Mariko Vineyard.

Fiscal Year	Program	Date	Number of participants
2017	At Tono hops farm	5/26 Fri~ 27 Sat	36
2017	At Ueda vineyard	9/22 Fri~ 23 Sat	31
2010	At Tono hops farm	6/1 Fri~ 2 Sat	36
2018	At Ueda vineyard	9/21 Fri~ 22 Sat	35
2010	At Tono hops farm	6/7 Fri~ 8 Sat	42
2019 -	At Ueda vineyard	10/18 Fri~ 19 Sat	40*

*Scheduled to participate. Cancelled due to typhoon damage.

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Stakeholder Engagement

To grow sustainably together with society, the Kirin Group has positioned Creating Shared Value (CSV) as the core of its company management in its Long-Term Management Vision, Kirin Group Vision 2027.

CSV management means achieving both solutions to social issues and the provision of value to customers. It realizes the creation of economic value and social value, with the aim of sustainable growth together with society. To achieve this, it is important that we establish and implement mechanisms for identifying and understanding the challenges, expectations, and demands of our diverse stakeholders and for twoway communication about whether or not Kirin's business characteristics and strengths can be leveraged to meet those challenges, expectations, and demands.

To this end, the Kirin Group has a range of opportunities for dialogue with the stakeholders involved in its business. In addition to dialogue, we also work together with many of our stakeholders and cooperate in voluntary activities that lead to policy recommendations.

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Engagement with raw material production regions

In our support for Sri Lankan tea farms to obtain Rainforest Alliance certification, which began in 2013, Kirin staff travel to Sri Lanka once a year to exchange views with the plantation managers and local residents, to identify and address local issues. The dialogue with the tea farms is an invaluable opportunity for us and the local producers to share their respective needs and issues, with a view to achieving more sustainable, higher quality and efficient tea leaf production.

We decided to expand support for obtaining sustainability certification to small farms in 2018 in response to the consultations received from managers of large tea farms that depend on small farms to cover the need to supply a large amount of tea leaves. We determined that support for small farms to obtain certification for tea leaves would lead not only to increasing revenues and stabilizing the business of small and large tea farms but also to securing stable procurement of tea leaves.

The activities for the conservation of water sources on the farms also materialized as a result of our dialogue with managers of large farms and local residents who had significant concerns over the impact of climate change on water sources. Further, in response to the motivation of local managers to pursue sustainable production of tea leaves offering greater security, we have taken a step further from support for obtaining certification and have started assisting farmers with the initiatives to move away from the use of chemical pesticides and take on the challenge of growing tea more efficiently.

(Assistance to obtain Rainforest Alliance certification→P.32) In Myanmar, after the establishment of the Kirin Group's Human Rights Policy in February 2018, we conducted human rights impact assessments in May and August of the same year and set out activity targets.

In that commitments, we are working on ensuring transparency in the supply chain for rice, one of our ingredients, and strengthening management.

We are also considering providing support with environmental training at Mariko Vineyard, where ecological surveys are conducted, in response to the requests from people in local communities.





Environmental Strategy

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Engagement with experts

In formulating the Kirin Group's Environmental Vision 2050, which was announced on February 10, 2020, we organized roundtable dialogue sessions with stakeholders, with cooperation from experts who had given us valuable advice in the past and we reflected many valuable comments received in our vision.

In ecological surveys on the process of converting idle and devastated land into vineyards, we ask the experts at the National Agriculture and Food Research Organization (NARO), our partner in joint research, to hold a joint research presentation once a year. In addition to sharing the insights obtained through this research, we discuss how to proceed into the future.

We also actively participate in the development of various public guidelines. In 2018 and 2019, at the request of the Ministry of the Environment, we sent a member to the Working Group on the Environmental Reporting Guidelines and

Environmental Accounting Guidelines and the Working Group on guidance and technical notes supplementing Environmental Reporting Guidelines 2018, where he deliberated with experts about disclosure of environmental information. In 2020, responding to the request from the Japan Food Industry Association, we dispatched members to the TCFD Guidance by Industry Review Committee for the food industry.

Roundtable dialogue during the revision of the Environmental Vision

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Held on November 27, 2019 Outside participants: Yoshinao Kozuma, Professor



Emeritus, Sophia University Faculty of Economics. Manabu Akaike, Director, Universal Design Intelligence, Inc. Mikako Awano, CEO, SusCon Japan Chairperson: Masakazu Oki, Environmental Restoration and Conservation Agency's Japan Fund for the Global Environment ·Participants from Kirin Holdings: Ryosuke Mizouchi, Senior Executive Officer. Ryuji Nomura, Executive Officer, Head of the CSV Strategy Department.

Future generations

Dialog with the National Agriculture

and Food Research Organization

The Kirin Group, based on its Environmental Vision 2050, promotes engagement with future generations in various ways to get the next generation involved in resolving environmental issues and have a positive impact to society.

To promote communication with junior and senior high school students who will lead the next generation, in 2014 we began holding workshops called the Kirin School Challenge for students in this age group to learn, think about, and discuss matters for solving various social issues in the world and convey those ideas to their peers. As of the end of 2019, 971 students from a total of 371 schools have participated in the workshop. We also continue to support the Japan Environmental Youth Network, which supports events where senior high school students present reports on their environmental activities. We invite senior high school students to visit our laboratories and ingredient production regions, and hold discussions with students at symposiums hosted by the Japan Environmental Youth Network Secretariat and other forums. In 2019, jointly with Japan Network for Climate Change Actions, we launched trials for an environmental mark program in which children work together to find environmental marks.



In June 2018, we held a CSV briefing for analysts and investors at the Kirin Brewery Yokohama Plant on the topics of "approach to the environment" and "the strengths of Kirin's technological expertise." At the briefing, we explained the various initiatives on the four themes of the Long-Term Environmental Vision, and the weight reduction technologies for containers and packaging being developed by the Institute for Packaging Innovation. We also gave attendees a tour of the Institute and the Yokohama Plant. This briefing provided an opportunity to give the analysts and investors who attended a deeper understanding of the fact that the Kirin Group's efforts are contributing to reducing environmental load and improving sustainability, as well as leading to cost reductions, and that, through these efforts, we are striving to achieve a balance of social and economic value. In the individual meetings, we exchange opinions on our new Environmental Vision announced in February 2020 and responses to climate-related issues, including TCFD recommendations. We hope these meetings provide an opportunity for attendees to better understand the Kirin Group's initiatives.

Since 2017, we have been taking the opportunity when the CDP's chairman or CEO visits Japan to set meetings with Kirin Holdings' Senior Executive Officer in charge of CSV strategy (Group general environmental manager) and exchange opinions on responses to climate change.





SCHOOL CHALLENG Kirin School Challenge Award Ceremony



National Convention of the Japan Environmental Youth Network

Voluntary participation leading to policy recommendations

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Organization	Nature of activity	Organization	Nature of activity
TCFD Consortium	Kirin Holdings has participated in the TCFD Consortium since it was established in 2019. Kirin Holdings serves as a member of the Guidance by Industry Review Committee (food sector) from 2020.	Japan Business and Biodiversity Project	Kirin Holdings has joined the Japan Business and Biodiversity Partnership, which was established by Nippon Keidanren (Japan Business Federation), Japan Chamber of Commerce and Industry, and Keizai Doyukai (Japan Association of Corporate Executives) in 2010.
Clean Ocean Material	Kirin Holdings is a member of the Clean Ocean Material Alliance, which was established with a view to accelerating innovation through public-	Green Purchasing Network (GPN)	The Kirin Group is a member of the Green Purchasing Network (GPN).
Alliance (CLOMA)	plastic products more sustainable and promote the development and introduction of alternative materials.	Forest Supporters	The Kirin Group participates in the activities of Forest Supporters, a civic movement that promotes the creation of beautiful forests. The National Land Afforestation Promotion Organization serves as
	In the WE MEAN BUSINESS coalition, the Kirin Group has committed		secretariat for this movement.
WE MEAN BUSINESS	responses in mainstream reports by CDSB" and "improvement of water security."	Water Project	The Kirin Group has been involved in the Water Project, a public- private sector collaborative awareness-raising project established to promote the maintenance and restoration of healthy water cycles
Science Based Targets	The Kirin Group's emission reduction targets for 2030 were the first in		since 2014.
	The Kirin Group joined the United Nations Global Compact in		The Kirin Groupis a founding member of and active participant in the
Compact September 2005.		Rainforest Alliance Consortium	2015 by the Rainforest Alliance and companies that handle Rainforest
Japan Sustainability Local Group (JSLG)	Kirin Holdings participates as a steering committee member and director of the JSLG.		agriculture.
Fun to Share/ COOL CHOICE	Since 2014,theKirin Group has supported the Japanese government's new climate change campaigns, Fun to Share and COOL CHOICE, and has registered with these campaigns.	Consortium for Sustainable Paper Use (CSPU)	The Consortium for Sustainable Paper Use was established by five (now ten) companies engaged in leading-edge paper use initiatives and WWF Japan. As a founding member of the CSPU, the Kirin Group pursues initiatives for the pursuit of sustainable paper use.
Voluntary Action Plan of Japan Business Federation (Nippon Keidanren)	In consideration of the conservation of the global environment, the Brewers Association of Japan, of which Kirin Brewery is a member, and the Japan Soft Drink Association, of which Kirin Beverage is a member, participate in initiatives for the reduction of environmental load conducted by Nippon Keidanren (Japan Business Federation) and are tackling CO ₂ reductions and the recycling of waste.		
Eco-First	Eco-First is a program in which companies make a pledge to the Minister of the Environment to conduct their own environmental conservation initiatives, such as counter-measures to global warming. The Kirin Group became the first manufacturer to be Eco-First accredited. It also participates in the Eco-First Promotion Council whose members comprise accredited companies.		

NGO		
Name of activity	Nature of activity	
WWF Japan	We received support from the WWF Japan when developing our Guidelines for the Procurement of Sustainable Biological Resources and our Action Plan. The Consortium for Sustainable Paper Use was under joint efforts, and we are continuing to conduct activities.	
Rainforest Alliance	We are working together to support the Sri Lankan tea farms and Vietnamese coffee plantations in acquiring certification.	
FSC Japan	We jointly engage in activities to promote the wide use of FSC- certified paper. Kirin declared its commitment to the Vancouver Declaration on SDGs and FSC certification in 2017.	
Roundtable on Sustainable Palm Oil (RSPO)	Kirin Holdings engages in activities as an associate member of the Roundtable on Sustainable Palm Oil (RSPO), a nonprofit organization that promotes the production and use of sustainable palm oil.	
Earthwatch Japan	We are jointly pursuing ecological surveys at Mariko Vineyard and conducting activities to regenerate Sophora flavescens.	

Engagement

Name of activity	Nature of activity
Kirin School Challenge	We hold environmental workshops for students in junior and senior high schools.
Japan Environmental Youth Network	We support the Japan Environmental Youth Network organized by the Ministry of the Environment and Environmental Restoration and Conservation Agency of Japan and serve on the adjudication panel at the regional and national conventions.

Research institutions

Name of activity	Nature of activity
National Agriculture and Food Research Organization (NARO)	We perform joint research on ecological changes associated with the process of converting idle and devastated land into vineyards and conduct revegetation activities for rare and native species.

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Industry organizations

Name of activity	Nature of activity
Brewers Association of Japan	We are jointly working on developing voluntary environmental action plans related to containers and packaging, global warming, creation of a recycle-based society, etc., and implementing associated measures and on conducting activities to prevent the scattering of beverage containers and promote community beautification.
Japan Soft Drink Association	We are jointly working on developing voluntary environmental action plans related to containers and packaging, global warming, creation of a recycle-based society, etc., and implementing associated measures and on conducting activities to prevent the scattering of beverage containers and promote community beautification.
Recycling related organizations	We are promoting 3R activities together with The Japan Containers and Packaging Recycling Association and various councils for promoting recycling.
The Beverage Industry Environment Beautification Association (BIEBA)	BIEBA brings together six beverage manufacturing industry bodies to conduct activities aimed at beautification of communities.



Environmental Data



Policies on biological resources

From an early stage, the Kirin Group has been pursuing initiatives concerning biological resources, which have a high possibility of being connected to environmental and human rights issues.

After making a Declaration of Support for Biodiversity Conservation in 2010, in 2013, we formulated the Kirin Group's Guidelines on Sustainable Sourcing of Biological Resources and the Action Plan on Sustainable Use of Biological Resources. Black tea leaves, paper and printed materials, and palm oil are specified in the Guidelines and Action Plan as particularly important supplies. After the formulation and announcement of the Kirin Group CSV Commitment in February 2017, we revised the Kirin Group Action Plan on Sustainable Use of Biological Resources and accelerated our initiatives.

Kirin Group' s Declaration of Support for Biodiversity Conservation

Kirin Group relies on the bounty of nature to make products. We utilize the power and wisdom nature has to offer in conducting its business activities. Because of that, we recognize the importance of conserving biodiversity as business challenges. Kirin Group actively pursues a broad range of activities to protect biodiversity in order to continue offering new joys of "food and well-being" into the future.

1. Kirin Group promotes sustainable use of resources while ensuring conservation of biodiversity The Kirin Group is committed to sustainable use of resources while taking biodiversity into consideration in all of its business activities so that all people around the world may continue to enjoy

2. Kirin Group makes effective use of its technologies

the bounty of nature.

As a company that offers new joys of "food and well-being," the Kirin Group makes effective use of its technologies when conducting business activities to contribute to the sustainable use of resources and protection of biodiversity.

3. Kirin Group works in cooperation with stakeholders

Kirin Group adds a biodiversity perspective to the environmental protection activities which have continuously been engaged in and works in cooperation with customers and local partners to continue conserving biodiversity.

4. Kirin Group properly complies with treaties and laws

Kirin Group complies with treaties, laws and regulations concerning biodiversity and strives to help people enjoy the blessings of biodiversity worldwide.

$\operatorname{Kirin}\nolimits$ Group's Guidelines on Sustainable Sourcing of Biological Resources

Purpose The purpose of the Guidelines is to present the fundamental principles of the Group so that it can continue to ensure the "sustainable sourcing of biological resources" based on the Kirin Group's Declaration of Support for Biodiversity Conservation.

Applicable scope The Guidelines apply to biological resources procured by the Kirin Group's operating companies in Japan for which the Group has specified that there is risk of illegal deforestation, environmental destruction and such like based on risk assessment performed.

Guidelines on Sustainable Sourcing of Biological Resources

Kirin Group procures applicable biological resources based on the following principles.

1. Resources that the Group has confirmed;

not to derive from a plantation developed illegally, to have been produced through appropriate procedures in compliance with the laws and regulations of the areas where the raw material is produced.

- 2. Resources deriving from plantations, forests, etc. that have been certified by credible third parties.
- 3. Resources that have not been produced by entities which are considered to be involved in environmental destructions.*1

*1 Reference is currently made to the FSC' s Policy for the Association of Organization with FSC.

Kirin Group' s Guidelines on Access to Genetic Resources

In order to enjoy the blessings of biodiversity worldwide, it is important to ensure proper management of genetic resources in accordance with the relevant laws and regulations agreed upon by the international community. Given the Nagoya Protocol adopted at COP 10, the Kirin Group established its Group Guidelines on the access to genetic resources and has been operating accordingly.

Kirin Group's Principles of Managing Access to Genetic Resources

1. The Group shall respect international agreements concerning biodiversity.

- 2. Access to genetic resources shall be based on prior informed consent of the country providing such resources, and no genetic resources whose backgrounds are unknown shall be carried in or used.
- 3. Use of genetic resources, including fair and equitable sharing of the benefits arising out of their utilization, shall be properly managed in accordance with international treaties.

Environmental Strategy

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Kirin Group Action Plan for the Sustainable Use of Biological Resources

1. Black Tea

Kirin Company, Limited conducts the following three-step survey and, through annual reviews, is raising the level of sustainability.

Step.1 Specify the tea growers from which to procure black tea leaves.

- Step.2 Evaluate the sustainability*1 of the specified growers.
- Step.3 Aim to use black tea leaves from those growers with a high level of sustainability.

2. Paper and Printed Materials

Kirin Company, Limited, Kirin Brewery Company, Limited, Kirin Beverage Company, Limited and Mercian Corporation will:

Office paper*2

aim to use only FSC®-certified paper or recycled paper by the end of 2020.

Containers and packaging*3 *4

1) 6-can packs: aim to use only FSC-certified paper by the end of 2017.

2) Gift boxes: aim to use only FSC-certified paper by the end of 2020.

3) Drink boxes: aim to use only FSC-certified paper by the end of 2020.

4) Cardboard cartons for products: aim to use only FSC-certified paper by the end of 2020.

Other

Priority will be given to the use of paper that is FSC-certified, paper made with wood from FSCmanaged forests, paper made from recycled paper, and paper that has been confirmed through supplier surveys as not resulting in the destruction of high conservation value forests^{*5}.

3. Palm Oil*6

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Operating companies in Japan will use the Book and Claim model in their handling of palm oil used as a primary or secondary ingredient. Book and Claim is a model for the trading of certificates approved by the Roundtable on Sustainable Palm Oil (RSPO).

When the identification of palm oil producers and the direct purchase of sufficient quantities of RSPO-certified palm oil becomes possible, a new, upgraded action plan will be formulated.

Notes

*1 Sustainability of tea in Step 2 will be evaluated according to the status of Rainforest Alliance certification.

- *2 "Office paper" refers to copy paper, envelopes (excluding non-standard sizes and some industrial-use envelopes), business cards, and printed materials such as company pamphlets.
- *3 Includes Kirin-Tropicana Inc.
- *4 Excludes limited-edition products, small-lot product varieties, special shapes, imported products, etc. *5 HCVF (High Conservation Value Forest), as defined by FSC[®].
- *6 Palm oil refers to the oil derived from the fruit of the oil palms, and includes palm kernel oil obtained from their seeds.

Established on February 2013 Revised on February 2017

The Kirin Group Plastic Policy

1. Promoting recycling of PET bottles

The plastic containers, packaging, and other materials provided by the Kirin Group are mostly PET used for beverage bottles and the Kirin Group has used recycled resin for a part of them. The Kirin Group will promote the recycling of PET bottles by aiming to increase this recycled plastic ratio to 50% by 2027.

The recycling of PET bottles cannot be promoted without an efficient method for collecting highquality used PET bottles. At the Kirin Group, we will proactively work with national and local governments, and industry organizations to create an efficient collection and reuse system for highquality used PET bottles.

2. Efforts to reduce single-use plastic* and replace it with other materials

Most plastic waste is comprised of what is referred to as single-use plastic. The Kirin Group will make efforts to reduce the single-use plastic provided by its group companies and replace it with other materials. * Disposable plastic that is used only and not intended for reuse.

3. Improving sustainability of raw materials for PET bottle

Policies on Plastic Policy

At the Kirin Group, we have made continuous efforts to reduce the weight of our PET bottles from the standpoint of reducing our environmental impact. We will keep striving toward even lighter bottles in the future.

In addition, to improve the sustainability of raw materials for PET bottle, we will study the introduction of PET bottle materials derived from inedible plants to reduce our dependence on petroleum resources.

In addition to the above measures, we will proactively participate in educational programs to promote plastic recycling, coastal cleanup activities, and other programs.

Kirin Beverage Company, Limited also supports the Soft Drink Business Plastic Resource Reclamation Declaration 2018 announced last year by the Japan Soft Drink Association, and will take proactive measures to realize the "100% Effective Utilization of PET Bottles by 2030" plan put forth by the industry.

Established on February 2019

Environmental Strategy

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Consideration of the Environment in Product Development

Environmentally Conscious Designs for Containers and Packaging

To further step up conservation of resources and promote activities to reduce environmental impact, the Kirin Group operates on its "Guidelines on Environmentally Conscious Design for Containers and Packaging," which has detailed provisions for what materials may be used and in what combinations. Originally established by Kirin Brewery in 1998, the Guidelines have been widely applied to its entire alcoholic and non-alcoholic beverages business since 2014. In 2019, it was expanded to all Kirin Group companies in Japan, excluding the Pharmaceutical Business.

89 LCA Initiatives for Containers

The Kirin Group performs LCA (Life Cycle Assessment)* on major containers for alcoholic beverages and non-alcoholic beverages whenever necessary. For example, in the case of a glass bottle, we make an assessment by performing calculations in consideration of raw materials used for all parts of the bottle, including the glass, paper for labels, and crown cap, energy used to produce raw materials, and energy associated with recycling after use. We also take into account the product characteristics, unit of purchase by customer at each purchase, major sales store format, projection on collection of empty containers and other relevant factors on a comprehensive basis to select containers.

Guidelines on Environmentally Conscious Design for Containers and Packaging

1. Purpose

The Kirin Group aims to pass down the bounty of natural environment of our Earth in sustainable form to the future generations and continue providing value to customers and society on the whole. To this end, we comply with the relevant laws and regulations and with the Guidelines on Environmentally Conscious Design for Containers and Packaging in pursuing product development in consideration of the environment and promoting reduction and recycling of wastes in its business activities. By so doing, the Kirin Group aims to realize a society that is based on 100% recycling so as to balance the environmental impact produced by the Kirin Group's value chain with the Earth's ability to supply resources.

2. Basic Concept for Development, Design and Adoption of Containers and Packaging

- (1) In development and design, maintain quality, safety and hygiene of product contents, safety of containers and packaging, and appropriate presentation of product information as prerequisites, and take into account environmental applicability, user-friendliness, transport efficiency and economic performance.
- (2) In adoption, select containers and packaging that meet customers' purchasing and drinking styles, form of selling, and characteristics of product contents.

3. Concept of Caring for the Environment in Development, Design and Adoption of Containers and Packaging

- (1) Strive to reduce the environmental impact associated with containers and packaging throughout the lifecycle, i.e., from procurement to recycling, and keep the impact on the natural environment to a minimum.
- (2) In order to make effective use of resources and contribute to the realization of society that is based on recycling, use materials that are easy to recycle or dispose of and that have minimal environmental impact.
- (3) In order to contribute to realizing a low-carbon society, select materials that require low energy use and that generate minimal greenhouse gas emissions during processes of manufacturing containers and packaging and of transporting products.
- (4) Select materials in consideration of preventing environmental pollution at the stage of disposal.
- (5) Promote the 3R (reduce, reuse, recycle) activities in accordance with the following.

4. Guidelines for Promoting the 3Rs (Reduce, Reuse, Recycle)

(1) Reduce

- Make efforts to reduce weight of containers and packaging, sales promotion tools, etc. and to reduce the amount of materials used.
 Make efforts to design containers and packaging so that the volume can be reduced as much as possible by folding or crushing them when they are recycled or disposed of.
- 3. Shift to simple packaging, try to eliminate individual pieces of wrapping and outer packaging, and make efforts to keep packaging reasonable.

(2) Reuse

1. Make efforts to design containers and packaging so that the number of reuses and refills can be repeated as much as possible. 2. Make efforts to keep the environmental impact associated with reuse and refilling as small as possible.

(3) Recycle

- 1. Use single material as much as possible, and when using two or more types of materials, make efforts so as to enable their easy separation.
- 2. Make efforts to use recycled materials and those with high recycling rates.
- 3. Make efforts to adopt specifications and designs that facilitate separated discharge, sorted collection, and material sorting.

Revised on November 18, 2014

(1) Usage Factors

Energy Use Conversion Factors

	Japan	Overseas	
Fuel	"Act on Rationalizing Energy Use" Factors	Lion	 Australia - National Greenhouse Account Factors New Zealand - Measuring Emissions: A Guide for Organisations
		Other than the above	"Act on Rationalizing Energy Use" Factors
Electricity	Used 3.6 (MJ/kWh), which is used by International Energy Agency (IEA) and other organizations		

Emission factors for GHG Emissions

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	Japan	Overseas	
Fuel	Emission factors from Greenhouse Gas Emissions Calculation and Reporting	Lion	 Australia - National Greenhouse Account Factors New Zealand - Measuring Emissions: A Guide for Organisations
Fuel	Manual (Ministry of Environment/Ministry of Economy, Trade & Industry)	Other than the above	Emission factors from Greenhouse Gas Emissions Calculation and Reporting Manual (Ministry of Environment/Ministry of Economy, Trade & Industry)
Electricity	 Emission factors published by individual power companies If none published: Emission factors by country from IEA's CO₂ Emissions from Fuel Combustion for the year in question 		

(2) Calculation boundaries

Entire Group

Business	Company
Japan Beer and Spirits Business	Kirin Brewery, Kirin Distillery, SPRING VALLEY BREWERY, Eishogen Kirin Brewery (Zhuhai)
Japan Non-Alcoholic Beverages Business	Kirin Beverage, Shinshu Beverage, Hokkaido Kirin Beverage, Kirin Maintenance Service, each site of Kirin Beverage Service (Hokkaido, Sendai, Tokyo, Chubu, Kansai) Hakodate Daiichi Vending, KIRINVIVAX, Tokai Beverage Service
Oceania Integrated Beverages Business	Lion
Pharmaceuticals Businesses	Kyowa Kirin, KYOWA KIRIN FRONTIER Co., Ltd., Kyowa Medical Promotion Co., Ltd., Kyowa Kirin plus Co., Ltd., Kyowa Hakko Kirin China Pharmaceutical, Kyowa Kirin Pharmaceutical Research
Other Businesses (all companies included)	Mercian, NIPPON LIQUOR, Daiichi Alcohol, Wine Curation, Myanmar Brewery Interfood, Vietnam Kirin Beverage, Azuma Kirin, Four Roses Distillery Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, KYOWA ENGINEERING CO.,LTD, BioKyowa Inc., Shanghai Kyowa Amino Acid, Thai Kyowa Biotechnologies Co., Ltd., Kirin Holdings, Kirin Business Expert, KIRIN BUSINESS SYSTEM, KOIWAI DAIRY PRODUCTS, Kirin Echo, Kirin and Communications, Kirin Engineering Kirin City, Kirin Techno-System, KIRIN GROUP LOGISTICS

Breakdown of Calculations by Business

Refer to above "entire Group" calculation boundary table.

Breakdown of Calculations by Region

Region	Company
Japan	Kirin Brewery, Kirin Distillery, SPRING VALLEY BREWERY, Eishogen, Kirin Beverage, Shinshu Beverage, Hokkaido Kirin Beverage, Kirin Maintenance Service, each site of Kirin Beverage Service (Hokkaido, Sendai, Tokyo, Chubu, Kansai) Hakodate Daiichi Vending, KIRINVIVAX, Tokai Beverage Service, Kyowa Kirin, KYOWA KIRIN FRONTIER Co., Ltd., Kyowa Medical Promotion Co., Ltd., Kyowa Kirin plus Co., Ltd., Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, KYOWA ENGINEERING CO.,LTD, KOIWAI DAIRY PRODUCTS, Kirin Echo, Kirin and Communications, Kirin Engineering, Kirin City, Kirin Techno-System, KIRIN GROUP LOGISTICS, Mercian, NIPPON LIQUOR, Daiichi Alcohol, Wine Curation, Kirin Holdings, Kirin Business Expert, KIRIN BUSINESS SYSTEM
Oceania	Lion
Southeast Asia	Myanmar Brewery, Interfood, Vietnam Kirin Beverag, Thai Kyowa Biotechnologies Co., Ltd.
Other	Kyowa Hakko Kirin China Pharmaceutical, Kyowa Kirin Pharmaceutical Research, BioKyowa Inc., Shanghai Kyowa Amino Acid, Kirin Brewery (Zhuhai), Four Roses Distillery, AZUMA KIRIN

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Calculation boundary of actual emissions against mid-term and long-term GHG emission targets (Scope 1, Scope 2) (P.22, P.25, P.61, P.72, P.99)

Business	Company
Japan Beer and Spirits Business	Kirin Brewery, Kirin Distillery, SPRING VALLEY BREWERY, Eishogen
Japan Non-Alcoholic Beverages Business	Kirin Beverage, Shinshu Beverage, Hokkaido Kirin Beverage, Kirin Maintenance Service, KIRIN Tropicana, each site of Kirin Beverage Service (Hokkaido, Sendai, Tokyo, Chubu, Kansai) Hakodate Daiichi Vending, KIRINVIVAX, Tokai Beverage Service
Oceania Integrated Beverages Business	Lion
Pharmaceuticals Businesses	Kyowa Kirin, KYOWA KIRIN FRONTIER Co., Ltd., Kyowa Medical Promotion Co., Ltd., Kyowa Kirin plus Co., Ltd., Kyowa Hakko Kirin China Pharmaceutical, Kyowa Kirin Pharmaceutical Research
Other Businesses (all companies included)	Mercian, NIPPON LIQUOR, Daiichi Alcohol, Wine Curation, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, KYOWA ENGINEERING CO.,LTD, BioKyowa Inc., Shanghai Kyowa Amino Acid, Thai Kyowa Biotechnologies Co., Ltd., Kirin Holdings, Kirin Business Expert, KIRIN BUSINESS SYSTEM, KOIWAI DAIRY PRODUCTS, Kirin Echo, Kirin and Communications, Kirin Engineering Kirin City, Kirin Techno-System, KIRIN GROUP LOGISTICS

Calculation boundary of actual emissions against mid-term and long-term GHG emission targets (Scope 3) (P.22, P.25, P.61, P.72, P.99)

Business	Company
Japan Beer and Spirits Business	Kirin Brewery, Kirin Distillery
Japan Non-Alcoholic Beverages Business	Kirin Beverage, Shinshu Beverage
Oceania Integrated Beverages Business	Lion
Pharmaceuticals Businesses	Kyowa Kirin, Kyowa Hakko Kirin China Pharmaceutical, Kyowa Kirin Pharmaceutical Research
Other Businesses (all companies included)	Mercian, Daiichi Alcohol, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, BioKyowa Inc., Shanghai Kyowa Amino Acid, Thai Kyowa Biotechnologies Co., Ltd., Kirin Holdings, KOIWAI DAIRY PRODUCTS, KIRIN GROUP LOGISTICS

Calculation boundary of Scope 3 emissions (P.98)

Business	Company
Japan Beer and Spirits Business	Kirin Brewery, Kirin Distillery,Kirin Brewery (Zhuhai)
Japan Non-Alcoholic Beverages Business	Kirin Beverage, Shinshu Beverage
Oceania Integrated Beverages Business	Lion
Pharmaceuticals Businesses	Kyowa Kirin, Kyowa Hakko Kirin China Pharmaceutical, Kyowa Kirin Pharmaceutical Research
Other Businesses (all companies included)	Mercian, Daiichi Alcohol, Myanmar Brewery, Interfood, Vietnam Kirin Beverage, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, BioKyowa Inc., Shanghai Kyowa Amino Acid, Thai Kyowa Biotechnologies Co., Ltd., Kirin Holdings, KOIWAI DAIRY PRODUCTS, KIRIN GROUP LOGISTICS

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Breakdown of business locations subject to water risk assessments (P.41)

Constituent/Name of Group Company	Country	Number of manufacturing plants	Remarks
Kirin Brewery	Japan	8	Sendai, Toride, Yokohama, Nagoya, Shiga, Kobe, Okayama, Fukuoka * Because Kirin Beverage Shiga Plant is attached to Kirin Brewery Shiga Plant, it is included in Kirin Brewery Shiga Plant
Kirin Distillery	Japan	1	Gotemba
Mercian	Japan	1	Yatsushiro
Kirin Beverage	Japan	1	Shonan * Because Kirin Beverage Shiga Plant is attached to Kirin Brewery Shiga Plant, it is included in Kirin Brewery Shiga Plant
Shinshu Beverage	Japan	1	
Kuowa Kirin	Japan	2	Takasaki, Fuji
Kyowa Kiriir	China	1	Kyowa Hakko Kirin China Pharmaceutical
Kyowa Hakko Bio	Japan	2	Yamaguchi Production Center (Hofu), Yamaguchi Production Center (Ube)
Kyowa Pharma Chemical	Japan	1	Head office
Koiwai Dairy Products	Japan	1	Koiwai
BioKyowa Inc.	America	1	
Shanghai Kyowa Amino Acid	China	1	
Thai Kyowa Biotechnologies Co., Ltd.	Thai	1	
Kirin Brewery (Zhuhai)	China	1	
Interfood	Vietnam	1	
Vietnam Kirin Beverage	Vietnam	1	
Four Roses Distillery	America	2	Lawrenceburg, Cox's Creek
Myanmar Brewery	Myanmar	1	
Lion	Austraria	12	Bentley Milk, Burnie, Canberra, Castlemaine Perkins Brewery, Chelsea Heights, James Boag Brewery, Little Creatures Brewery Fremantle, Morwell, Penrith, Smithfield, Tooheys Brewery, West End Brewery
	Newzealand	3	Palmerston North, Pride Brewery, Speights Brewery

Environmental Accounting

Environment conservation costs

(Unit:million yen)

Cotogony	Constitute dataile	Invest	ment am	ounts	Expense amounts		
Category	specific details	2017	2018	2019	2017	2018	2019
Environmental conser impact resulting from the business areas (to	vation costs to control environmental production and service activity within otal of ①②③ below)	1,311	763	1,243	5,971	5,499	5,854
 Pollution prevention costs 	Air and water pollution prevention activities, analysis and measurement of air and water quality, etc.	1,093	533	536	3,229	2,477	2,330
② Global environmental conservation costs	Solar power generation, CO ₂ recovery, energy saving, cogeneration, etc.	147	215	655	947	828	854
③ Resource circulation costs	Reduction of sludge, waste recycling, water recycling, etc.	71	16	53	1,795	2,195	2,669
Upstream / downstream costs	Containers and Packaging Recycling Act, Recycling contracting costs	0	1	86	40	584	375
Administration costs	Operation of environmental management systems, environmental education, greenification in business sites, etc.	15	13	35	305	319	300
Research and development costs	Container lightweighting, R&D regarding mitigation of environmental load of byproducts, wastewater, etc.	24	29	63	105	100	131
Social activities costs	Environmental conservation activity costs such as activities to protect the blessings of water, donations to nature conservation groups, etc.	3	0	0	95	47	49
Environmental remed	iation costs	0	0	0	0	0	0
Others		0	0	131	3	1	186
Total		1,353	806	1,559	6,520	6,550	6,895

Economic effect (Unit:million yer)							
Items	Details	2017	2018	2019			
Proceeds from sales of valuables, etc.	Waste recycling, etc.	851	840	949			
Resources saving effects	Energy saving, waste reduction, resources saving, etc.	418	555	591			

Calculation boundaries

2017: Kirin (Includes Kirin Brewery, Kirin Beverages, and certain other constituent companies), Kyowa Hakko Kirin,

Kyowa Medex, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, Koiwai Dairy Products 2018:Kirin Brewery, Kirin Distillery, Eishogen, Kirin Beverages, Shinshu Beverages, Mercian, Kyowa Kirin, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, Koiwai Dairy Products, Kirin

2019 Kirin Brewery, Kirin Distillery, Eishogen, Kirin Beverages, Shinshu Beverages, Mercian, Kyowa Kirin, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, Koiwai Dairy Products, Kirin Holdings

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Material Balance

Material Flow (2019, entire Group)

		Unit	Japan Beer and	Japan Non- Alcoholic Beverages	Oceania Integrated	Pharmaceuticals	Other Businesses	Total		
			Spirits Business	Business	Beverages Business	Businesses		2019	2018	2017
Substance		thousand t	584	85	376	1	385	1,431	1,484	2,452
		%	41	6	26	0.1	27	100		
	Raw material	thousand t	406	36	127	0.2	320	889	858	1,733
	Packaging material	thousand t	178	49	249	0.6	65	542	626	719
Wator (frod	water only)	thousand m ³	14,470	2,211	5,023	2,232	44,283	68,218	76,319	79,583
water (iresi	i water onty)	%	21	3	7	3	65	100		
Water recyc	ling	thousand m ³	2,994	341	244	22,166	95,589	121,334	124,003	61,112
Foorgy		TJ	4,029	915	2,400	642	4,645	12,630	13,081	12,972
Energy		%	32	7	19	5	37	100		
Production	Alcoholic and non-alcoholic beverages	thousand kL	2,862	707	1,528	0	762	5,860	5,881	5,743
volumes	Food products/Pharmaceuticals and biochemicals	thousand t	9	0	78	0.2	84	171	191	188
Wastowato	-	thousand m ³	11,949	1,845	3,996	2,002	47,596	67,387	71,747	73,563
wastewate		%	18	3	6	3	71	100		
Greenhouse	e gas emissions	thousand t-C02e	232	56	229	56	376	949	986	996
(Scope1+S	cope2)	%	24	6	24	6	40	100		
NOx		t	138	20	213	6	48	425	436	429
SOx		t	0.3	1	2	0	12	15	19	95
Waste products		thousand t	198	17	148	2	106	470	421	427
		%	42	4	31	0.4	22	100		
	Volume disposed on site	thousand t	0	0	0	0	2	2	12	35
	Volume of recycled waste	thousand t	196	17	139	2	102	455	402	378
	Final disposed volume	thousand t	3	0	8	0.1	2	12	8	14

Water Resources

Trends in water use volumes and water consumption rate (entire Group)

	Water use volume	Water consu (by sales revenu	Imption rate e) (m ³ /million yen)
	(thousand ma)	Japan standard	IFRS
2015	80,625	39	-
2016	81,620	42	44
2017	79,583	-	43
2018	76,319	-	40
2019	68,218	- 35	

Trend in water use volumes (by business)

(Unit:thousand m³)

	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals Businesses	Other Businesses (all companies included)	Total
2015	13,101	2,515	5,444	4,046	55,520	80,625
2016	12,896	2,656	5,514	3,110	57,443	81,620
2017	13,190	2,341	5,469	3,047	55,534	79,583
2018	14,049	2,345	5,378	2,309	52,238	76,319
2019	14,470	2,211	5,023	2,232	44,283	68,218

Trend in water use volumes (by region)

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	Japan	Oceania	Southeast Asia	Other	Total
2015	63,292	5,444	2,317	9,573	80,625
2016	62,707	5,514	2,560	10,838	81,620
2017	61,721	5,469	2,500	9,892	79,583
2018	58,120	5,378	2,811	10,011	76,319
2019	50,333	5,023	3,654	9,208	68,218

Trends in annual water use volumes by water source (entire Group)

		Fresh water							
	Unit	Service water	Rivers (including industrial water)	Underground water	Storm water	Gray water* (Reclaimed water)	Total		
2015	thousand m ³	10,155	40,374	30,067	0	30	80,625		
2015	%	13	50	37	0.0	0.0	100		
2016	thousand m ³	9,946	41,375	30,289	2	8	81,620		
2016	%	12	51	37	0.0	0.0	100		
2017	thousand m ³	9,765	42,150	27,667	1	0	79,583		
2017	%	12	53	35	0.0	0.0	100		
2010	thousand m ³	10,312	40,415	25,592	0	0	76,319		
2010	%	14	53	34	0.0	0.0	100		
2010	thousand m ³	10,605	35,679	21,934	0	0	68,218		
2019	%	16	52	32	0.0	0.0	100		

* Externally supplied gray water

Trend in water use volumes of Japan Integrated Beverages Business

	Unit	Kirin Brewery	Kirin Distillery	Kirin Beverage	Shinshu Beverage	Mercian
2015	thousand m ³	11,104	1,274	1,309	1,205	5,041
2015	m ³ /kL	4.9	3.3	3.4	5.4	39.3
2016	thousand m ³	11,009	1,324	1,359	1,297	4,317
2016 m ³ /kL	m ³ /kL	5.0	3.1	2.9	5.2	32.6
2017	thousand m ³	11,199	1,383	968	1,374	3,391
2017	m ³ /kL	5.3	3.2	2.2	5.2	25.5
2010	thousand m ³	12,006	1,379	971	1,374	3,240
2010	m ³ /kL	5.3	3.1	2.1	5.3	22.5
2010	thousand m ³	12,509	1,380	968	1,243	2,825
2019	m ³ /kL	5.3	3.1	2.2	4.8	19.8

* Because Kirin Beverage Shiga Plant is attached to Kirin Brewery Shiga Plant, it is included in Kirin Brewery Shiga Plant

	Linit		Booveling rate (%)		
	Unit	Re-used water	Recycled water	Total	Recycling fale (%)
2015	thousand m ³	13,508	91,386	104,894	57
2015	%	12.9	87.1	100.0	
2016	thousand m ³	13,386	86,180	99,566	EE
2010	%	13.4	86.6	100.0	55
2017	thousand m ³	15,123	90,944	106,067	57
2017	%	14.3	85.7	100.0	57
2019	thousand m ³	18,993	105,010	124,003	62
2018	%	15.3	84.7	100.0	02
2019	thousand m ³	15,901	105,433	121,334	6.4
	%	13.1	86.9	100.0	04

Trend in use of recycled water in entire Group manufacturing plants and business locations

Trend in wastewater volume by destination (entire Group)

		Wastewater volume						
	Unit	Sewage water	Direct release into rivers, etc.	Indirect release into ocean	Other*	Total		
2015	thousand m ³	6,247	27,890	36,768	8	70,913		
2015	%	9	39	52	0.0	100		
2016	thousand m ³	6,620	27,068	37,898	109	71,695		
2010	%	9	38	53	0.2	100		
2017	thousand m ³	7,224	27,679	38,559	102	73,563		
2017	%	10	38	52	0.1	100		
2010	thousand m ³	6,980	26,063	38,604	99	71,747		
2018	%	10	36	54	0.1	100		
2010	thousand m ³	9,551	24,603	33,135	98	67,387		
2019	%	14	37	49	0.1	100		

* Water sprayed onto forest areas

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Containers and Packaging

Volume of resources used in containers and packaging

	Unit	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals Businesses	Other Businesses (all companies included)	Total
2015	thousand t	204	152	281	0.4	115	752
2015	%	27	20	37	0.05	15	100
2016	thousand t	208	45	391	0.2	114	759
2016	%	27	6	51	0.03	15	100
2017	thousand t	219	51	332	0.3	117	719
2017	%	30	7	46	0.03	16	100
2010	thousand t	179	51	281	0.2	115	626
2010	%	29	8	45	0.03	18	100
2010	thousand t	178	49	249	0.6	65	542
2019	%	33	9	46	0.1	12	100

Volume of resources used by container(Major companies in Japan)

		Aluminum cans	PET bottles	Glass bottles	Cartons	6-can packs
201E	Volume reduction	18,908	9,517	792	5,364	3,758
2015	Volumes used	70,648	58,917	32,280	109,234	15,522
2016	Volume reduction	18,795	11,326	960	6,078	3,564
2016	Volumes used	68,850	63,000	33,531	111,631	14,803
2017	Volume reduction	30,031	7,710	1,332	8,792	3,444
	Volumes used	66,915	60,561	31,276	102,693	14,499
2010	Volume reduction	19,226	12,218	870	5,798	3,629
2018	Volumes used	73,724	66,894	31,183	107,771	14,821
2010	Volume reduction	22,975	11,998	340	5,910	3,646
2019	Volumes used	77,912	67,747	27,844	109,526	16,716

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(Unit:t)

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* Reduction volumes are totals for Kirin Brewery and Kirin Beverage, use volumes are totals for Kirin Brewery, Kirin Beverage, and Mercian.

(Ref.) Trends in recycling rates of other containers in Japan

The Kirin Group pursues initiatives in cooperation with Japanese industry organizations involved in container recycling.

		2014	2015	2016	2017	2018	Target*
	Weight of consumed (thousand t)	313	332	341	336	331	_
Aluminum cans	Recycled weight (thousand t)	273	299	315	310	309	-
	Recycling rate (%)	87.4	90.1	92.4	92.5	2018 331 309 93.6 439 404 92.0 626 3334 195 529 84.6 1.553 1.160 74.7 68.9	≥90
	Weight of consumed (thousand t)	571	486	463	451	439	-
Steel cans	Recycled weight (thousand t)	525	451	435	422	404	-
	Recycling rate (%)	201420152016201720onsumed (thousand t)31333234133633weight (thousand t)27329931531030ycling rate (%)87.490.192.492.593onsumed (thousand t)57148646345143weight (thousand t)52545143542240ycling rate (%)92.092.994.093.492of specified PET bottles56956359658762(thousand t)27126227929833volume in Japan (thousand t)19922722120119ume of used PET bottle (thousand t)47048950049852ycling rate (%)82.686.983.984.884weight (thousand t)1.6521.6181.6061.5831.5ycling rate (%)74.475.975.475.174ycling rate (%)69.868.471.069.268	92.0	≥85			
PET bottles	Sales volume of specified PET bottles (thousand t)	569	563	596	587	626	_
	Recycling volume in Japan (thousand t)	271	262	279	298	334	_
	Recycling volume outside Japan (thousand t)	199	227	221	201	195	_
	Recycling volume of used PET bottle (thousand t)	470	489	500	498	529	_
	Recycling rate (%)	82.6	86.9	2016 2017 2018 341 336 331 315 310 309 92.4 92.5 93.6 463 451 439 435 422 404 94.0 93.4 92.0 596 587 626 279 298 334 221 201 195 500 498 529 83.9 84.8 84.6 1.606 1.583 1.553 1.211 1.189 1.160 75.4 75.1 74.7 71.0 69.2 68.9	≥85		
	Melted weight (thousand t)	1,652	1,618	1,606	1,583	1,553	-
Aluminum cans Steel cans PET bottles Glass bottles	Cullet usage volume (thousand t)	1,230	1,228	1,211	1,189	1,160	-
	Cullet usage rate (%)	74.4	75.9	75.4	75.1	74.7	≥90
	Recycling rate (%)	69.8	68.4	71.0	69.2	68.9	_

* Recycling target of 2nd Voluntary Action Plan

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State of sale and collection of returnable glass bottles (Kirin Brewery)

	Sale volumes(million bottles)	Collected volume(million bottles)	Collection rate (%)
2015	248.7	247.1	99
2016	232.0	232.7	100
2017	224.6	227.8	101
2018	205.1	203.2	99
2019	182.6	182.3	100

* Total of major returnable bottles (large, medium, small bottles)

* Kirin Brewery is engaged in the re-use of beer bottles and commercial large draft kegs. With the diversification of containers, the volume of returnable bottles used has fallen, but the collection rate is 99%. Kirin Beverage also uses returnable bottles for Kirin Lemon and other products and has a collection rate of nearly 100%.

Climate Change

Actual results for Fiscal 2019 marked with 🗹 have received independent assurance by KPMG AZSA Sustainability Co., Ltd.in accordance with International Standard on Assurance Engagements (ISAE) 3000 and ISAE3410.

Trends in greenhouse gas emissions

Scope 1 (direct emissions) + Scope 2 (indirect emissions from energy use)

Trends in greenhouse gas emissions and emissions intensity (entire Group)

	Greenhouse gas e (thousand tCC	emissions D2e)	Greenhouse gas emissions intensity (per unit of sales) (tCO2e/million yen)		
		(of which, CO2)	Japan standard	IFRS	
2015	1,004	(1,002)	0.49	-	
2016	1,012	(1,010)	0.52	0.55	
2017	996	(995)	-	0.53	
2018	986	(983)	_	0.51	
2019	949	(948)	_	0.49	

Trends in greenhouse gas emissions (by business)

	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals Businesses	Other Businesses (all companies included)	Total
2015	239	68	258	73	365	1,004
2016	233	70	251	65	393	1,012
2017	231	61	247	62	396	996
2018	232	59	235	55	405	986
2019	232	56	229	56	376	949

Trends in greenhouse gas emissions (by region)

	Japan	Oceania	Southeast Asia	Other	Total 🗹
2015	597	258	32	116	1,004
2016	593	251	46	122	1,012
2017	581	247	50	119	996
2018	570	235	57	124	986
2019	520	229	76	124	949

(Unit: thousand tCO2e)

(Unit: thousand tCO₂e)

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Trends in greenhouse gas emissions and emission intensities from manufacturing plants

(a) Kirin Brewery

	Greenhouse gas emissions (thousand tCO2e)	Greenhouse gas emissions intensity (kgCO2e/kL)
2015	197	88
2016	194	89
2017	191	90
2018	195	85
2019	196	84

*Greenhouse gas emissions include the greenhouse gas emissions from sold electricity.

(b) Kirin Beverage

	Shonan Plant				
	Greenhouse gas emissions (thousand tCO2e)	Greenhouse gas emissions intensity (kgCO2e/kL)			
2015	28	90			
2016	31	77			
2017	28	64			
2018	27	60			
2019	26	59			

(c) Mercian

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	Greenhouse gas emissions (thousand tCO2e)
2015	26
2016	28
2017	29
2018	30
2019	25

Trends in energy usage (entire Group)

Energy usage by type	2015	2016	2017	2018	2019
Total usage (TJ)	12,426	12,803	12,972	13,081	12,630
Coal (t)	1,403	1,758	2,294	2,339	2,079
Gasoline (kL)	4,734	3,887	3,600	3,621	4,758
Kerosene (kL)	87	166	1,466	1,399	1,342
Diesel oil (kL)	11,399	12,242	13,790	12,611	14,965
Heavy fuel oil (kL)	10,544	11,674	12,475	14,006	9,430
LPG (t)	2,711	2,623	3,334	3,356	3,331
Town gas (thousand Nm ³)	108,465	111,648	110,950	112,987	96,747
LNG (t)	0	0	0	0	0
Purchased electricity (MWh)	780,123	818,925	811,123	811,507	777,626
Renewable electricity (MWh)	815	843	23,848	31,657	31,947
Purchased steam (TJ)	1,963	1,979	1,925	1,886	1,599
Other (TJ)	1,680	1,662	1,771	1,811	2,413

Breakdown and Trends in Greenhouse Gas Emissions Scope 1 (direct emissions)

Trends in greenhouse gas emissions from fuel use (by business)

	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals Businesses	Other Businesses (all companies included)	Total
2015	158	45	82	19	87	391
2016	159	45	77	18	101	401
2017	164	44	74	21	103	405
2018	168	42	74	18	110	412
2019	169	40	72	20	108	411

(Unit:thousand tCO2e)

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Trends in greenhouse gas emissions from fuel use (by region)

	Japan	Oceania	Southeast Asia	Other	Total 🗹
2015	254	82	17	37	391
2016	259	77	18	47	401
2017	266	74	21	44	405
2018	271	74	21	46	412
2019	264	72	26	48	411

Breakdown of g	(L	Init:thousand tCO2e)			
CO ₂	CH4	N2O	HFCs	PFCs	SF ₆
410	0.4	<0.1	0	0	0

■ Scope3 (other indirect emissions)

(Unit:thousand tCO₂e)

Trends in CO₂ emissions by other parties related to business activities (by business) See P. 91 for calculation boundaries

(Unit:thousand tCO2)

	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals Businesses	Other Businesses (all companies included)	Total
2015	1,553	1,037	1,314	16	642	4,561
2016	1,521	1,099	800	14	767	4,200
2017	1,413	1,060	1,083	15	793	4,364
2018	1,483	1,060	761	14	845	4,163
2019	1,569	1,095	712	13	852	4,241

Trends in CO₂ emissions by other parties related to business activities (by region)

See P. 91 for calculation boundaries

	Japan	Oceania	Southeast Asia	Other	Total
2015	3,209	1,314	0	39	4,561
2016	3,244	800	112	44	4,200
2017	3,081	1,083	152	47	4,364
2018	3,145	761	209	48	4,163
2019	3,201	712	284	44	4,241

Trends in CO₂ emissions* accompanying transportation volumes and distances (Japan)

		Kirin Brewery	Kirin Beverage	Mercian	Total
2014	Transport volumes (thousand ton kilometer)	589,483	706,443	99,654	1,395,580
2014	CO2 emissions (thousand tons-CO2)	49	60	7	116
2015	Transport volumes (thousand ton kilometer)	604,865	791,106	85,488	1,481,459
2015	CO2 emissions (thousand tons-CO2)	51	66	8	125
2016	Transport volumes (thousand ton kilometer)	641,171	830,808	87,036	1,559,015
2016	CO2 emissions (thousand tons-CO2)	52	71	8	131
2017	Transport volumes (thousand ton kilometer)	735,996	822,256	87,904	1,646,156
2017	CO2 emissions (thousand tons-CO2)	55	68	8	131
2018	Transport volumes (thousand ton kilometer)	823,267	906,144	94,212	1,823,623
	CO2 emissions (thousand tons-CO2)	62	84	8	155

* Tally period is April to March of following year for each year. Calculated within the reporting scope of specified consigners, in line with the calculation standards of the Act on Rationalizing Energy Use.

ion) (Unit:thousand tCO2)

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Scope 2 (indirect emissions from energy use)

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Trends in greenhouse gas emissions from electricity and steam purchases (by business) (Unit:thousand tCO2e)

	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals Businesses	Other Businesses (all companies included)	Total
2015	81	23	176	54	279	613
2016	74	26	174	46	292	611
2017	67	17	173	41	293	591
2018	64	17	161	37	295	574
2019	62	16	157	35	268	538

Trends in greenhouse gas emissions from electricity and steam purchases (by region) (Unit:thousand tCO2e)

	Japan	Oceania	Southeast Asia	Other	Total 🗹
2015	342	176	15	79	613
2016	334	174	28	75	611
2017	315	173	28	75	591
2018	299	161	36	79	574
2019	256	157	50	76	538

Independent Assurance

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The Kirin Group has been receiving independent assurances to ensure the reliability and transparency of information disclosed.

The Kirin Group has engaged an independent third party to provide assurance on the 2019 CO₂ emissions in Scope 1 and 2 from the entire Kirin Group and those in Scope 3 from Kirin Brewery, Kirin Beverage, Mercian and Koiwai Dairy Products. The independent assurance report is shown on (P.111).

Calculation results of Scopes 1 and 2 for the entire Kirin Group*1 (2019) 🗹 (Unit:tCO2e/year)

I	
Scope1	Scope2
410,875	537,858

Calculation results of Scope 3 for Kirin Brewery, Kirin Beverage, Mercian and Koiwai Dairy Products (2019)

(Unit:tCO2/year)

Upstream/ Downstream	'n	Scope3 Categories	Calculation results	Remarks
	1	Products and services purchased	1,694,074	Calculated by multiplying the purchased volume of raw materials, etc. by the CO2 emission factors for producing each type of raw material, etc.
	2	Capital goods	-	Not calculated
	3	Fuel and energy-related activities not included in Scopes 1 and 2	42,485	Calculated by multiplying the purchased volume of fuel or electricity by CO2 emissions factors for each energy type
Upstream	4	Transportation and delivery (upstream)	325,223	Calculated by multiplying the shipping volume of products as shipper and the purchased volume of raw materials, etc. by the distance of transportation and then by the CO2 emission factors for each transportation method (the amount of CO2 emissions based on shipping volume of products as shipper is calculated using FY2018 data)
	5	Waste from operations	6,781	Calculated by multiplying the amount of waste discharged, etc. by the CO2 emission factors for each disposal method
	6	Business travel	1,876	Calculated by multiplying the number of employees by the annual average distance of transportation and then by the CO2 emission factors for each means of transportation
	7	Employee commuting	5,331	Calculated by multiplying the number of employees by the annual average distance of transportation and then by the CO2 emission factors for each means of transportation
	8	Leased assets (upstream)	-	Included in Scopes 1 and 2
	9	Transportation		Customer: Calculated by multiplying the product sales volume by the CO2 emission factors for selling products for each sales method
		and delivery (downstream)	794,006	Vending machines: Calculated by multiplying the estimated power consumption of vending machines in operation by the C02 emission factor for electricity
	10	Processing of sold products	-	Not applicable
Downstream	11	Use of sold products	34,826	Calculated by multiplying the product sales volume by the estimated power consumption per product unit amount in homes, etc. and by the C02 emission factors for electricity. From 2019, the amount of C02 injected into products is considered as the amount of C02 released to the atmosphere. The amount is calculated based on the products specifications.
	12	Disposal of sold products	57,911	Calculated by multiplying the amount of containers and packaging disposed by the CO2 emission factors for each type of container and packaging
	13	Leased assets (downstream)	-	Not applicable
	14	Franchises	-	Not applicable
	15	Investments	-	Not applicable
	Total		2 962 514	

Progress toward Mid-Term Greenhouse Gas Emission Reduction Targets Through SBTs*2 (2019) See P. 91 for calculation boundaries (Unit:tCO2e)

Scope1+2

		Total
Scope1+Scope2		881,943
	Scope1	368,169
	Scope2	513,774
Reduction rate (compared t	-8.5%	

Scope3

			lotal	
Scope3			3,982,794	
	1	Products and services purchased	2,306,915	
	2	Capital goods	-	
	3	Fuel and energy-related activities not included in Scopes 1 and 2	131,069	
Upstream	4	Transportation and delivery (upstream)	405,309	
	5	Waste from operations	32,549	
	6	Business travel	9,406	
	7	Employee commuting	14,207	
	8	Leased assets (upstream)	-	
	9	Transportation and delivery (downstream)	929,111	
	10	Processing of sold products	-	
	11	Use of sold products	44,635	
Downstream	12	Disposal of sold products	109,592	
	13	Leased assets (downstream)	-	
	14	Franchises	-	
	15	Investments	-	
Reduction rate (compared to 2015 base year) -12.7%				

*1 Methods of calculating Scope 1 and 2 emissions

• Fuel: Lion calculates emissions according to the calculation standards set by the Australian and New Zealand governments.

All other manufacturing sites calculate emissions according to the calculation standards in Japan's Act on Promotion of Global Warming Countermeasures and Act on Rationalizing Energy Use.

•Electricity: Calculated by multiplying the amount of purchased electricity by the CO2 emission factors published by the individual power companies (or, if there are no published figures, by the country-specific emission factor published by the IEA).

·Greenhouse gas emissions include the greenhouse gas emissions from sold electricity.

*2 GHG reduction targets for the total of Scope 1 and Scope 2 emissions, and Scope 3 emissions, by 30% compared with those of 2015 by the end of 2030.

Trends in biogas electricity and biogas generated at Kirin Brewery plans

	Biogas electricity generated (Unit: million kWh)	Biogas generated (Unit: thousand Nm ³)
2015	20.5	8,967
2016	21.2	8,593
2017	19.2	8,115
2018	18.6	8,689
2019	21.9	9,009

	Annual electricity consumption (Unit: kWh/year)
2015	708
2016	724
2017	712
2018	702
2019	704

Trend in annual electricity consumption per one can and bottle vending machine shipped

Source: Japan Vending Machine Manufacturers Association

Breakdown of purchased electricity (Kirin Brewery plants)

		2018	2019
	Renewable energy(hydroelectric power)	20,627	20,269
Purchased electricity	Non-renewable energy	112,835	117,569
,	Total	133,462	137,839
Renewable energy/purchased electricity (%)		15%	15%

(Unit:thousand kWh)

Breakdown of electricity usage (entire Group) (Unit:thousand k				(Unit:thousand kWh)
			2018	2019
		Hydro-electric power	30,813	30,480
Purchased	Renewable energy	Wind power	502	499
electricity		Total	31,315	30,979
Non-renewable energy			780,694	777,626
	Biogas-generated electricity		19,099	22,291
Private power generated	Solar-generated electricity		342	968
	Other than renewable energy		165,746	160,790
Electricity usag	e		997,197	992,654
	Of which, renewable energy (excluding energy mix)		50,757	54,238

Reduction of waste and prevention of pollution

Volume of waste generated (2019)			(Unit:	thousand tons. Figure	s in brackets: %)	
	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals Businesses	Other Businesses (all companies included)	Total
	198 (42)	17 (4)	148 (31)	2 (0.4)	106 (22)	470 (100)

Trends in volume of waste generated and recycling rates (Japan)

	Volume of waste generated (thousand t)	Volume disposed on site (thousand t)	Volume of recycled waste (thousand t)	Final disposed volume (thousand t)	recycling rates (%)
2015	228	14	213	0.5	99.8
2016	237	17	219	0.4	99.8
2017	243	24	219	0.6	99.7
2018	346	12	333	0.7	99.8
2019	230	2	227	0.6	99.8

Wastewater quality

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		COD (t)		Nitrogen (t)			Phosphorous (t)		
	Japan	Overseas	Total	Japan	Overseas	Total	Japan	Overseas	Total
2018	742	3,127	3,869	344	826	1,169	45	220	264
2019	735	3,682	4,417	315	754	1,069	47	265	312
Y/Y change	-7	555	548	-28	-72	-100	2	45	48

Trend in emissions of air pollutants

Trends in emissions of NOx and SOx (entire Group)

	NOx	SOx
2015	271	71
2016	442	64
2017	431	95
2018	436	19
2019	425	15

Trends in emissions of VOCs (Kyowa Kirin Group, Kyowa Hakko Bio Group)

	Methanol	Acetone	Substances subject to PRTR Act	Ethyl acetate, etc.	Total
2015	376	32	57	105	570
2016	324	21	55	88	488
2017	417	21	62	97	596
2018	308	13	57	103	481
2019	183	8	49	74	314

	Soil	Investigations	Status	(2019)	
--	------	----------------	--------	--------	--

Number of investigations	Area of investigations (m ²)
5	116,835

(Unit:t)

(Unit:t)

Targets regarding chemical substances

Kyowa Kirin Group 50% reduction of VOC emissions in 2020 compared to FY2003 levels

Status of PCB management (2019)

High-concentration capacitors, reactors, etc.	Trace-quantity capacitor reactors, etc.	High-concentration stabilizers	Trace-quantity stabilizers
0	26	16	69

Status of asbestos management (2019)

Number of buildings	Area (m ²)
4 buildings	2,590

Status of HCFC management (2019)

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Number of offices	Weight (kg)
13 locations	25,345

Number of offices	Weight (kg)
6 locations	14,921

Status of Environmental Management Certifications

Status as of July 2020

Japan	
Number of independently certified business locations	7
Number of business locations making self-declaration of conformity	21
Number of uncertified business locations	2
Certification rate (%)	93

Overseas

Number of certified business locations	30
Number of uncertified business locations	7
Certification rate (%)	81

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Other information disclosure

Disclosure of environmental information through products

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Label name	Nature of disclosure
Eco-Rail	In 2006, Kirin Beverage, and in 2010, Kirin Brewery were selected as "Eco-Rail" mark-certified companies by the Ministry of Land, Infrastructure, Transport and Tourism for proactively tackling global environmental issues with the use of rail freight transport.
Carbon Footprint	Kirin Brewery launched Carbon Footprint initiatives together with the beer industry in 2008. The Product Category Rule (PCR), which is the rule for the calculation of beer categories, was certified in February 2011 and revised in December 2013.
Rainforest Alliance Certification Label	The gable-top paper drink box for Kirin Gogo-no-Kocha displays a Rainforest Alliance certification label since it was placed on the 500 ml paper drink box for Kirin Gogo-no-Kocha Straight Tea in March 2015.
FSC Certification Label	Kirin Brewery and Kirin Beverage (including Tropicana) display the FSC certification label on many of their paper containers to encourage understanding among consumers about the importance of protecting the forests. Mercian displays the label on some of its paper containers.
Organic Wine	Mercian sells organic wines certified by Euro Leaf, ECOCERT, BIODYVIN, bioagricert, SOHISCERT and so on.

GRI Contents Index

This report uses the following disclosure matters of the GRI Standard 2016 as reference.

GRI Contents Index Standard	Disclosure matters	Page number or URL	GRI Contents Index Standard	Disclosure matters	Page number or URL	
General Disclosures				102-13 Membership of associations	P.84-85	
	102-1 Name of the organization 102-2	P.5 P.5		102-14 Statement from senior decision-	P.4, 6 https://www.kirinholdings.co.jp/english/csv/purpose/	
	Activities, brands, products, and services	https://www.kirinholdings.co.jp/english/company/ business/		102-15 Key impacts, risks, and	P.9, 18, 13-17, 22, 25, 27, 37, 41, 76	
GRI 102 : General	102-3 Location of headquarters	P.5		opportunities	https://www.kirinholdings.co.jp/english/csv/materiality/	
	102-4 Location of operations	P.5 https://www.kirinholdings.co.jp/english/company/ overview/		102-16 Values, principles, standards, and norms of behavior	P.4, 75, 78, 80 https://www.kirinholdings.co.jp/english/company/ philosophy/ https://www.kirinholdings.co.jp/english/csv/procurement/	
	102-5 Ownership and legal form	P.5			https://www.kirinholdings.co.jp/english/ir/governance/ compliance.html https://www.kirinholdings.co.jp/english/csv/env/policies/ vision.html	
	102-6 Markets served	P.5 https://www.kirinholdings.co.jp/english/ir/finance/				
	102-7 Scale of the organization	Segment.html P.5 ESG Data Profile(https://www.kirinholdings.co.jp/english/ Csv/esg_gri/) Http://www.kirinholdings.co.jp/english/ Disclosures 2016		102-18 Governance structure	https://www.kirinholdings.co.jp/english/ir/governance/ management.html ESG Data Governance (https://www.kirinholdings.co.jp/ english/csv/env/policies/vision.html)	
Disclosures 2016		overview/		102-19 Delegating authority	P.75, 78	
	102-8 Information on employees and other workers	P.5 ESG Data Profile, Employees(https://www.kirinholdings. co.jp/english/csv/esg_gri/)		102-20 Executive-level responsibility for	P.75, 78	
	102-9 Supply chain	P.26, 36, 44, 60, 80 https://www.kirinholdings.co.jp/english/csv/procurement/		social topics		
	102-10 Significant changes to the organization and its supply chain	KIRIN CSV REPORT 2020 p.67 ESG Data Notes (https://www.kirinholdings.co.jp/ english/csv/esg_gri/)		102-21 Consulting stakeholders on economic, environmental, and social topics	P.83 https://www.kirinholdings.co.jp/english/ir/governance/ governance.html https://www.kirinholdings.co.jp/english/csv/	
	102-11 Precautionary Principle or	P.10, 87-89 Kirin Group's Environmental Policy (https://www.			sustainability/stakeholder.html https://www.kirinholdings.co.jp/english/ir/library/	
	102-12 External initiatives	P.84-85 https://www.kirinholdings.co.jp/english/csv/sustainability/ gc.html https://www.kirinholdings.co.jp/english/csv/human_		102-26 Role of highest governance body in setting purpose, values, and strategy	System to Promote CSV (https://www.kirinholdings.co.jp/ english/csv/sustainability/promotion_csv.html) Policy and structure (environment) (https://www. kirinholdings.co.jp/english/csv/env/policies/vision.html)	

Message from Top Management

Environmental Strategy

Indicators and Goals

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GRI Contents Idex Standard	Disclosure matters	Page number or URL	GRI Contents Index Standard	Disclosure matters	Page number or URL	
GRI 102: General Disclosures 2016 102 Effe pro 102 Rev env 102 Rev env 102 Rev env 102 List 102 List 102 List 102 List 102 List 102 List 102 List 102 List 102 List 102 List	102-27 Collective knowledge of highest governance body	System to Promote CSV (https://www.kirinholdings.co.jp/ english/csv/sustainability/promotion_csv.html)			102-44 Key topics and concerns raised	P.82-83 https://www.kirinholdings.co.jp/english/csv/sustainability/ stakeholder.html
		102-29 Identifying and managing economic, environmental, and social impacts	P.75, 76, 77, 9 System to Promote CSV (https://www.kirinholdings.co.jp/ english/csv/sustainability/promotion_csv.html) Cooperation with Stakeholders (https://www.kirinholdings. co.jp/english/csv/sustainability/stakeholder.html) Policy and structure (environment) (https://www. kirinholdings.co.ip (english (csv/env/enoile) (csv/env/enoile)		102-45 Entities included in the consolidated financial statements	P.3 https://www.kirinholdings.co.jp/english/csv/human_ organization/index.html
	102-30 Effectiveness of risk management processes	P.76, 77, 9 System to Promote CSV (https://www.kirinholdings.co.jp/ english/csv/sustainability/promotion_csv.html) Policy and structure (environment) (https://www. kirinholdings.co.jp/english/csv/env/policies/vision.html)	GRI 102: General Disclosures 2016	102-46 Defining report content and topic Boundaries	P.8-11, 18, 19, 20 Our CSV Commitment (https://www.kirinholdings.co.jp/ english/csv/commitment/) Management Issues for Sustainable Growth (Group Materiality Matrix) (https://www.kirinholdings.co.jp/ english/csv/materiality/)	
	102-31 Review of economic, environmental, and social topics	P.75, 76, 77, 9 System to Promote CSV (https://www.kirinholdings.co.jp/ english/csv/sustainability/promotion_csv.html)		102-47	P.8-11, 18, 19, 20 Our CSV Commitment (https://www.kirinholdings.co.jp/ english/csv/commitment/)	
	102-32 Highest governance body's role in sustainability reporting Highest content of kirin Holdings (CSV strategy, Group general environmental manager) of Kirin Holdings Company, Limited. System to Promote CSV (https://www.kirinholdings.co.jp/ english/csv/sustainability/promotion_csv.html) Policy and structure (environment) (https://www. kirinholdings.co.jp/english/csv/env/policies/vision.html)	 Kirin Group's Environmental Vision 2050 has been proved by the Board of Kirin Holdings. e overall content of the Kirin Group Environmental contribution is supervised by the Senior Executive Officer (in carge of CSV strategy, Group general environmental nager) of Kirin Holdings Company, Limited. 		102-48 Restatements of information	Management issues for Sustainable Growth (Group Materiality Matrix) (https://www.kirinholdings.co.jp/ english/csv/materiality/) No corrections to the previous year's report. See page 91 for changes in the calculation boundaries due to business divestitures.	
			102-49 Changes in reporting	P.83 ESG Data Notes (https://www.kirinholdings.co.jp/ english/csv/esg_gri/)		
	102-40 List of stakeholder groups	P.82-85 https://www.kirinholdings.co.jp/english/csv/		102-50 Reporting period	P.3	
	102-41 Collective bargaining agreements	ESG data Employee (https://www.kirinholdings.co.jp/ english/csv/esg_gri/)		102-51 Date of most recent report	July 2019	
	102-42 Identifying and selecting stakeholders	P.82-85 https://www.kirinholdings.co.jp/english/csv/ sustainability/stakeholder.html		Reporting cycle 102-53 Contact point for questions	Pear Back cover	
	102-43 Approach to stakeholder	P.82-85 https://www.kirinholdings.co.jp/english/csv/ 102-43 Approach to stakeholder		regarding the report 102-54 Claims of reporting in accordance with the GRI Standards	P.3	
	engagement	policies.html https://www.kirinholdings.co.jp/english/csv/human_		102-55 GRI content index	P.104-107 https://www.kirinholdings.co.jp/english/csv/esg_gri/	

GRI Contents Index Standard	Disclosure matters	Page number or URL
GRI 102: General Disclosures 2016	102-56 External assurance	P.111
Material topics	-	
Biological Resour	ces	
	103-1 Explanation of the material topic and its Boundary	P.8-9, 12-17, 18, 19, 26
GRI 103: Management Approach 2016	103-2 The management approach and its components	P.10-11, 12, 18-21, 28-35
	103-3 Evaluation of the management approach	P.16, 22, 25, 27
GRI 304: Biodiversity 2016	304-2 Significant impacts of activities, products, and services on biodiversity	P.28-35, 47
	304-3 Habitats protected or restored	P.28, 30, 31, 34, 35,
	304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	P.30, 34, 35
Water Resources		
	103-1 Explanation of the material topic and its Boundary	P.8-9, 12-17, 18, 19, 36
GRI 103: Management Approach 2016	103-2 The management approach and its components	P.10-11, 12, 18-21, 38-42
	103-3 Evaluation of the management approach	P.16-17, 22, 25, 37
GRI 303:	303-1 Interactions with water as a shared resource	P.36, 37, 38-39, 41, 42
Effluents 2018	303-2 Management of water discharge related impacts	P.36, 37, 39, 40

GRI Contents Index Standard	Disclosure matters	Page number or URL		
	303-3 Water withdrawal	P.90, 92, 93, 94	age fro Manag	
GRI 303: Water and Effluents 2018	303-4 Water discharge	P.90, 92, 93, 95, 101	om ement	
	303-5 Water consumption	P.37, 41, 43, 90, 92, 93, 94-95	SE	
Containers and Pa	ackaging		nviro rate:	
	103-1 Explanation of the material topic and its Boundary	P.8-9, 15, 18, 19, 44	onmental egy	
GRI 103: Management Approach 2016	103-2 The management approach and its components	P.10-11, 12, 18-21, 46-57, 88, 89	and	
	103-3 Evaluation of the management approach	P.16-17, 22, 25, 45	Goals	
	301-1 Materials used by weight or volume	P.93, 95, 45	Activit	
GRI 301: Materials 2016	301-2 Recycled input materials used	P.46, 52-53, 58-59, 95-96		
	301-3 Reclaimed products and their packaging materials	P.54, 58-59, 96	0	
Climate Change			0	
	103-1 Explanation of the material topic and its Boundary	P.8-9, 12-17, 18, 19, 60	Ris	
GRI 103: Management Approach 2016	103-2 The management approach and its components	P.10-11, 12, 18-21, 62-71	vernanc :k Mana _{	
	103-3 Evaluation of the management approach	P.16-17, 22, 25, 61	e and ;ement	
GRI 201 : Economic Performance 2016	201-2 Financial implications and other risks and opportunities due to climate change	P.12-19	Environr Data	

GRI Contents Index Standard	Disclosure matters	Page number or URL	GRI Contents Index Standard	Discl
GRI 302:	302-1 Energy consumption within the organization	P.72, 73, 90, 93, 97, 22	GRI 103: Management Approach 2016	103-3 Evaluation o approach
	302-2 Energy consumption outside of the organization	P.100		306-1 Waste gener waste-relate
Energy 2016	302-4 Reduction of energy consumption	P.93, 97, 100	306-2 Manage related	
	302-5 Reductions in energy requirements of products and services	P.100	GRI 306: Waste 2020	306-3 Waste gener
	305-1 Direct (Scope 1) GHG emissions	P.72, 90-91, 97, 98, 99		306-4 Waste divert
	305-2			306-5 Waste direct
	emissions	12.72, 90-91, 98, 99,	GRI 307: Environmental	307-1 Non-complia
	305-3 Other indirect (Scope 3) GHG	P.61, 72, 90-91, 98, 99	Compliance 2016	
			Supply chain	
GRI 305: Emissions 2016	305-4 GHG emissions intensity	P.73, 96, 97		103-1 Explanation
	305-5 Reduction of GHG emissions	P.61, 65-66, 69, 99	CPI 102 ·	and its Boun
	305-6 Emissions of ozone-depleting	P.101	Management Approach 2016	The manage its compone
	305-7 Nitrogen oxides (NOx), sulfur	P 79 93 101 102		103-3 Evaluation o approach
	oxides (SOx), and other significant air emissions	1.7.9, 95, 101, 102	GRI 308: Supplier	308-2 Negative env
Waste and prever	ntion of pollution		Environmental	in the supply
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundary	P.8-9, 10, 15, 20, 18, 19, 26, 44, 79	Assessment 2016	taken
	103-2 The management approach and its components	P.10-11, 18-21, 30, 46-57, 79, 88, 89		

Disclosure matters	Page number or URL			
103-3 Evaluation of the management approach	P.16, 22, 25, 27, 45, 101-102			
306-1 Waste generation and significant waste-related impacts	P.26, 30, 44, 79			
306-2 Management of significant waste- related impacts	P.30, 45, 79			
306-3 Waste generated	P.93, 101, 103			
306-4 Waste diverted from disposal	P.57, 59, 93, 96, 101-102			
306-5 Waste directed to disposal	P.93, 101-102			
307-1 Non-compliance with environmental laws and regulations	No legal violations in the year			
iupply chain				
103-1 Explanation of the material topic and its Boundary	P.10, 20, 26, 36, 44, 60			
103-2 The management approach and its components	P.20, 21, 80, 82			
103-3 Evaluation of the management approach	P.23			
308-2 Negative environmental impacts in the supply chain and actions taken	P.16-18, 27, 29-35, 37, 41-42, 45, 46-51, 53, 61, 62, 65-66			
	Disclosure matters 103-3 Evaluation of the management approach 306-1 Waste generation and significant waste-related impacts 306-2 Management of significant waste- related impacts 306-3 Waste generated 306-4 Waste diverted from disposal 306-5 Waste directed to disposal 307-1 Non-compliance with environmental laws and regulations 103-1 Explanation of the material topic and its Boundary 103-2 The management approach and its components 103-3 Evaluation of the management approach 308-2 Negative environmental impacts in the supply chain and actions taken			

Activity

Environmental Indicators Strategy and Goals

TCFD Recommendations' Recommended Disclosure Index

	Page	
Governance	a) Describe the board's oversight of climate-related risks and opportunities.	P.12, 75, 77
	 b) Describe management's role in assessing and managing climate-related risks and opportunities. 	P.12, 75, 77
Strategy	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	P.12-15, 18
	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	P.12-18
	c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2° C or lower scenario.	P.10, 12-19
Risk Management	 a) Describe the organization's processes for identifying and assessing climate-related risks. 	P.12, 76
	b) Describe the organization's processes for managing climate-related risks.	P.12, 76-78
	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	P.12, 76-78
Metrics and Targets	 a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process. 	P.12, 20-21, 61
	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	P.61, 72-73, 96-99
	c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	P.10, 12, 20-22, 25, 61, 72-73, 99

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CDSB framework

F	Reporting requirements	Page
REQ-01	Governance	P.4, 6, 12, 75-78
REQ-02	Management's environmental policies, strategy and targets	P.7, 9-22, 26, 36, 41, 44, 60, 82-85
REQ-03	Risks and opportunities	P.12-19
REQ-04	Sources of environmental impacts	P.26-35, 43, 58-59, 72-73, 90-102
REQ-05	Performance and comparative analysis	P.22, 25, 27, 37, 45, 61
REQ-06	Outlook	P.4, 6
REQ-07	Organisational boundary	P.3, 90-92
REQ-08	Reporting policies	P.3, 90-92, 104-110 The reporting provisions are consistent with those of the previous year.
REQ-09	Reporting period	P.3
REQ-10	Restatements	No corrections to the previous year's report. See page 91 for changes in the calculation boundaries due to business divestitures.
REQ-11	Conformance	P.3, 9, 108
REQ-12	Assurance	There is no third-party assurance concerning conformance with the CDSB framework. Third-party assurance has been obtained for some GHG emissions. (P.96-99, 111)
Environmental Strategy

SASB Content Index

Food & Beverage sector/ Alcoholic beverages industry October 2018 version

Sustainability Disclosure Topics & Accounting Metrics

Topics	Accounting Metrics	Disclosure		
Energy Management	(1) Total energy consumed, (2) percentage grid electricity, (3) percentage renewable*a	P.93, P.97		
Water Management	(1) Total water withdrawn, (2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress* ^b	P.37, P.41, P.43, P.94-95		
	Description of water management risks and discussion of strategies and practices to mitigate those risks	P.10-11, P.13-19, P.36-43		
Responsible Drinking & Marketing	Percentage of total advertising impressions made on individuals at or above the legal drinking age* ^C			
	Number of incidents of non-compliance with industry or regulatory labeling and/or marketing codes*d	ESG Data (Social, Customer) (https://www.kirinholdings.co.jp/english/csv/esg_gri/)		
	Total amount of monetary losses as a result of legal proceedings associated with marketing and/or labeling practices*e	ESG Data (Social, Customer) (https://www.kirinholdings.co.jp/english/csv/esg_gri/)		
	Description of efforts to promote responsible consumption of alcohol	A Responsible Alcohol Producer (Our CSV Commitment) (https://www.kirinholdings. co.jp/english/csv/commitment/) A Responsible Alcohol Producer (Policy and System) (https://www.kirinholdings. co.jp/english/csv/alcohol/policies.html)		
Packaging Lifecycle Management	(1) Total weight of packaging, (2) percentage made from recycled and/or renewable materials, and (3) percentage that is recyclable, reusable, and/or compostable* ^f	P.22, P.53, P.57-59, P.95-96		
	Discussion of strategies to reduce the environmental impact of packaging throughout its lifecycle	P.10-11, P.14-15, P.18-19, P.44-59		
Environmental & Social Impacts of Ingredient Supply Chain	Suppliers' social and environmental responsibility audit (1) non-conformance rate and (2) associated corrective action rate for (a) major and (b) minor non-conformances*g	Efforts to promote CSR procurement (https://www.kirinholdings.co.jp/english/csv/ procurement/promotion.html) ESG Data (Social, Supplier) (https://www.kirinholdings.co.jp/english/csv/esg_gri/)		
Ingredient Sourcing	Percentage of beverage ingredients sourced from regions with High or Extremely High Baseline Water Stress ^{*h}	P.13-14, P.41		
	List of priority beverage ingredients and description of sourcing risks due to environmental and social considerations	P.13-14, P.16-19, P.26-28, P.31-35, P.38, P.41-42		

Activity Metrics

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Activity Metrics	Disclosure	*a Percentage of grid electricity and renewable energy can be estimated from the amount of energy consumed. *b Total water consumed can be estimated based on (water consumed - wastewater volume). Although data on water stress by country is disclosed, the
Volume of products sold*i	P.93	percentage of regions with high baseline water stress to total water withdrawn and total water consumed is not disclosed. *c Not disclosed.
Number of production facilities ^{*j}	Group Companies (https://www.kirinholdings. co.jp/english/company/organization/) P.41	*d Only the information on alcoholic beverages is disclosed. *e Monetary losses are not disclosed. In addition, for some cases of violation of laws concerning alcoholic beverages, a reference URL is provided in the note *f The content ratio of recycled materials is disclosed in some containers.
Total fleet road miles traveled* ^k	P.98	*g The self-assessment rate of suppliers is disclosed, but the rate of non-conformance is not disclosed. In the event of a non- conformance, a correction request is made. *h Although the percentage is not disclosed, water consumption by raw material and by country is disclosed. The results of scenario analyses, including the on the water risk of agricultural products, which are important sources for beverages, are disclosed.
		*i Volume of products sold is not disclosed, but volume of products manufactured is disclosed. *j Number of major production facilities is disclosed.

*k While the total distance traveled is not disclosed, freight transport volume (= freight weight x distance of transport) within the reporting boundaries of specified consignors in the Act on Rationalizing Energy Use is disclosed only for Japan.

Sustainability Disclosure Topics & Accounting Metrics

Topics	Accounting Metrics	Code	Disclosure		
Fleet Fuel Management	Fleet fuel consumed, percentage renewable*a	FB-NB-110a.1	P.97, P.98		
Energy Management	(1) Operational energy consumed, (2)percentage grid electricity, (3) percentage renewable*b	FB-NB-130a.1	P.68, P.93, P.97		
Water Management	(1) Total water withdrawn, (2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress*c	FB-NB-140a.1	P.37, P.41, P.43, P.94-95		
-	Description of water management risks and discussion of strategies and practices to mitigate those risks	FB-NB-140a.2	P.10-11, P.13-19, P.36-43		
Health & Nutrition	Revenue from (1) zero- and low-calorie, (2) noadded- sugar, and (3) artificially sweetened beverages*d	FB-NB-260a.1	ESG Data (Social, Customer) (https://www.kirinholdings.co.jp/ english/csv/esg_gri/)		
	Discussion of the process to identify and manage products and ingredients related to nutritional and health concerns among consumers*e	FB-NB-260a.2	Our CSV Commitment (Supporting self-care for healthy people and people with pre-disease) (https://www.kirinholdings.co.jp/english/csv/commitment/)		
	Percentage of advertising impressions (1) made on children and (2) made on children promoting products that meet dietary guidelines*f	FB-NB-270a.1			
	Revenue from products labeled as (1) containing genetically modified organisms (GMOs) and (2) non-GMO*g	FB-NB-270a.2			
Product Labeling & Marketing	Number of incidents of non-compliance with industry or regulatory labeling and/or marketing codes*h	FB-NB-270a.3	ESG Data (Social, Customer) (https://www.kirinholdings.co.jp/ english/csv/esg_gri/)		
	Total amount of monetary losses as a result of legal proceedings associated with marketing and/or labeling practices*i	ing MetricsCodeDisclosureFB-NB-110a.1P.97, P.98I electricity, (3) percentage renewable*bFB-NB-130a.1P.68, P.93, P.97percentage of each in regions with High or ExtremelyFB-NB-140a.1P.37, P.41, P.43, P.94-95point of strategies and practices to mitigate those risksFB-NB-140a.2P.10-11, P.13-19, P.36-43sugar, and (3) artificially sweetened beverages*dFB-NB-260a.1ESG Data (Social, Customer) (https://www.kirifpoducts and ingredients related to nutritional and healthFB-NB-260a.2Our CSV Commitment (Supporting self-care for people with pre-disease) (https://www.kirifnho csv/commitment/)hildren and (2) made on children promoting productsFB-NB-270a.1ESG Data (Social, Customer) (https://www.kirifnho csv/commitment/)etically modified organisms (GMOs) and (2) non-GMO*gFB-NB-270a.3ESG Data (Social, Customer) (https://www.kirif english/csv/esg_gri/)proceedings associated with marketing and/or labeling or recycled and/or renewable materials, and (3)FB-NB-270a.4ESG Data (Social, Customer) (https://www.kirif english/csv/esg_gri/)impact of packaging throughout its lifecycleFB-NB-410a.1P.22, P.53, P.57-59, P.95-96impact of packaging throughout its lifecycleFB-NB-430a.1Efforts to promote CSR procurement (https://www.kirif 	ESG Data (Social, Customer) (https://www.kirinholdings.co.jp/ english/csv/esg_gri/)		
Packaging Lifecycle	(1) Total weight of packaging, (2) percentage made from recycled and/or renewable materials, and (3) percentage that is recyclable, reusable, and/or compostable*j	TISKSPB-NB-140d.2P.10-11, P.13-19, P.30-43**dFB-NB-260a.1ESG Data (Social, Customer) (https://www.kirinholdings.co.jp/ english/csv/esg_gri/)d healthFB-NB-260a.2Our CSV Commitment (Supporting self-care for healthy people and people with pre-disease) (https://www.kirinholdings.co.jp/english/ csv/commitment/)'ductsFB-NB-270a.1Our CSV Commitment (Supporting self-care for healthy people and 			
Management	Discussion of strategies to reduce the environmental impact of packaging throughout its lifecycle	FB-AB-410a.2	P.10-11, P.14-15, P.18-19, P.44-59		
Environmental & Social Impacts of Ingredient Supply Chain	Suppliers' social and environmental responsibility audit (1) non-conformance rate and (2) associated corrective action rate for (a) major and (b) minor non-conformances*k	FB-NB-430a.1	Efforts to promote CSR procurement (https://www.kirinholdings.co.jp/ english/csv/procurement/promotion.html) ESG Data (Social, Supplier) (https://www.kirinholdings.co.jp/english/ csv/esg_gri/)		
	Percentage of beverage ingredients sourced from regions with High or Extremely High Baseline Water Stress*l	FB-NB-440a.1	P.13-14, P.41		
Ingredient Sourcing	List of priority beverage ingredients and description of sourcing risks due to environmental and social considerations	FB-NB-440a.2	P.13-14, P.16-19, P.26-28, P.31-35, P.38, P.41-42		

Activity Metrics

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Activity Metrics	Code	Disclosure	*b
Volume of products sold*m	FB-NB-000.A	P.93	
Number of production facilities* ⁿ	FB-NB-000.B	Group Companies (https://www.kirinholdings. co.jp/english/company/organization/) P.41	*c
Total fleet road miles traveled* ⁰	FB-NB-000.C	P.98	*d

- *a Fuel consumed by energy type and CO2 emissions from transportation as a shipper are disclosed, but fleet fuel consumed is not disclosed.
- *b Total energy consumption by energy type and GHG emissions from plants are disclosed, but operational energy consumed is not disclosed. The data of some plants, the amount of purchased electricity, and the amount of renewable electricity are disclosed.
- *c Total water consumed can be estimated based on (water consumed wastewater volume). Although data on water stress by country is disclosed, the percentage of regions with high baseline water stress to total water withdrawn and total water consumed is not disclosed.
- *d Revenues from no-added sugar beverages are not disclosed, but revenues from low-sugar and low-fat products are disclosed. Revenue from artificially sweetened beverages is not disclosed.
- *e Commitment is disclosed, but no specific management process is disclosed.
- *f Not disclosed.
 *g Not disclosed.
- *h Only the information on alcoholic beverages is disclosed

- *i Monetary losses are not disclosed. In addition, for some cases of violation of laws concerning alcoholic beverages, a reference URL is provided in the notes.
- *j The self-assessment rate of suppliers is disclosed, but the rate of nonconformance is not disclosed. In the event of a non-conformance, a correction request is made.
- *k Although the percentage is not disclosed, water consumption by raw material and by country is disclosed. The results of scenario analyses, including those on the water risk of agricultural products, which are important sources for beverages, are disclosed.
- *l Volume of products sold is not disclosed, but volume of products manufactured is disclosed.
- *m Number of major production facilities is disclosed.
- *n While the total distance traveled is not disclosed, freight transport volume (= freight weight x distance of transport) within the reporting boundaries of specified consignors in the Act on Rationalizing Energy Use is disclosed only for Japan.

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Independent Assurance Report

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KPMG

Independent Assurance Report

To the President and CEO of Kirin Holdings Company, Limited

We were engaged by Kirin Holdings Company, Limited (the "Company") to undertake a limited assurance engagement of the CO₂ emissions in Scopes 1 and 2 from the entire Kirin Geoup and those in Scope 3 from Kirin Brewery Company, Limited, Kirin Beverage Company, Limited, Mercian Corporation and Kolwai Dairy Products Company, Limited with *S* for the period from January 1, 2019 to December 31, 2019 (the "Indicators") included in its Kirin Group Environmental Report 2020 (the "Report") for the fiscal year ended December 31, 2019.

The Company's Responsibility

The Company is responsible for the preparation of the Indicators in accordance with its own reporting criteria (the "Company's reporting criteria"), as described in the Report.

Our Responsibility

Our responsibility is to express a limited assurance conclusion on the Indicators based on the procedures we have performed. We conducted our engagement in accordance with the 'International Standard on Assurance Engagements (ISAE) 3000, Assurance Engagements other than Audits or Reviews of Historical Financial Information' and the 'ISAE 3410, Assurance Engagements consisted as Statements' issued by the International Auditing and Assurance Standards Board. The limited assurance engagement consisted of making inquiries, primarily of persons responsible for the preparation of information presented in the Report, and applying analytical and other procedures, and the procedures performed vary in nature from, and are less in extent than for, a reasonable assurance engagement. The level of assurance provided is thus not as high as that provided by a reasonable assurance engagement. Our assurance procedures included:

- Interviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's responsible personnel to obtain an understanding of its policy for personnel to obtain an understanding of its policy for personnel to obtain an understanding of its policy for personnel to obtain an understanding of its policy for personnel to obtain an understanding of its policy for personnel to obtain an understandits policy for personnel to obtain an understanding of its pol
- Inquiring about the design of the systems and methods used to collect and process the Indicators.
- Performing analytical procedures on the Indicators.
- Examining, on a test basis, evidence supporting the generation, aggregation and reporting of the Indicators in conformity with the Company's reporting criteria, and recalculating the Indicators.
- Making inquiries and reviewing materials including documented evidence of the Fujisawa Plant of Mercian Corporation selected on the basis of a risk analysis, as alternative procedures to a site visit.
- Evaluating the overall presentation of the Indicators.

Conclusion

Based on the procedures performed, as described above, nothing has come to our attention that causes us to believe that the Indicators in the Report are not prepared, in all material respects, in accordance with the Company's reporting criteria as described in the Report.

Our Independence and Quality Control

We have complied with the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which includes independence and other requirements founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior. In accordance with International Standard on Quality Control I, we maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

KPMG AZA Sustaneolory co., Ltd.

KPMG AZSA Sustainability Co., Ltd. Tokyo, Japan October 9, 2020

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The KIRIN, the messenger of Good Luck.

The KIRIN is a mythical creature, a messenger of good luck. Derived from various ancient legends, it is said to appear as a prelude to joyous times to come. The KIRIN, a gentle creature, flies the skies; its feet never touching the ground as not to harm any insects or plants.The KIRIN, which creates the rich natural environment for future generations, is a symbol of the Kirin Group.



Contact Us https://www.kirinholdings.co.jp/english/customer/