Climate Change

Background to Initiatives

The Kirin Group has long been working to reduce GHG emissions. We have achieved significant reductions, having set an ambitious target of "reducing GHG emissions across the entire value chain by half from the 1990 level by 2050" in 2009. However, following the adoption of the Paris Agreement in 2015, the IPCC Special Report on Global Warming of 1.5° C in 2018, and other developments, society has embarked on a major move toward the creation of a decarbonized society, meaning that more ambitious GHG reduction targets are required. Scenario analysis, which the Kirin Group has been conducting since 2018, has revealed significant declines in the yields of major agricultural raw materials that are important for our businesses, as well as water risks and water stress at production sites and business sites. As such, there is pressure to implement further measures to combat climate change. Against this backdrop, the Kirin Group will accelerate efforts to lead the building of a decarbonized society, having declared our aim to achieve net zero GHG emissions by 2050 and shift to 100% renewable energy for all electricity used by 2040.

We will create together

A society that has overcome climate change

- Realize net zero GHG emissions across the entire value chain
- Lead to build a decarbonized society

Raw materials Containers

P.63 Tea farms
P.63 Regenerative agriculture
P.63 In-house container manufacturing and weight reduction
P.63 Ocean transportation in large bags

Production

P.61 Heat pumps
P.64 Fuel conversion
P.64 Cogeneration
P.64 High-efficiency production facilities

Distribution

P.65 Modal shift
P.65 Joint delivery
P.65 Joint collection of beer pallets
P.66 Improving loading efficiency
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Sale

P.67 Vending machines
P.67 Year-month labeling for production dates

A decarbonized society

P.61 "SBT for 1.5°C" target
P.62 Joined RE100
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Points

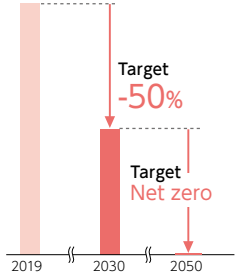
- Having obtained approval for the "SBT for 1.5° C" target, raised our target for reducing GHG emissions to 50% across Scope 1 + 2, and 30% for Scope 3 (both by 2030, compared with 2019).
- Joined RE100 and set a target for the proportion of renewable energy in electric power used (100% by 2040).
- Reduced Kirin Brewery GHG emissions by 2% from the previous year by introducing heat pump systems.
- Moved to renewable energy for 100% of electric power purchased at Kirin Brewery's Nagoya Plant. Utilized electric power from large-scale solar power generation thanks to the introduction of a PPA model at four domestic plants.

Overview of initiatives

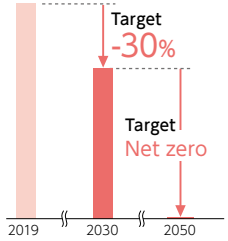
Initiative	Issue	Progress
Initiatives to achieve our vision	Reduction of GHG emissions	Acquired approval for "SBT for 1.5° C" target. We raised our targets for reducing GHG emissions to 50% across Scope 1 + 2, and 30% for Scope 3 (by 2030, compared with 2019).
	Renewable energy	Joined RE100 and declared our aim of using renewable energy for 100% of electric power by 2040.
Realize net zero GHG emissions across the entire value chain	Energy conservation	Began introducing heat pump systems at wastewater treatment facilities in 2019.
	Hydro-electric power	Began using hydro-electric power at the Kyowa Kirin Takasaki Plant in 2020, in a first for the pharmaceuticals production business. Completed installation at the Kirin Brewery's Toride Plant and the Kirin Beverage Shonan Plant in 2017.
	Solar power generation	Utilized electric power from large-scale solar power generation thanks to the introduction of a PPA model at four domestic plants in 2021.
	Renewable energy certificates	Utilized electric power with environmental value (non-fossil fuel energy certificates with tracking information) and moved 100% of electric power purchased to renewable energy at the Kirin Brewery's Nagoya Plant. Introduced renewable energy certificates (I REC) at Kyowa Hakko Bio's Thai site, with the aim of reducing GHG emissions from electricity by approximately 25%.
Lead to build a decarbonized society	Reinforcing resilience in the upstream portion of the value chain	Prevented soil outflows from torrential rain by supporting the acquisition of Rainforest Alliance Certification by Sri Lankan tea farms.
	Green recovery declaration	Signed the "Business Ambition for 1.5° C" and "Uniting Business and Governments to Recover Better." Consented to "Making Japan a Nation where Renewable Energy is Easily Accessed: Three Strategies and Nine Policies Sought By Corporations Engaged in Climate Action."
	Engagement with the next generation	Supported the Decarbonization Challenge Cup. Rolled out an environmental mark program.

Target

Total emissions targets for Scope 1 and Scope 2*



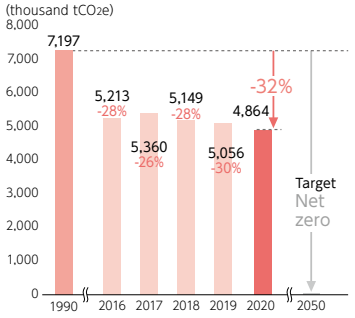
Scope 3 emissions target*



* In December 2020, we upgraded our previous "SBT for 2℃" target, and received approval for our "SBT for 1.5℃" target.

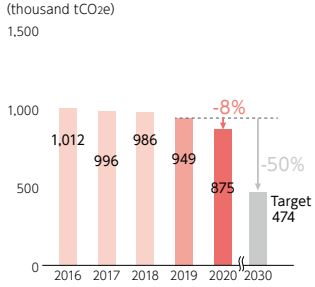
Progress

GHG emissions across the whole value chain

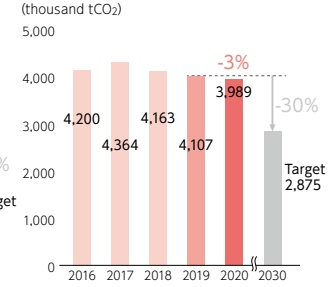


Progress towards medium-term GHG emissions reduction targets

Total emissions for Scope 1 and Scope 2

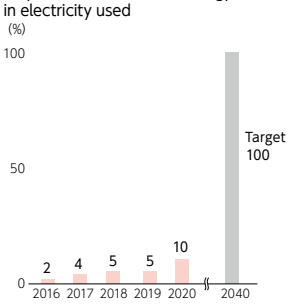


Scope 3 emissions



Progress toward the target for increased use of renewable energy

Proportion of renewable energy in electricity used



1996 Began installing biogas boilers at breweries.

2002 Began introducing biogas cogeneration facilities at breweries.

2004 Began converting fuel used at breweries from heavy oil to city gas.

2006 Kirin Beverage was selected as an "Eco-Rail" mark-certified company. Kirin Brewery sponsored a "wind power generation project" in Yokohama City. Began introducing heat pumps for Kirin Beverage vending machines.

2007 Completed fuel conversion at Kirin Brewery.

2009 Announced Action Plans for Becoming a Low-Carbon Corporate Group, and declared aim to halve GHG emissions by 2050 compared with 1990.

2010 Kirin Brewery was selected as an "Eco-Rail" mark-certified company.

2017 Obtained approval for "SBT for 2° C" target.

2019 Introduced a heat pump at Kirin Brewery's Okayama Plant.

2020 Declared aim to achieve net zero emissions by 2050 in the Kirin Group Environmental Vision 2050. Joined RE100 and declared our aim of using renewable energy for 100% of electric power by 2040. Obtained approval for "SBT for 1.5° C" target.

2021 Moved to renewable energy for 100% of electric power purchased at Kirin Brewery's Nagoya Plant. Began utilizing electric power from large-scale solar power generation thanks to the introduction of a PPA model at four domestic plants.

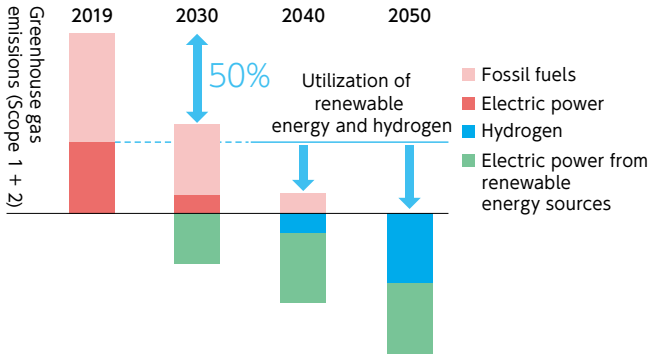
“SBT for 1.5℃” target: Aiming for the world’s most advanced energy system

■Upgraded from “SBT for 2℃” target to “SBT for 1.5℃” target

As a mid-term target for the reduction of GHGs, in November 2020, the Kirin Group obtained approval from the international SBT initiative (SBTi) for a target under the new standards for an “SBT for 1.5℃.” The “SBT for 1.5℃” target has been developed in order to prevent irreversible global climate change. It is a science-based target (SBT) aimed at limiting the increase in the global average temperature to 1.5℃, compared with levels prior to the industrial revolution.
The Kirin Group was the first Japan food company to obtain approval for an “SBT for 2℃” target under the former standards in 2017. Now, we are the first Japanese food company to obtain an upgrade from an “SBT for 2℃” target to an “SBT for 1.5℃” target.
Although large-scale investment will be required to achieve this goal, the Kirin Group aims to implement measures to combat climate change that will be profit neutral over the medium- to long-term, by introducing renewable energy, using the energy cost reduction benefits of energy conservation investments throughout the Group as funds.

SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

Method of reducing GHG emissions

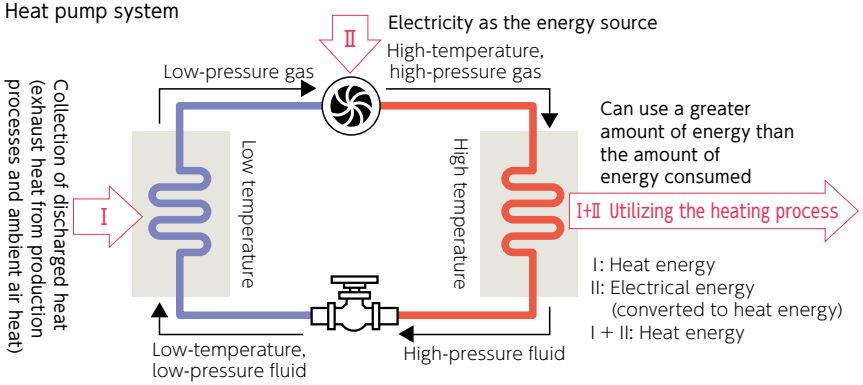


■Use of heat pumps in production processes

At five Kirin Brewery plants, we introduced heat pump systems for wastewater treatment facilities in 2019, thereby reducing GHG emissions by 2% (approximately 3,400 tons) from the previous year across Kirin Brewery as a whole. We will disseminate the knowledge gained through these efforts to each Group company as soon as possible to maximize the effects.
Kirin Brewery has successfully reduced its GHG emissions by approximately 70% over the 25 years from 1990 to 2015, thanks to its leading technological capabilities in the global beer industry. Kirin Brewery 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, 50% reduction by 2030 compared to 2019 levels).
As a means to achieve this, Kirin Brewery is aiming to shift its energy sources from fossil fuels to electric power. Kirin Brewery currently uses both electric power and fossil fuels as energy sources at breweries. Comparatively, the largest amount of GHG emissions comes from fossil fuels, which we use 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 technologies, and Kirin Brewery made use of that experience while aiming to put in place a production system that realizes the world’s lowest amount of GHG emissions.
We have begun introducing heat pumps at wastewater treatment plants. We treat wastewater with microorganisms, and keep the temperature of wastewater constant in order to maintain the activity of microorganisms. In the past, we used steam for heating in winter when the water temperature was low, and released the water 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, contributing to a reduction in GHG emissions. In the future, we will expand the use of heat pumps in other processes such as cleaning and sterilization.
The Kirin Group will continue leveraging its technological strengths to take on the challenge of creating the world’s best energy system.

Heat pump system




Heat pump at the Okayama Brewery

RE100: Aiming for 100% of electric power used to come from renewable energy

■Joining RE100 and 100% of electric power used to come from renewable energy

In November 2020, Kirin Holdings joined "RE100," an international environmental initiative consisting of companies aiming to use renewable energy for 100% of their electric power. At the same time, we announced that we would aim to increase the proportion of renewable energy in electric power used to 100% by 2040.
We are actively promoting specific initiatives such as moving to 100% renewable energy for all purchased electric power at the Kirin Brewery's Nagoya Plant, the use of solar power via a PPA model at four breweries in Japan, and the use of hydro-electric power.

Kirin Group ratio of renewable energy in power used

■100% renewable energy for all electric power purchased at Kirin Brewery's Nagoya Plant

In the summer of 2021, Kirin Brewery's Nagoya Plant will move to 100% renewable energy for all electric power purchased, marking our first step toward achieving RE100. With this move, GHG emissions from purchased electric power will be zero, and we expect to reduce GHG emissions by 7,400 tons per year.
We will achieve this by purchasing power with environmental value (non-fossil fuel energy certificates with tracking information) generated at a renewable energy power plant (solar power generation) financed and operated by Mitsubishi Corporation Energy Solutions Ltd.

■Solar power generation using PPA model at four breweries in Japan

At Kirin Brewery's Sendai, Nagoya, Shiga, and Kobe Plants (four plants) we began introducing solar power generation based on the PPA (Power Purchase Agreement) model in 2021. As a result, Kirin Brewery will be able to reduce its GHG emissions by approximately 4,500 tons per year and increase the ratio of renewable energy from solar power across Kirin Brewery as a whole to approximately 22% from approximately 18%.
MCKB Energy Service Co., Ltd., a subsidiary of Mitsubishi Corporation Energy Solutions Ltd., will act as a PPA provider, installing megawatt-class solar power generation facilities on the roofs of the four breweries, while Kirin Brewery will purchase and use the power generated.

Status of installation of solar power generation facilities→P.68


Nagoya Brewery

Shiga Brewery


Kobe Brewery

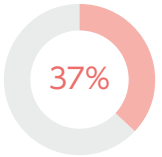

Sendai Brewery

■Hydro-electric power generation

Since April 2017, Kirin Brewery's Toride Plant and Kirin Beverage's Shonan Plant started using GHG-free hydro-electric 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 GHGs 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 plant in Japan, not just in the food and beverages industry.
In January 2020, Kyowa Kirin's Takasaki Plant began using GHG-free hydro-electric power, for the first time in the pharmaceuticals production business.

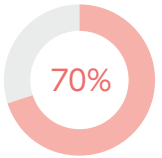
Kirin Beverage Shonan Plant

Ratio of hydro-electric power(2020)




Kirin Brewery Toride Plant

Ratio of hydro-electric power(2020)



Raw materials

Measures for adapting to climate change at tea farms

In training programs for Rainforest Alliance Certification at Sri Lankan tea farms, the Kirin Group is providing directions on how to prevent the runoff of fertile soil from rain erosion by planting grasses whose roots sink deep into the soil and that crawl the ground on slopes. The results of scenario analysis show that the effects of climate change increase water risks and water stress in many countries and regions producing agricultural products. 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. This initiative contributes to the prevention of landslide disasters caused by heavy rainfall, serving as a measure for adapting to the problem of climate change.
We are implementing measures to adapt in the upstream portion of their value chain, such as training to increase water retention in fields in response to drought caused by climate change in Vietnamese coffee farms.

Regenerative agriculture carbon offsets

New Belgium Brewing, a Kirin Group company, purchases regenerative agriculture carbon offsets, thereby providing incentives and financial support for producers to move from traditional to regenerative agricultural methods. By shifting to regenerative agriculture, we can create healthy soil and reduce farm emissions by isolating large amounts of carbon dioxide in the soil.

Containers

In-house production of PET bottles

Kirin Beverage introduced Japan's first in-line PET blowing aseptic filling machine at 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.
In the past, we purchased empty PET bottles from container manufacturers and shipped them to plants where we filled them with beverages, to make fina products. With an in-line blow aseptic filling machine, we mold PET bottle containers from a material called preform in the production process of the plant and filled under aseptic conditions. Installation consequently contributes greatly to reducing CO_2 emissions as using preforms allows us to process greater loads on trucks compared to transporting empty PET bottles.
In 2003, we installed preform molding equipment on the beverage production line at Kirin Distillery ahead of other players in the industry.

Reducing the weight of containers

Between 1990 and 2020, Kirin Brewery and Kirin Beverage reduced CO_2 emissions from container manufacturing by a total of 4.51 million tonnes* by reducing the weight of containers and packaging. Making containers lighter leads to reducing CO_2 emissions in the manufacturing process of containers and packaging and improving loading efficiency, which leads to reduction of CO_2 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 2020.

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 kl bags (equivalent to about 32,000 750 ml 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% because it eliminates the need to transport heavy bottles by sea, although it increases the amount of CO_2 emissions from the company's plants in Japan owing to bottling in Japan.
Bottling wine in Japan allows us to use Ecology Bottles (made with at least 90% recycled glass), lightweight bottles, and PET bottles, which contribute to making effective use of resources and reducing CO_2 emissions significantly across the value chain as a whole.

Specially designed large bags

Production

Fuel shift and cogeneration

A significant proportion of the fuel we use at breweries is used in the boilers that generate steam. At all Kirin Brewery and Kirin Beverage plants, we have completed the shift to natural gas, which generates less CO_2 than heavy oil.
We have achieved more efficient boiler operations through the installation of highly efficient small boilers in line with the fuel shift. We have introduced cogeneration systems to provide some of the plants' heat and electricity.

Cogeneration

Refrigeration systems

At Kirin Brewery, we reduce energy consumption through improving the efficiency of refrigerating systems. We are introducing a cascade refrigeration system, which cools in phases in a process that involves a considerable temperature difference, and making operational improvements.

Wastewater biogas

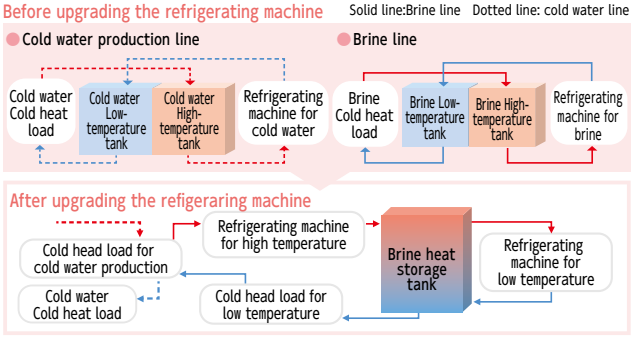
In our beer breweries, we make use of biogas generated as a by-product of anaerobic treatment facilities in boilers and other equipment.

For details→P.43

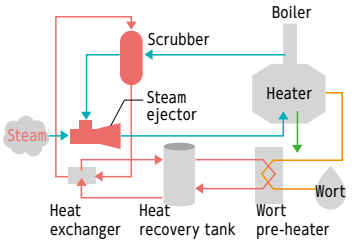
Construction of highly efficient production facilities at Myanmar Brewery

To meet skyrocketing demand, Myanmar Brewery has made major expansions at its brewing and filling facilities. Its high-efficiency 100,000 kl line started operation in the beginning of 2018.
Kirin Holdings has allocated skilled engineers to the Myanmar business. They collaborate with Kirin Engineering, one of our group companies, which provides engineering services to the food industry and has a good reputation for its high quality of work such as entire design of new facilities, selection of equipment, installation, and tuning. Kirin Holdings utilizes this engineering experience and expertise to support Myanmar Brewery.
Currently, with the rapid economic development in Myanmar, there are concerns about tightening of the energy supply-demand 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 to introduce the latest energy-saving equipment with a track record in the domestic business. In March 2020, we began operating biogas boilers.

Improving the efficiency of refrigeration systems



Installed energy-saving equipment



Wort pre-heating system
Recovery of steam generated at the time of boiling wort and use as heat source

Vapor re-compression system
Use of steam ejector

Reduction of steam used in the wort boiling process

by half

Distribution

Modal shift

The Kirin Group is actively pursuing a modal shift of switching from truck transport to rail and ocean transport, which has lower CO_2 emissions, for 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 warehouses of our business partners, rail transport causes lower CO_2 emissions over long-distance shipments. We have developed special cartons (registered as a 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 non-competitive sector and is actively engaging in initiatives together with other companies 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 plants on the Japan Sea side, so products previously 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 CO_2 emissions but shortened distances between the plants and the terminals and between the terminals and the destinations with a significant alleviation of the burden on drivers, which is helping to solve the social issue of a shortage in truck drivers. Through these efforts, we have successfully completed a modal shift from long-distance truck transportation, equivalent to 10,000 vehicles a year, to railway containers, and we estimate that we can thus annually reduce CO_2 emissions by approximately 2,700 tons.
In September 2017, we began joint delivery in the eastern Hokkaido area. As a result of these efforts, we are effectively utilizing railway containers and have enhanced truck loading efficiency, leading to more efficient logistics. We estimate that this results in a reduction in annual CO_2 emissions of approximately 330 tons.*

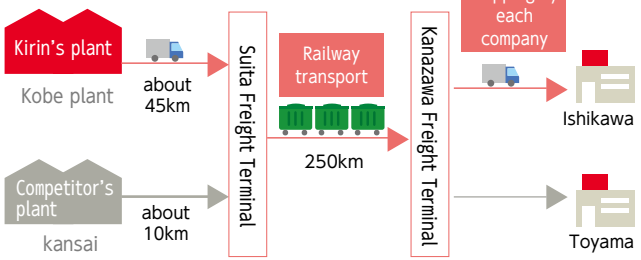
* Contribution to Avoided Emissions through the Global Value Chain, Third Edition, Keidanren (Japan Business Foundation)

Joint collection of beer pallets

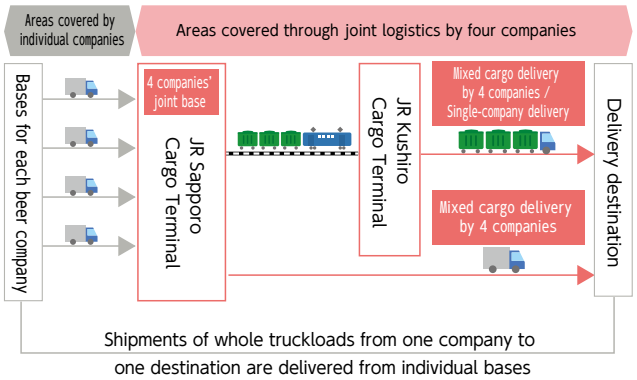
In a joint initiative by the Japan's four major breweries, we are expanding the joint collection of beer pallets.
We began the joint collection of beer pallets in the Tohoku area in November 2018. From July 2019, we expanded the initiative to the Tokyo metropolitan, Tokai, and Kyushu areas, before deploying it nationwide from November 2019.
Thanks to these efforts, it is estimated that in total, the four brewers have reduced annual CO_2 emissions by 5,158 tons of CO_2 (a reduction of approximately 37% compared with former methods),* by improving the loading ratio of collection vehicles and shortening distances to collection.

* Contribution to Avoided Emissions through the Global Value Chain, Third Edition, Keidanren (Japan Business Foundation)

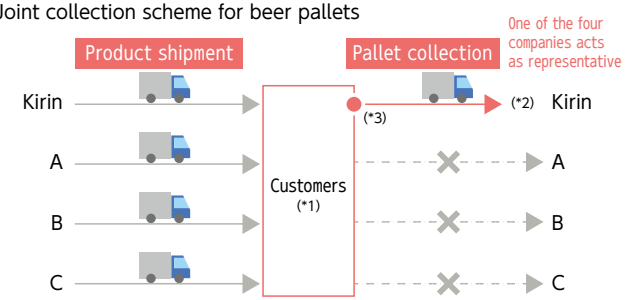
Joint delivery from Pacific Ocean side to Japan Sea side



Joint delivery in Hokkaido



Joint collection scheme for beer pallets

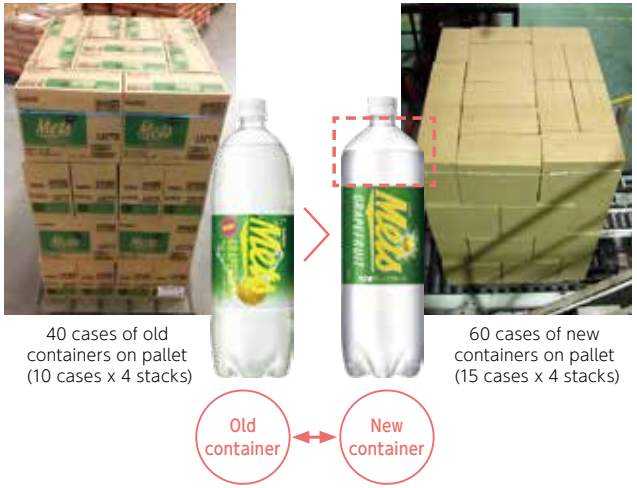


*1 Restricted to customers that have dealings with multiple companies and a transaction scale of at least a certain level (total of around 10,000 beer pallets a year from members of the Association for Joint Use of Beer Pallets)
*2 One company will represent the four beer companies and collect the pallets. 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.

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. Kirin Beverage compensated for reduction in capacity for large carbonated drink containers (1.5 L) by changing the shape of the "shoulders" of bottles and changing the diameter of PET bottles bodies 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 by a factor of 1.5.

* Calculated based on the results of shipments of large carbonated drink containers in 2016.

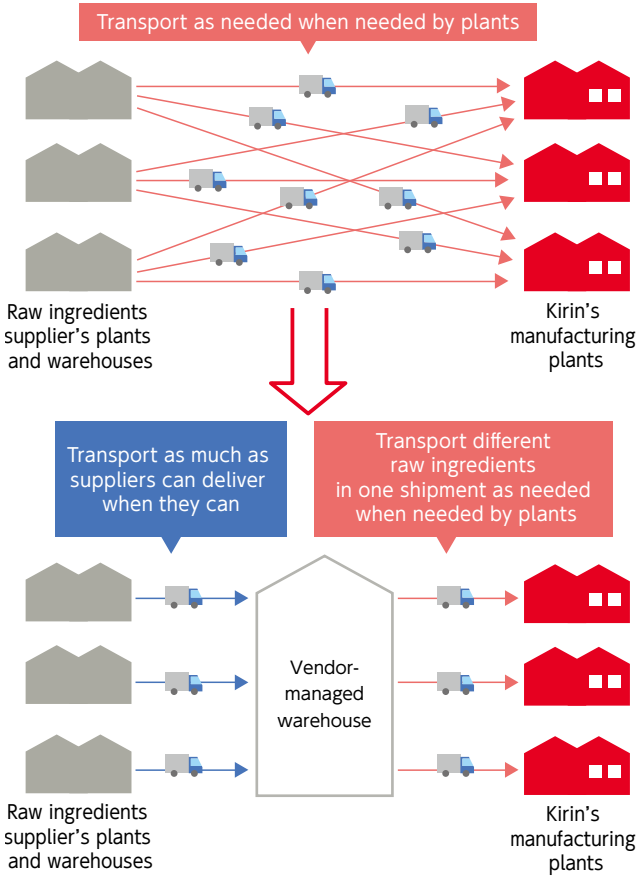


Vendor-managed warehouse

The soft drinks sold by Kirin Beverage are produced at plants throughout Japan, and they 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 we transport raw ingredients when necessary, and in the amounts necessary, in accordance with the production plans of product manufacturing plants, even small amounts of raw ingredients are transported over a long distance, which was becoming an inefficient practice.
With the aim of mitigating the risk of not being able to transport due to an unavailability of trucks and optimizing transportation efficiency, we started a trial operation of a raw materials procurement and distribution system using a raw materials warehouse (vendor-managed warehouse) adjacent to Kirin Beverage's in-house plants, the Shonan Plant and Shiga Plant, from October 2019. By establishing this facility as a vendor-managed warehouse, raw ingredient suppliers can transport the desired amount of raw ingredients when they need to, thereby maximizing efficiency. This has made it easier to cope with sudden changes in production plans, and contributed greatly to improving the responsiveness of plants.
Based on the results of this trial, in April 2020, we increased the number of applicable raw ingredients to more than 200 types at 20 plants nationwide, including subcontracted plants, and the system is in full operation. Given full-scale operation, we have estimated that we are able to reduce GHG emissions by at least 1,000 tonnes per year (reduction rate of approximately 80%) and 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 vendor-managed warehouses.

Efforts to improve the efficiency of raw ingredient transportation by using vendor-managed warehouse



Sale

Vending machines

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 2021, we have switched more than 85% of installed vending machines to this type.

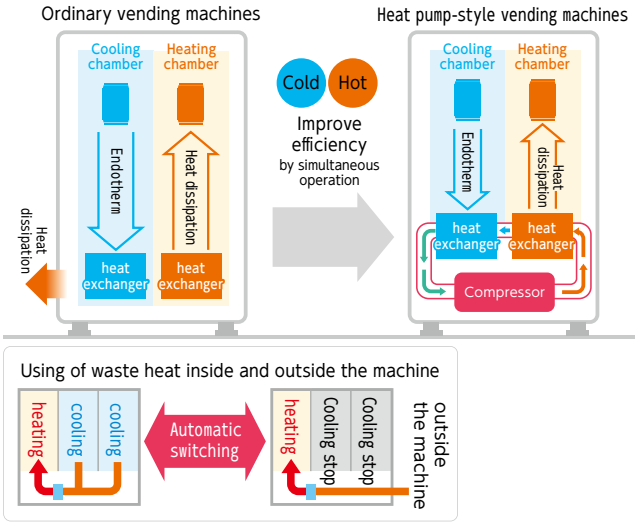
Heat pump-style vending machines pump up the waste heat generated when cooling products and use it for heating to warm up the products. This allows reduction in power consumption compared to conventional vending machines by cutting down the power used by the heaters.

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. Some types offer higher energy-saving performance, such as with heating functions not only by using the waste heat released by the cooling chamber as previous models did, but by capturing the heat from outside the machine, and by improving hot and cold insulation performance 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.

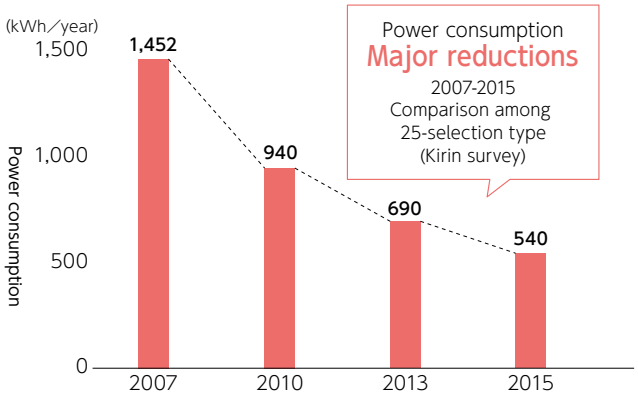
Installation of the new models began in 2015, and we are aiming for 80% of the new machines we install in 2021 to be new models.

With regard to lighting, we are replacing conventional fluorescent lighting with LED lighting, which conserves more energy.

About heat pump



Trend in power consumption



Change to the best-before labeling

Since 2013, Kirin Beverage has been working to shift to labeling the "year and month" as the best before date on soft drinks.

Kirin Brewery has changed its labeling of production dates on cans and bottles of beer, low-malt beer, no-malt beer products, and non-alcoholic beer-taste beverage from the former "year, month and early/middle/late month" to "year and month" for products from October 1, 2020 onwards.

We expect that this change in labeling will contribute to alleviating the need for managing products based on periods of "one-third of a month," streamlining store display operations at distributors, and reducing operational loads associated with in-house inventory management and shipping operations, thereby increasing efficiency across the supply chain and significantly reducing product waste losses.

More information on measures to reduce food waste→P.36

Before change　After change

SPRING VALLEY BREWERY TOKYO

PRING VALLEY BREWERY TOKYO is an all-day dining establishment with a brewery that we 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

Renewable energy

Other solar power generation

Production plants, including those of Kirin Brewery and Kirin Beverage, have installed solar-power generation equipment in their plant tour facilities and other locations. As part of the Kanagawa Prefectural Government's Thin-Film Solar Cell Promotion and Expansion Project, Kirin Brewery's Yokohama Plant installed a thin-film solar cell in 2016. 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 the dissemination of natural energy.

Yokohama plant

Kyowa Hakko Bio

Yokohama City Wind Power Plant (Hama Wing)

Wind power

The Kirin Group has 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, as part of our support for 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.

Renewable energy certificates

Since 2021, Kyowa Hakko Bio has introduced "Renewable Energy Certificates (I-REC)" at Thai Kyowa Biotechnologies in Thailand. This marks the first adoption of these certificates in the pharmaceutical and food industries in Thailand, and enables GHG emissions associated with the use of electric power to be reduced by approximately 25% (equivalent to a reduction in annual GHG emissions of 5,300 tons), thanks to the use of renewable energy sources for some of the electricity used in the plant.
In anticipation of growing global demand for Human Milk Oligosaccharide (HMO) for powdered milk, we are building a new production facility at the Rayong Plant, which we plan to bring online in the summer of 2022. By introducing this renewable energy certificate, we are aiming to achieve business growth while reducing the environmental impact.

Thai Kyowa Biotechnologies

At Kyowa Kirin's Tokyo Research Park, as a "Designated Global Warming Prevention Facility" based on the Tokyo Metropolitan Ordinance on Environmental Preservation, we achieved significant additional reductions in emissions (equivalent to 3,736 tons of CO_2) by exceeding the mandatory reductions for the first and second plan periods, and provided these reductions as credits under the "Tokyo 2020 Carbon Offset Programme," as part of our support for the achievement of "four days of zero carbon emissions in 2020."
We have begun introducing 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 Château Mercian, which is equivalent to all electricity consumption.

New Zealand's first carbon zero certified beer

Kiwi Pale Ale, which Lion produces under its sustainable beer brand, The Fermentist, became New Zealand's first carbon zero certified beer in 2019. In 2020, *Steinlager*, which Lion brews in the suburbs of Auckland, also obtained carbon zero certification. *Steinlager* accounts for about 10% of New Zealand's entire beer market, and is the most exported beer from New Zealand. To obtain this certification, Lion focused on reducing CO_2 emissions across the *Steinlager* product life cycle (from the cultivation of hops and barley, to the brewing of beer, to packaging and transportation). Lion took the approach of assessing and reducing the beer's carbon footprint and then offsetting any 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.

Lion initiatives

Lion announced that it became Australia's first large-scale carbon neutral certified brewer in May 2020.
Lion has announced its commitment to source 100% of the electric power required to brew beer from renewable energy by 2025. To help achieve the Kirin Group's "SBT for 1.5°C" target, Lion increased its targets for reducing direct GHG emissions (Scopes 1 and 2) to an ambitious target of a 55% reduction by 2030 compared with the 2019 level.
Lion assesses its response to climate change using three key metrics: the reduction of direct emissions, increases in energy efficiency, and the use of renewable electricity.
First, to reduce dependence on natural gas, Lion is promoting the use of biogas derived from the anaerobic treatment of wastewater at breweries.
In addition to installing a solar photovoltaic system in 2019 at Castlemaine Perkins Brewery, a brewery for the leading beer in Brisbane, Queensland, *XXXX Gold beer*, the company installed a solar photovoltaic system in 2020 at Little Creatures Geelong in Victoria. With a rated output of 650 kW, the system is expected to reduce Little Creatures Geelong's CO_2 emissions by 955 tonnes per year (25% of CO_2 emissions from electricity used).
In addition to continuing to invest in highly energy-efficient facilities, Lion is continuing to explore the possibility of using contracts based on a PPA model, which Lion uses to purchase renewable energy in New South Wales, in other states.

Acquisition of carbon neutral certification in Australia and New Zealand

Lion Little Creatures Geelong brewery

TOPICS

Kirin Group engineering

As a manufacturer, production equipment is an essential part of our business, and it is vital that we possess the engineering capabilities to quickly develop facilities that are capable of efficiently producing quality products while being eco-friendly and comfortable for our workers. The Kirin Group has set up engineering organizations within each operating company to ensure that our production facilities are supported by engineers with a thorough understanding of manufacturing processes, production technology, and maintenance techniques.The Kirin Group owns Kirin Engineering, a general engineering company specializing in the construction of plants producing beer, beverages, pharmaceuticals, and other products. This company is engaged in the large-scale construction, expansion, and remodeling of production facilities for both for Kirin Group companies in Japan and overseas and companies outside the Group. The capabilities of these engineering organizations are strengths of the Kirin Group, and support environmental measures of our business domains, ranging from food and beverages to pharmaceuticals.

Policy recommendations

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 three parties - United Nations 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.
On the same day, we signed the "Uniting Business and Governments to Recover Better" statement, which makes requests of companies that have set SBTi targets or declared their intention to set SBTi targets. This is a declaration of our agreement to the statement calling for national governments to support activities such as the UNGC and SBTi, and maintain the current pace of climate change initiatives when considering economic aid in response to the recent COVID-19 pandemic.
There has been a growing trend, primarily in Western countries, toward a "green recovery," in which measures to rebuild economies and societies damaged by the spread of COVID-19 do not cause the risk of the emergence of new infectious diseases or increase the spread of disease, but rather promote reconstruction in a sustainable and resilient manner while 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.
The Kirin Group has set forth the target of achieving net zero GHG emissions across the entire value chain by 2050. The aforesaid signatures are part of these efforts.

Kirin Holdings consents to "Making Japan a Nation where Renewable Energy is Easily Accessed: Three Strategies and Nine Policies Sought By Corporations Engaged in Climate Action"

On July 30, 2020, Kirin Holdings became a supporter of "Making Japan a Nation where Renewable Energy is Easily Accessed: Three Strategies and Nine Policies Sought By Corporations Engaged in Climate Action," a recommendation by the RE-Users (Renewable Energy Users Network), which promotes the use of renewable energy mainly by companies. This recommendation was developed in January 2020 in cooperation with CDP Japan and WWF Japan based on the opinions of 20 large companies participating in the RE-Users. The RE-Users will communicate with the Japanese government and electric power companies to take measures to ensure that the country as a whole is able to promote the implementation and use of renewable energy, even in the face of the spread of COVID-19.

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. By participating in the Consortium, the Kirin Group will study highly practical electric vehicles suitable for our business operations, share insights across industries, and promote initiatives to realize a sustainable society.

Interview in TCFD Guidance on Scenario Analysis

In the "Guidance on Scenario Analysis for Non-Financial Companies" published by the TCFD in October 2020, we expressed our opinions in an interview as one of 15 companies from around the world.

https://assets.bbhub.io/company/sites/60/2020/09/2020-TCFD_Guidance-Scenario-Analysis-Guidance.pdf

Participation in the Review Committee of Sector-Specific Disclosure Guidance in the TCFD Consortium

On May 27, 2019, the Kirin Group became a founding member of the TCFD Consortium, which discusses effective corporate disclosure related to the Task Force on Climate-related Financial Disclosures (TCFD) and the ways in which disclosed information can be used to help financial institutions, etc., make appropriate investment decisions.
In 2020, we served as a member of the Review Committee of Sector-Specific Disclosure Guidance (food sector), the results of which were made public in the "Guidance on Climate-related Financial Disclosures 2.0 (TCFD Guidance 2.0)" published on July 31, 2020.
At the TCFD Summit held on October 9, 2020 (organized by the Ministry of Economy, Trade and Industry and cosponsored by the WBCSD and the TCFD Consortium), an officer of Kirin Holdings overseeing related efforts participated in a panel discussion in response to requests.

Graphs Related to Climate Change Issues

Independent Assurance Report→P.116 Related Information→P.99～P.101

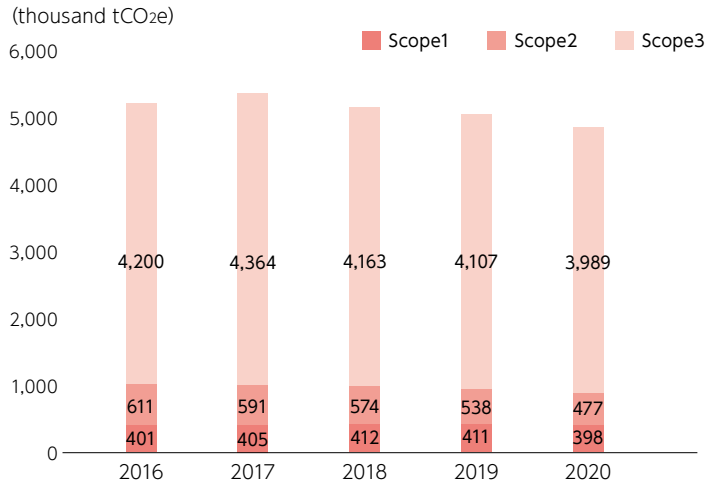
Value chain greenhouse gas emissions* (Unit : tCO_2e)

		2016	2017	2018	2019	2020
Direct emissions from corporate activities (Scope 1 + Scope 2)		1,012,241	996,414	985,916	948,733	875,006
	Scope 1 (Emissions from use of fuel)	401,081	405,005	411,747	410,875	398,216
	Scope 2 (Emissions related to purchase of power and steam)	611,160	591,409	574,169	537,858	476,789
Indirect emissions (Scope 3)		4,200,483	4,363,666	4,163,408	4,106,863	3,988,639
	Raw materials (Category 1)	2,682,791	2,628,183	2,444,176	2,334,076	2,308,001
	Transport - Upstream (Category 4)	383,886	376,266	379,998	424,038	396,149
	Transport - Downstream (Category 9)	832,989	995,389	981,069	1,002,583	958,298
	Product use/disposal (Category 11, 12)	80,111	158,309	150,569	154,227	153,406
	Other (Category 2, 3, 5, 6, 7, 8, 10, 13, 14, 15)	220,705	205,519	207,595	191,939	172,785
Emissions from entire value chain (Scope 1 + Scope 2 + Scope 3)		5,212,723	5,360,080	5,149,323	5,055,596	4,863,645

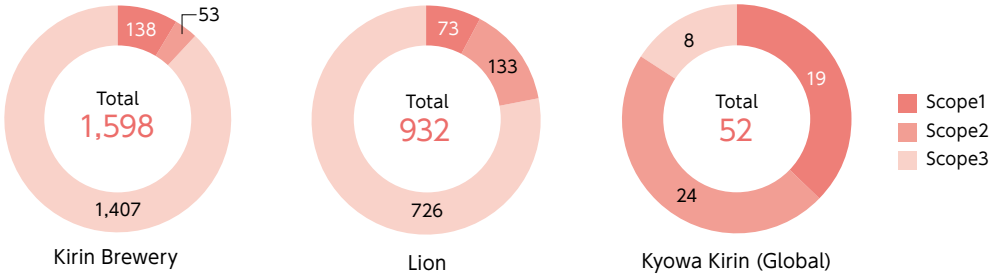
* The emissions are calculated in the same range as the target approved by SBTi.

Calculation boundaries→P.92

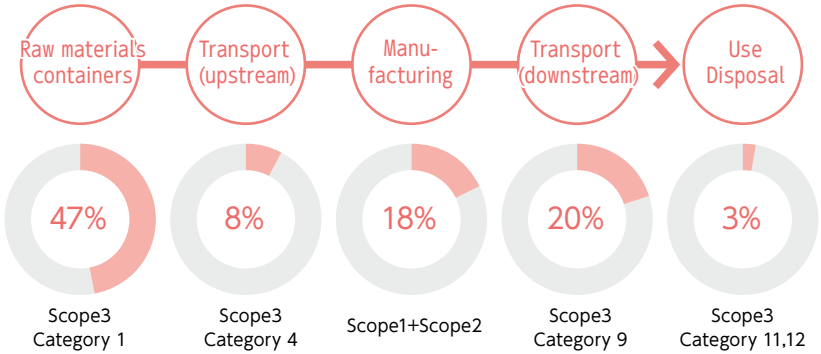
Trend in value chain greenhouse gas emissions



Greenhouse emissions by business (2020) (thousand tCO_2e)

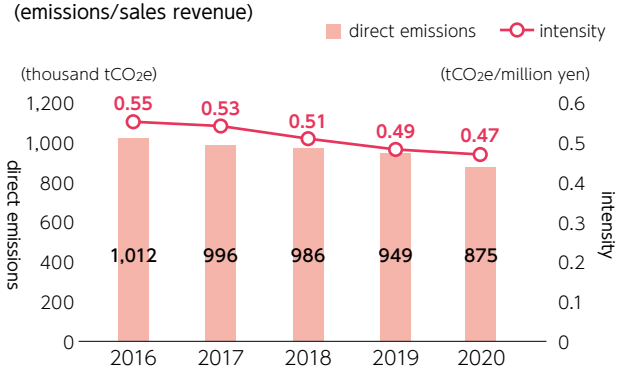


Ratios of greenhouse gas emissions in value chain

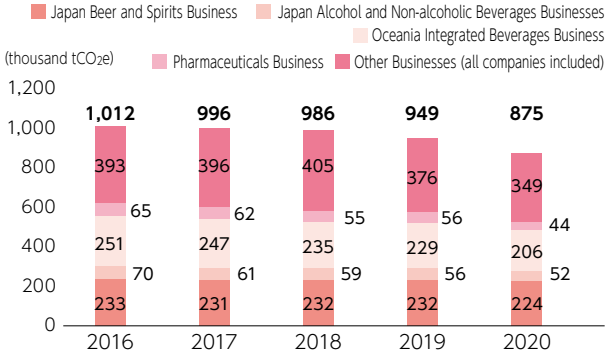


Related Information→P.99～P.103

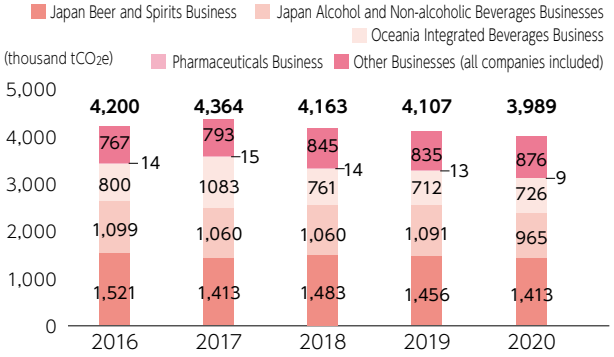
Total direct emissions (Scope 1+2) and intensity (emissions/sales revenue)



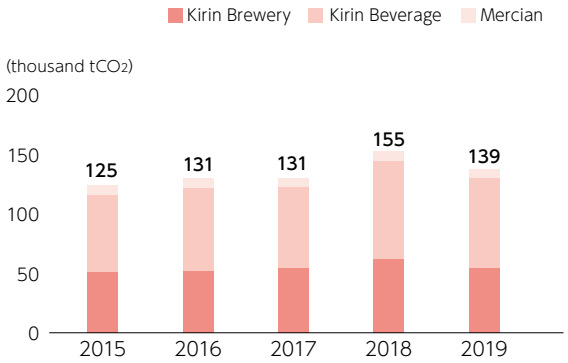
Kirin Group total direct emissions by business segment (Scope1 + 2)



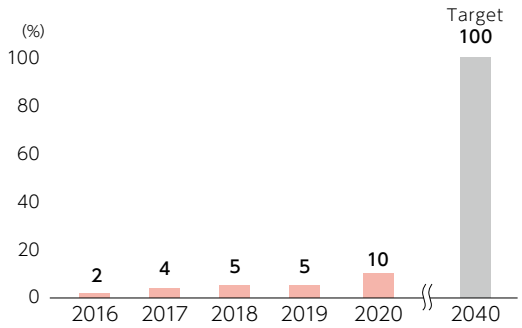
Kirin Group total Scope 3 emissions by business segment



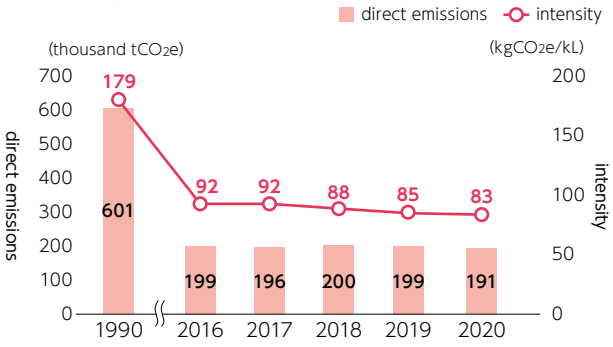
GHG emissions associated with domestic transportation



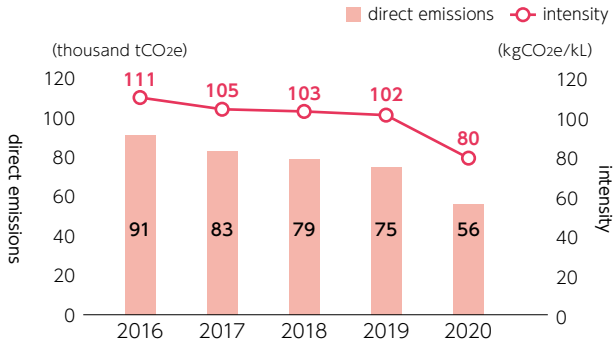
Ratio of renewable energy to total electric power used in the Kirin Group as a whole



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

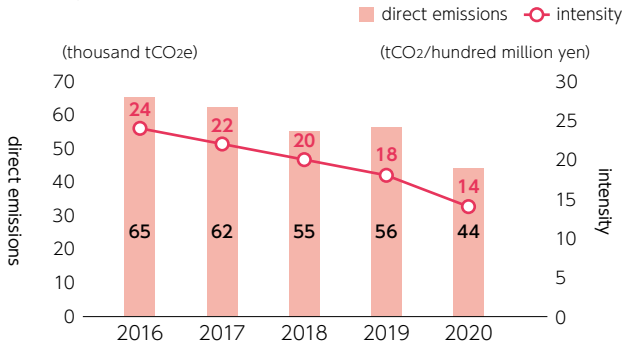


Direct emissions (Scope 1+2) and intensity (emissions/production) of Lion

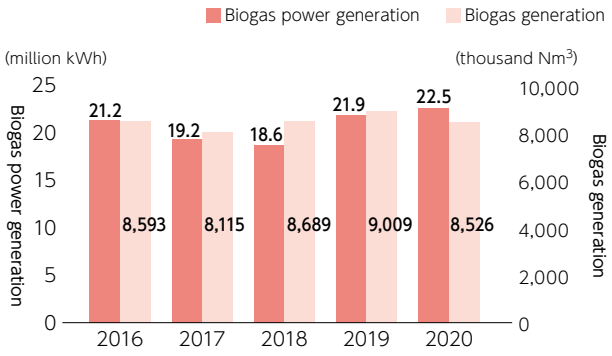


*Excluding the dairy products and beverages businesses

Kyowa Kirin (Global) direct emissions (Scope 1+2) and intensity(emissions/sales revenue)



Biogas generation and power generation by Kirin Brewery's



Energy use by business (2020)