Climate Change

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.

Raw materials Containers

P.62 Tea farms
P.62 In-line blowing aseptic filling machine
P.62 Ocean Transportation in Large Bags and Bottling in Japan

Manu-facturing

P.63 GHG reduction in manufacturing processes
P.64 Cogeneration,Improvement of the refrigeration system, Wastewater biogas
P.64 Myanmar Brewery
P.68 Natural energy

Distribution

P.65 Modal Shift
P.65 Joint delivery
P.65 Joint collection of beer pallets
P.66 Improving loading efficiency
P.66 Vendor-managed warehouse

Sale

P.67 Vending machines

A decar-bonized society

P.70 *Business Ambition for 1.5°C* and *Uniting Business and Governments to Recover Better*
P.70 Consortium for promoting the use of electric vehicles
P.70 Carbon zero certified beer

Overview of Approaches

In 2009, the Kirin Group declared the lofty target of halving our CO_2 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 CO_2-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.

Related Information→P.96～P.100

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 *the Business Ambition for 1.5℃* and *Uniting Business and Governments to Recover Better* in response to the efforts for the 1.5℃ 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.

TCFD

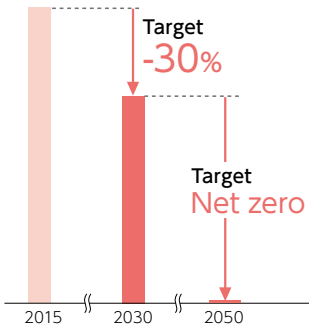
Kirin Holdings is the first company in Japanese food industry which supports the Task Force on Climate-related Financial Disclosures (TCFD) recommendations.

SCIENCE BASED TARGETS

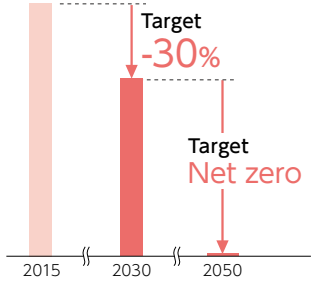
The Kirin Group's medium-term GHG reduction target is the first case in Japanese food industry approved by the Science Based Targets initiative (SBTi).

Target

Target for total Scope 1 and Scope 2 emissions*



Target for total Scope 3 emissions*

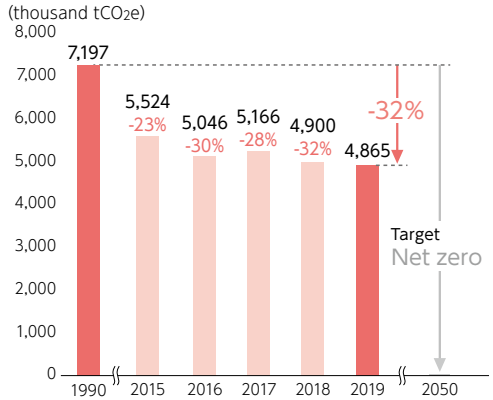


*The emissions are calculated in the same range as the target approved by SBTi.

Calculation boundaries→P.91

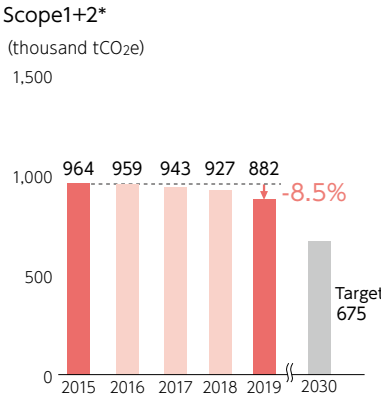
Progress

Trends of GHG emission from entire value chain*

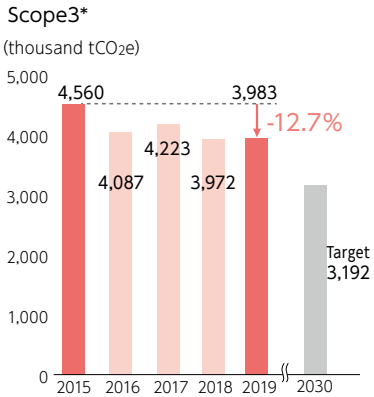


Trends of GHG emissions against medium-term targets

Scope1+2*



Scope3*



Realize Net-Zero GHG emission from the entire value chain

Value chain upstream

Responses at tea farms

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→P.32
Conservation activities for water sources on tea farms→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 in-line 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 CO_2 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.

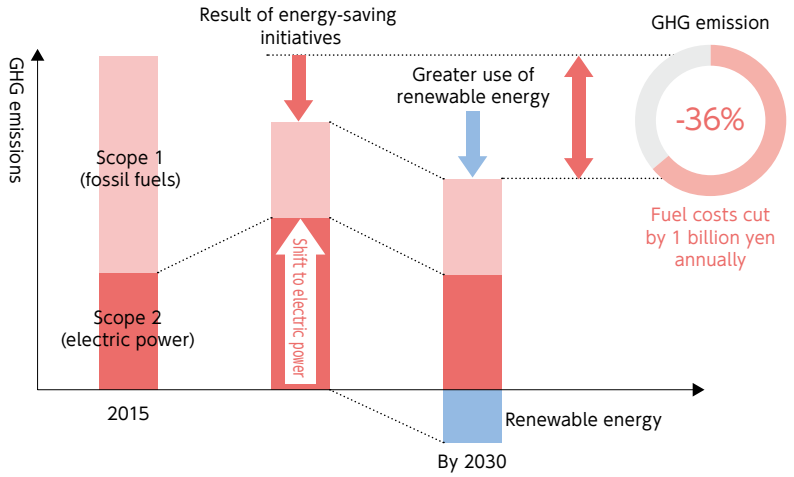

Specially designed large bags

Manufacturing

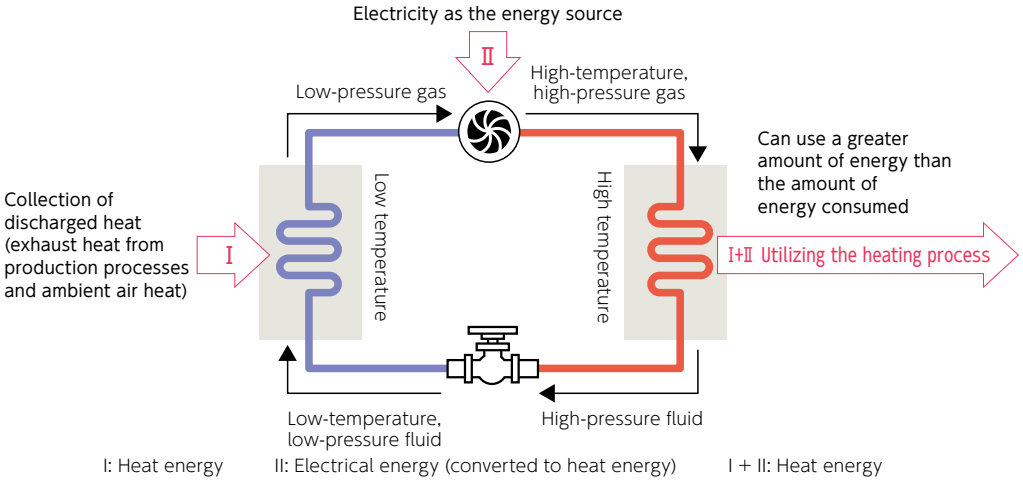
GHG reduction initiatives in manufacturing processes

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.

Method of reducing GHG emissions



Heat pump 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 CO_2 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

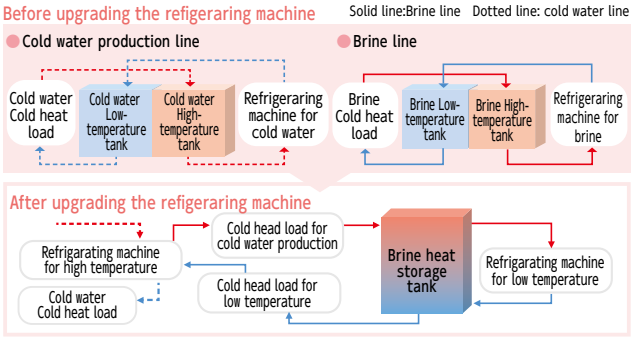
At some of the plants of Kirin Brewery, we reduced energy consumption through improving the efficiency of refrigerating systems. We applied cascade refrigeration system as key technology to improve the efficiency, the system cools in phases in a process that involves a considerable temperature difference,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

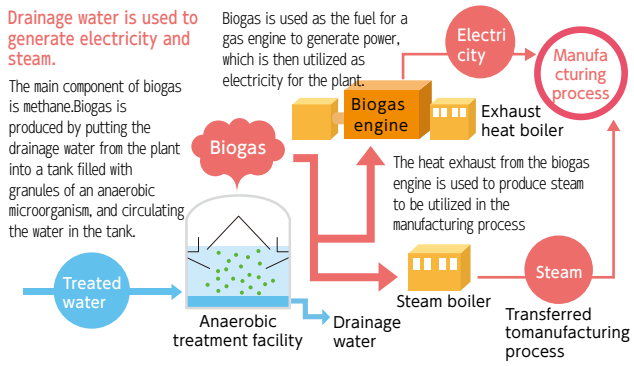
Wastewater biogas

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 CO_2-free fuel.

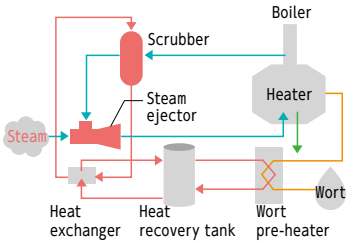
Construction of highly efficient production facilities at Myanmar Brewery

To meet skyrocketing demand, Myanmar Brewery has made major expansions at its manufacturing facilities. Its high-efficiency 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 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





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

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.

Distribution

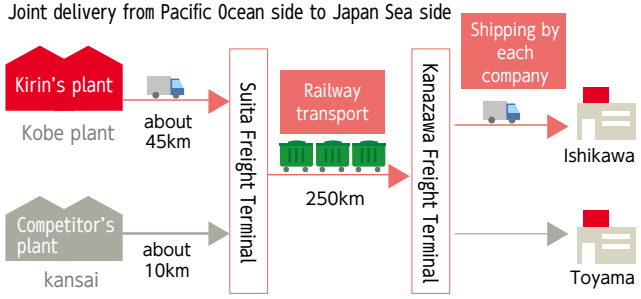
Promoting Modal Shift in Transportation of Goods

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.

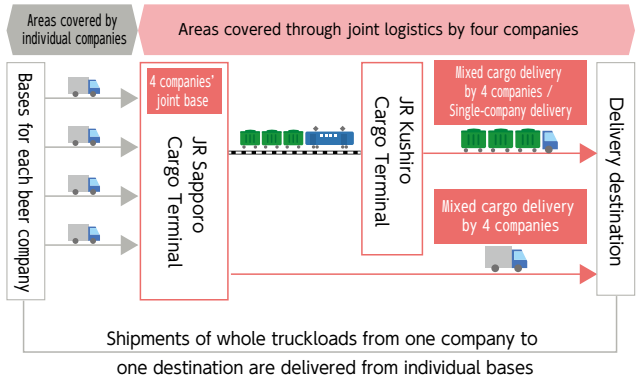
Joint delivery

The Kirin Group has positioned the logistics area as a non-competitive 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 CO_2 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 from Pacific Ocean side to Japan Sea side



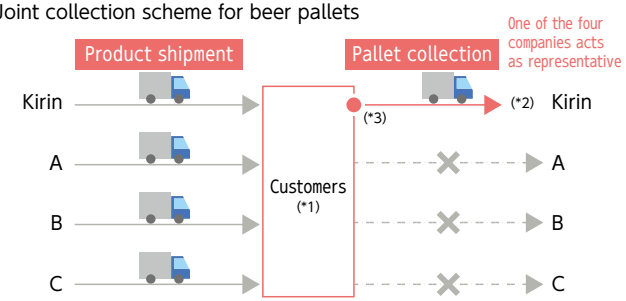
Joint delivery in Hokkaido



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 CO_2 emissions. It is estimated that this will result in an annual reduction in total CO_2 emissions by the four breweries of approximately 4,778 tonnes (approximately 47% compared to usual emissions).

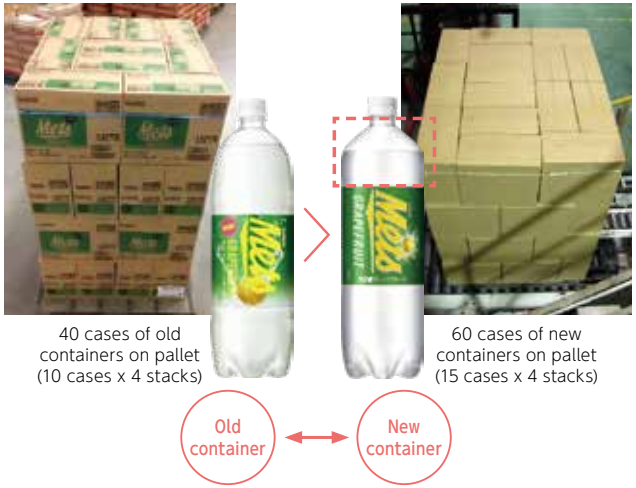
Joint collection scheme for beer pallets



*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.
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

Between 1990 and 2019, Kirin Brewery and Kirin Beverage reduced CO_2 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 CO_2 emissions in the manufacturing process of containers and packaging and improving loading efficiency, which also leads to reduction of CO_2 emissions.

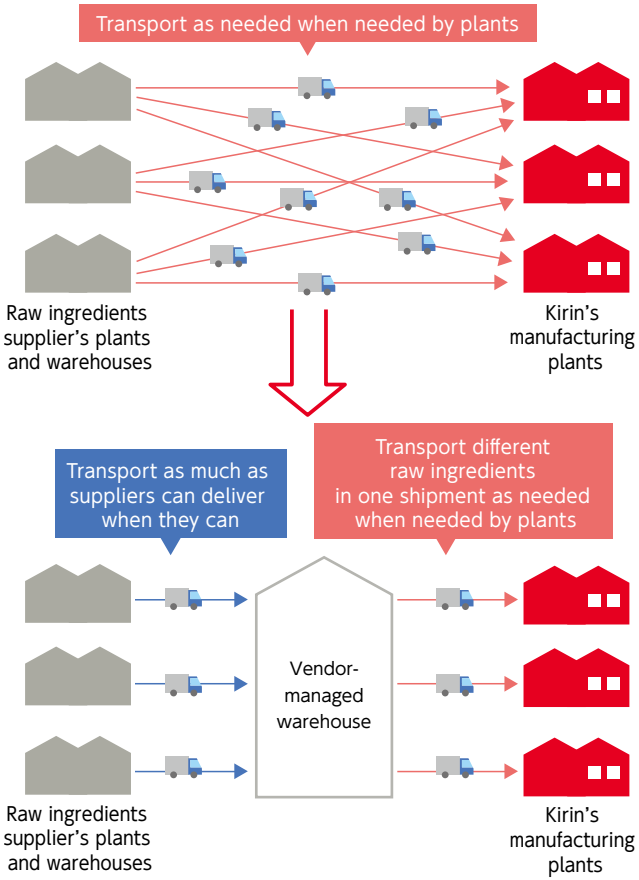
*Calculated based on the Carbon Footprint Product Category Rule (Certified CFP-PCR Number: PA-BV-02) applied to the actual container usage of Kirin Brewery and Kirin Beverage from 1990 to 2019.

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 vendor-managed warehouse.

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

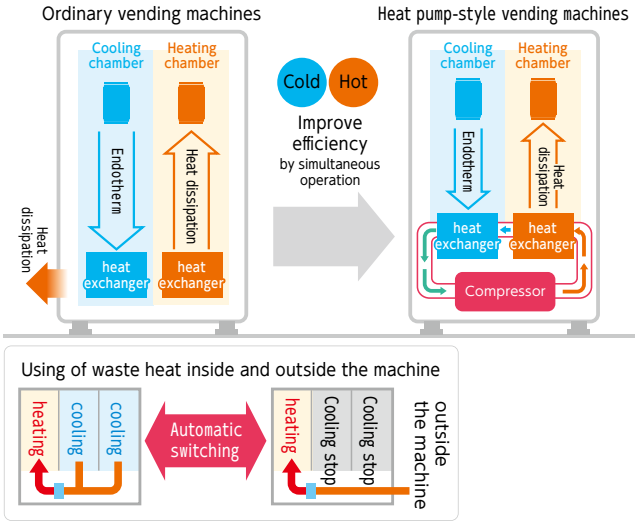


Sale

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

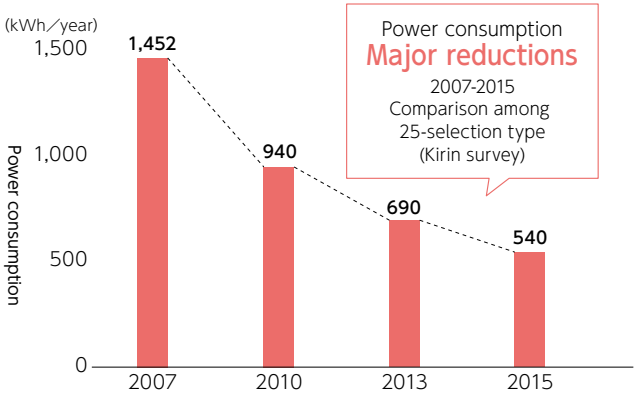


The latest heat pump-style vending machines are equipped with a compressor that uses an inverter to delicately control the operation (variable speed of rotation) according to the atmospheric temperature and the temperature of the products in the machine. Further, some types offer higher energy-saving performance, such as with heating functions not only by using the waste heat released by the cooling chamber as previous models did, but 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

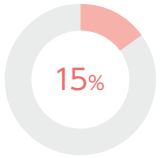
Kyowa Kirin is proceeding with switching business vehicles to hybrid cars. The company started serially switching from the conventional certified low emission vehicles in 2009, and by the end of 2019, all company-owned vehicles are hybrid vehicles. By cutting back fuel used in sales activities in this way, the company is achieving reductions in CO_2 emissions.

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

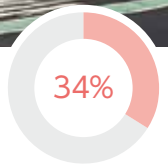


CO_2-free hydroelectric power

Since April 2017, Kirin Brewery's Toride Plant and Kirin Beverage's Shonan Plant started using CO_2-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 CO_2 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, CO_2-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 CO_2-free hydroelectric power, which is the first case in the pharmaceuticals manufacturing business.

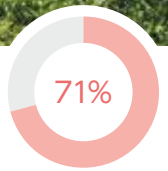
Kirin Beverage Shonan Plant

Ratio of hydro-electric power



Kirin Brewery Toride Plant

Ratio of 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.

Yokohama City Wind Power Plant (Hama Wing)

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

Kyowa Hakko Bio

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 CO_2 emissions from electricity). The installation and commissioning of this system is planned for July 2020.

Castlemaine Perkins Brewery

Lead to build a decarbonized society

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.
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.

GHG data

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

Value chain greenhouse gas emissions*

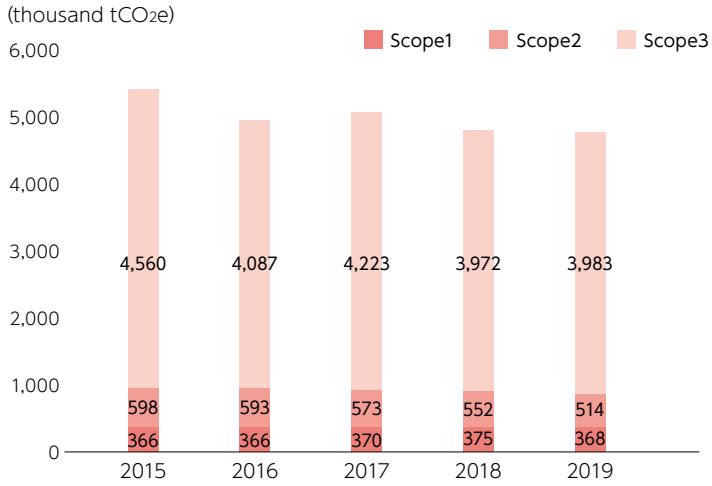
(Unit : tCO_2e)

		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 purchase of power and steam)	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 (Category 4)	384,873	374,510	363,123	364,936	405,309
	Transport - Downstream (Category 9)	979,569	787,665	941,234	920,313	929,111
	Product use/disposal (Category 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

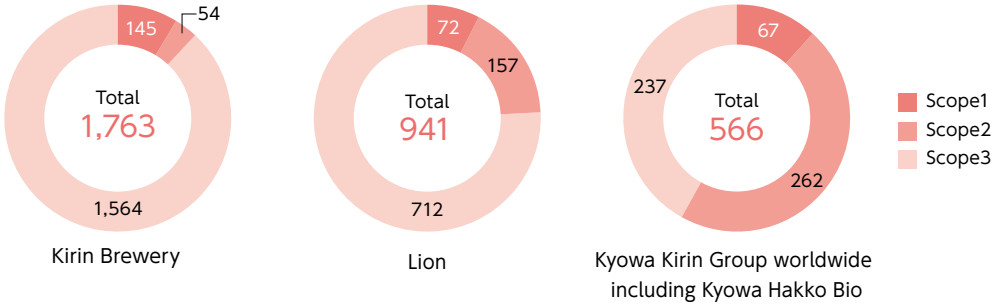
* The emissions are calculated in the same range as the target approved by SBTi.

Calculation boundaries→P.91

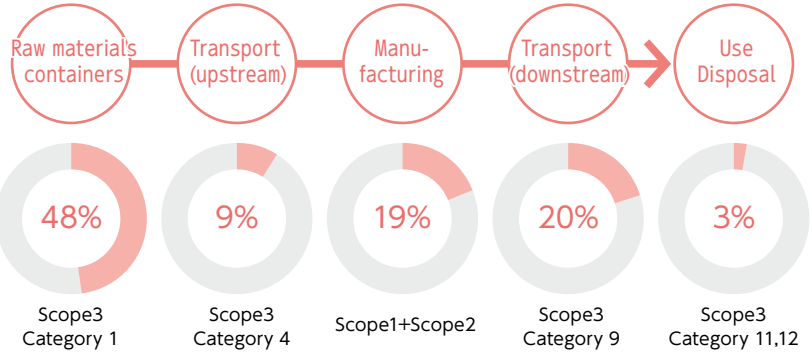
Trend in value chain greenhouse gas emissions*



Greenhouse emissions by business (2019) (thousand tCO_2e)



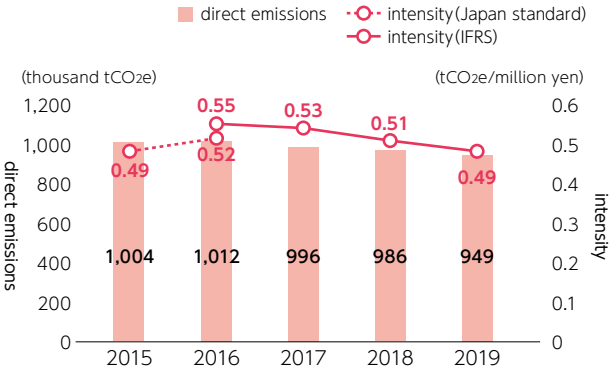
Ratios of greenhouse gas emissions in value chain



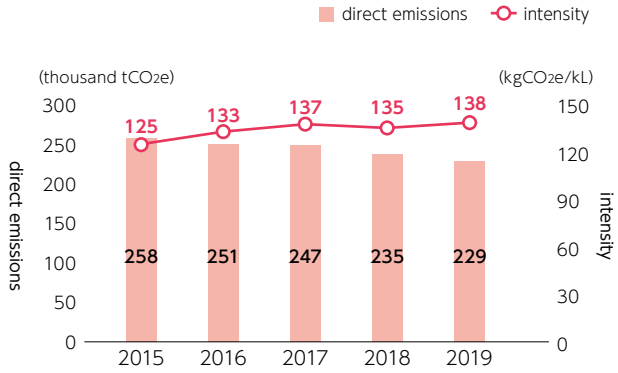
GHG Graphs

Related Information→P.96～P.100

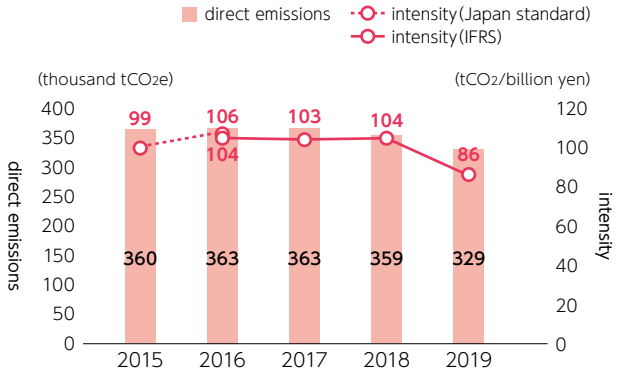
Total direct emissions (Scope 1+2) and intensity (emissions/sales revenue)



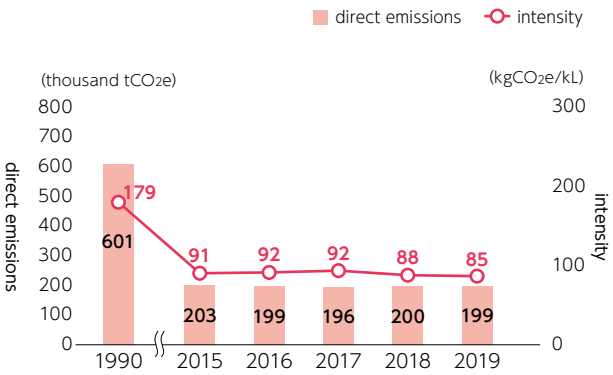
Direct emissions (Scope 1+2) and intensity (emissions/production) of Lion



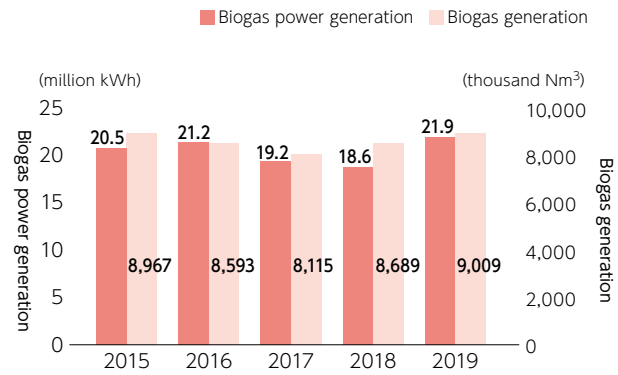
Direct emissions (Scope 1+2) and intensity (emissions/sales revenu of Kyowa Kirin Group worldwide including Kyowa Hakko Bio



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



Biogas generation and power generation by Kirin Brewery's



Energy use by business (2019)