Climate change adaptation and mitigation

Climate change is not only an urgent global issue, but also an issue that has a major impact on Ajinomoto Group businesses. The risks involved with the advancement of climate change include the inability to procure raw materials. At the corporate management level, we see climate change as both a risk and an opportunity as we study measures in response. Aiming to reduce our environmental footprint throughout the lifecycle of our products, we promote energy conservation, using energy from renewable energy sources, and participation in international initiatives, aiming to solve issues as we work closely with entities both internal and external.

Specific examples

- Greenhouse gas emissions (Scope 1, 2, and 3)
- Energy management
- Fuel management
- Air quality

Related opportunities and risks (○ Opportunity ● Risk)

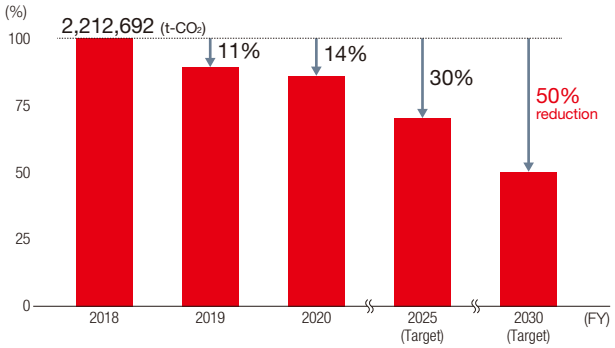
- ○ Cost competitiveness ensured through renewable energy and reduced carbon tax burden
- ○ Collaboration with outside organizations on decarbonization
- ● Failure to procure raw materials due to climate change
- ● Damaged corporate value due to delayed response to climate change

Key initiatives by the Ajinomoto Group

- Long-term effort to turning the overall product lifecycle carbon neutral
- Initiatives to reduce energy use during production and transportation
- Shifting to renewable energy
- Use of internal carbon-pricing
- Disclosing information in line with the Task Force on Climate-related Financial Disclosures (TCFD) (scenario analysis, etc.)
- Lowering environmental impact by feed-use amino acids (reduction of soil and water pollution)

Related SDGs

Greenhouse gas emission reduction rate (vs. FY2018)



Climate Change Adaptation and Mitigation

Response to climate change risks

Approach

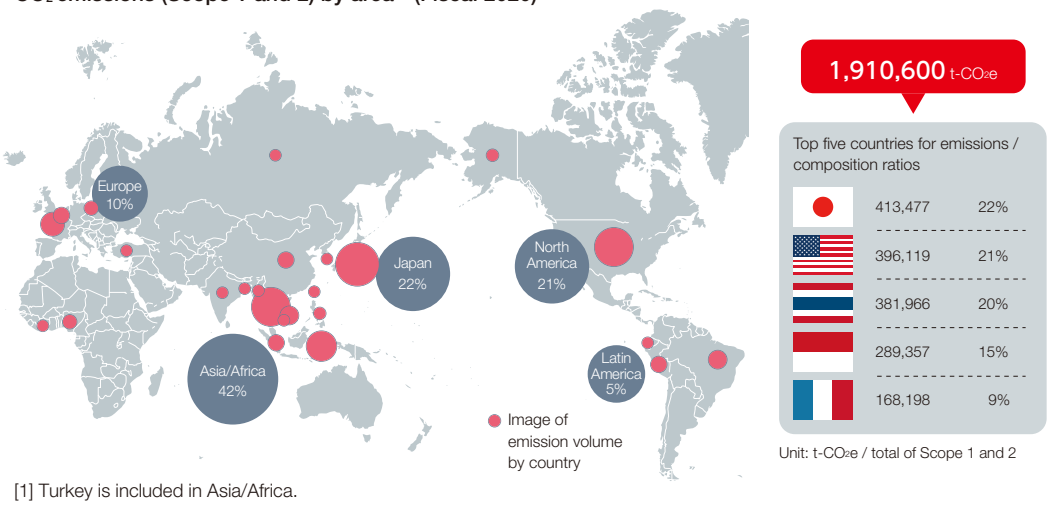
GRI102-11
GRI201-2

> Integrated Report 2021 P33–34
> CDP Climate Change

The Ajinomoto Group uses the bounty of nature such as agricultural products. We understand that responding to climate change is an urgent issue in conducting business in a sustainable manner.

Ajinomoto Group greenhouse gas (GHG) emissions for fiscal 2020 were a total of 1.91 million tons of CO_2, comprising Scope 1 and 2, with 87% of the total coming from the top five countries including Japan, the United States, and Thailand. Furthermore, the total GHG emissions over the entire product life cycle, which includes Scope 3 emissions came to approximately 13.7 million tons of CO_2, with these Scope 3 emissions comprising more than 85% of the total.

CO_2 emissions (Scope 1 and 2) by area[1] (Fiscal 2020)



[1] Turkey is included in Asia/Africa.

For fiscal 2030, we have set a target of a 50% reduction in Scope 1 and 2 GHG emissions over fiscal 2018 levels (we obtained SBT approval in April 2020). As measures to meet this goal, we are promoting energy-saving activities, a switch to fuels with low GHG emissions, the use of renewables such as biomass and solar power, and the introduction of lower energy-consumption processes. For Scope 3 emissions, we have set a fiscal 2030 target of a 24% reduction over fiscal 2018 levels. Of these, raw materials are causing approximately 60% of total GHG emissions over the whole product life cycle, therefore we are encouraging raw materials suppliers to reduce their GHG emissions, and are considering the introduction of new technologies such as on-site ammonia production.

At the same time, we will evaluate the risks and opportunities of climate change on our business, and actively disclose relevant information based on the four perspectives of governance, strategy, risk management, and metrics and targets.

Climate Change Adaptation and Mitigation

Governance

In the Ajinomoto Group, we honestly comply with the Ajinomoto Group Policy (AGP) that shows the ideal way of thinking and action that the Group companies and their officers and employees should comply with, continue to develop and properly operate our internal control system, strengthen our system that considers sustainability as an active risk-taking system, and continuously enhance our corporate value.

The board of directors has established the Sustainability Advisory Council, and establishes a system to recommend the Group's approach to sustainability and ESG from a multiple-stakeholder perspective. It determines materiality items related to sustainability that serve as guidelines for ASV management, including items related to climate change.

The Executive Committee has established the Sustainability Committee and selects and extracts risks and opportunities at the companywide management level, including those related to climate change, and assesses the degree of impact, formulates measures, and manages their progress.

Strategy

Products in the Ajinomoto Group's business domains range from food such as seasonings, frozen foods and coffee to healthcare. Further, our operations span the globe. Climate change may impact Group operations in many ways. Major natural disasters may become diminished our business activities, affecting our ability to procure raw materials and fuel. Disasters may also alter the consumption of our products.

We review production over the short, medium, and long terms, considering the physical risks of climate change (droughts, floods, rising sea levels, changes in yield of our main raw materials, etc.) and transition risks (introduction of carbon tax, rising energy prices, tight supply and demand and price increases of our main raw materials due to competition with other food sources and biofuels, etc.).

Since fiscal 2018, we have included a scenario analysis of the impacts of climate change on our business. We also established a framework for a more quantitative assessment of risk based on the TCFD recommendations. As a result of scenario analyses, we are reviewing counterstrategies related to physical and transition risks, such as switching to energy sources with low GHG emissions.

Risk management

In light of politics, economics, social conditions, climate change, and other circumstances surrounding the Group, the Sustainability Committee determines the overall level of risks reflecting the impact on our business and likelihood of occurrence. The committee then identifies the significant risks Group-wide and considers strategies in response.

Climate-related risks are regarded as part of significant risks Group-wide. We evaluate the impact of physical risks and transition risks, such as legal risks and market risks, based on published reports and expert advice. The committee's review and recommendations are reported to the Executive Committee and the Board of Directors at least once a year.

Climate Change Adaptation and Mitigation

Performance

GRI201-2
GRI305-4
GRI305-5

> P72

Metrics and targets

In our 20-25 MTP, the Ajinomoto Group aims to reduce GHG emissions by 50% by fiscal 2030 (compared with fiscal 2018).

Total Scope 1 and 2 GHG emissions for fiscal 2020 were down 63,090 tons of CO_2 over the previous fiscal year, 14% down on the base year of fiscal 2018. This was well above the target for fiscal 2020. The main reason for this was a drop in production volumes at many of our plants due in part to the spread of COVID-19. On the other hand, Scope 3 emissions were down 33,859 tons of CO_2 over the previous fiscal year, a 1% drop over the base year of fiscal 2018; however, this failed to meet targets.

In fiscal 2021, we plan to formulate and implement a detailed plan for cutting GHG emissions by half. Additionally, we plan to formulate measures with which to promote decarbonization by using internal carbon pricing[1], and promote a plan in collaboration with Scope 3 raw materials suppliers.

[1] A system in which companies set their own internal carbon price, promoting low-carbon investment and countermeasures. This system is used as an incentive to promote energy conservation, to identify revenue opportunities and risks, and as a guide in investment decision-making.

GHG emission reduction rate

	FY2020		FY2021	FY2030
	Target	Result	Target	Target
Scope 1 and 2: GHG emission reduction rate (vs. FY2018)	9% decrease	14% decrease	14%+ decrease	50% decrease
Scope 3: GHG emission reduction rate (vs. FY2018)	4% decrease	1% decrease	6% decrease	24% decrease

GHG emissions calculated from IEA[2] CO_2 emissions factors

(t-CO_2e)

	FY2016	FY2017	FY2018	FY2019	FY2020
Scope 1 emissions	1,270,429	1,244,676	1,196,969	1,013,315	1,008,811
Scope 2 emissions (Market-based method)	1,121,770	1,072,248	1,015,723	960,375	901,789
Scope 1 and 2 total emissions	2,392,199	2,316,924	2,212,692	1,973,690	1,910,600
Scope 3 emissions	—	11,972,183	11,933,273	11,821,564	11,787,705

[2] International Energy Agency

GHG emissions per volume unit calculated from IEA CO_2 emissions factors

	FY2016	FY2017	FY2018	FY2019	FY2020
Scope 1 and 2 emissions per volume unit (intensity per ton of product)	0.90	0.86	0.84	0.79	0.79
Reference value: Production volume (1,000 t)	2,657	2,684	2,627	2,512	2,423
Scope 1 and 2 emissions per volume unit (intensity per million yen sales)	—	—	1.99	1.79	1.78
Consolidated sales (million yen)	—	—	1,114,308	1,100,039	1,071,453

Climate Change Adaptation and Mitigation

GRI305-6
GRI305-7

NOx and other atmospheric emissions

(tons)

	FY2018	FY2019	FY2020
Nitrogen oxide (NOx)	9,421	5,224	6,637
Sulfur oxide (SOx)	10,701	6,779	7,016
Particulates	1,827	884	1,310
CFCs	11	9[1]	7

[1] The figure has been revised because CFC, HCFC, and HFC have been redefined to exclude non-fluorocarbons such as natural refrigerants.

Summary of scenario analysis conducted

Performance

GRI201-2

> Integrated Report 2021 P34

In fiscal 2019, the Ajinomoto Group has conducted a scenario analysis of the potential impact of climate change in fiscal 2050 under the assumption that the average temperature will rise by 2°C for all production sites by 2100 modeled using our mainstay umami seasoning *AJI-NO-MOTO*®. In fiscal 2020, we expanded this analysis to cover other mainstay products such as foods and specialty chemicals and analyzed the impacts in fiscal 2030 in the events that the average temperature rises by 2°C and 4°C, respectively, by 2100.

As a result, we estimated there to be an impact of approximately 20 billion yen by fiscal 2030, and 30 billion yen by fiscal 2040 from increased risk of higher energy unit prices and higher carbon tax payments[2] due to the advancement of low-carbon societies. When considering procurement of raw materials in fiscal 2030, we expect yields of sugarcane, tapioca, etc. to remain stable. However, increased water stress in production areas, more widespread pests and diseases, and more infectious diseases in livestock may result in more instability in the procurement of corn, pork, and dairy products, etc., or an increase in unit prices. Additionally, more severe and frequent wind and water damage are expected to have an impact on raw material production volumes and distribution. For fishery resources, we predicted that quantities of skipjack tuna would remain stable, however procuring the extract could be problematic.

Our market is expected to shrink as a result of Japan's population that is declining and aging, and global warming is expected to lead to weaker demand for warm meals and drinks. However, this also presents us with opportunities, such as an increase in ethical consumption because of the increasing sense of urgency about climate change and the increase in the use of certified raw materials and demands for traceability together with the spread of the concept of a circular economy. We expect to see increased demand for Ajinomoto Group products which have long been involved in these initiatives. An increase in health-consciousness means we also expect to see an increase in sales of products in fields we have been focusing on, such as low-calorie, low-salt, and protein-enhanced products, and products that promote vegetables intake.

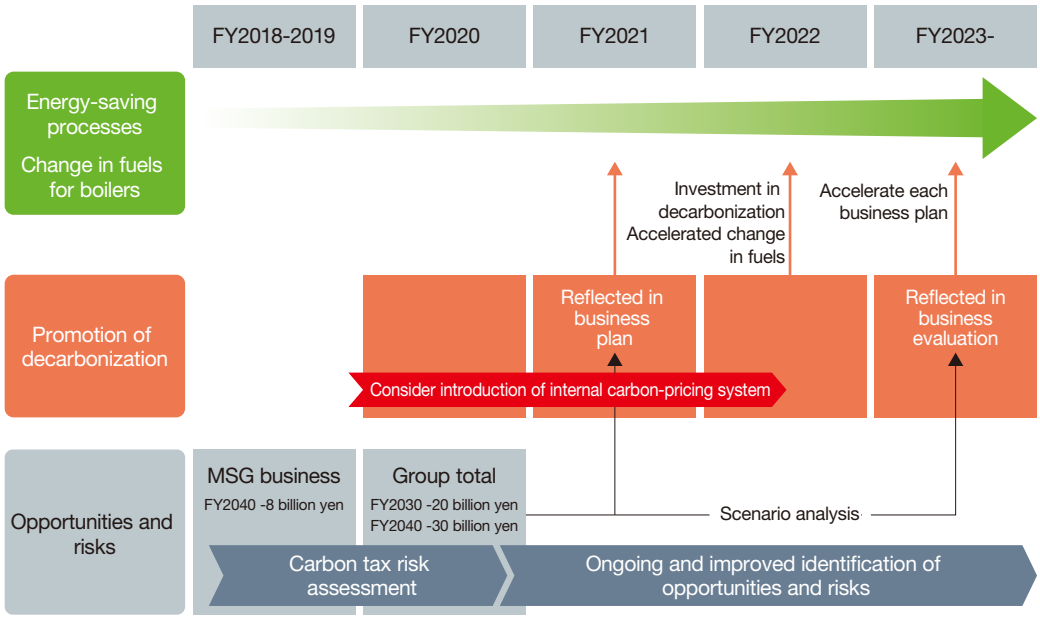
Given the results of our scenario analyses, we will bolster our decarbonization measures through the introduction of internal carbon-pricing systems so that we can avoid or mitigate the financial risks from carbon taxes, and we will promote measures such as alternative fuels and use of renewable energy. For raw materials procurement, we are strengthening our supply stabilization survey and management system that extends upstream throughout the supply chain. We are also promoting diversification of procurement partners, identification of alternative raw materials and reductions in food loss and waste by ensuring that these raw materials are fully utilized. In the market, we will develop products to seize upon these opportunities while still taking these risks into consideration.

In fiscal 2021, we plan to conduct scenario analysis on the impacts in fiscal 2050 using the same assumptions as fiscal 2020.

[2] Calculation based on IEA data (energy unit price increase between 2040 and 2050 of 60% for heavy oil and 30% for gas; carbon taxes in 2040 of US$140/t-$CO_2$ in advanced economies and US$125/t-$CO_2$ in developing economies).

Climate Change Adaptation and Mitigation

Accelerating GHG emission reduction through internal carbon-pricing system



Climate Change Adaptation and Mitigation

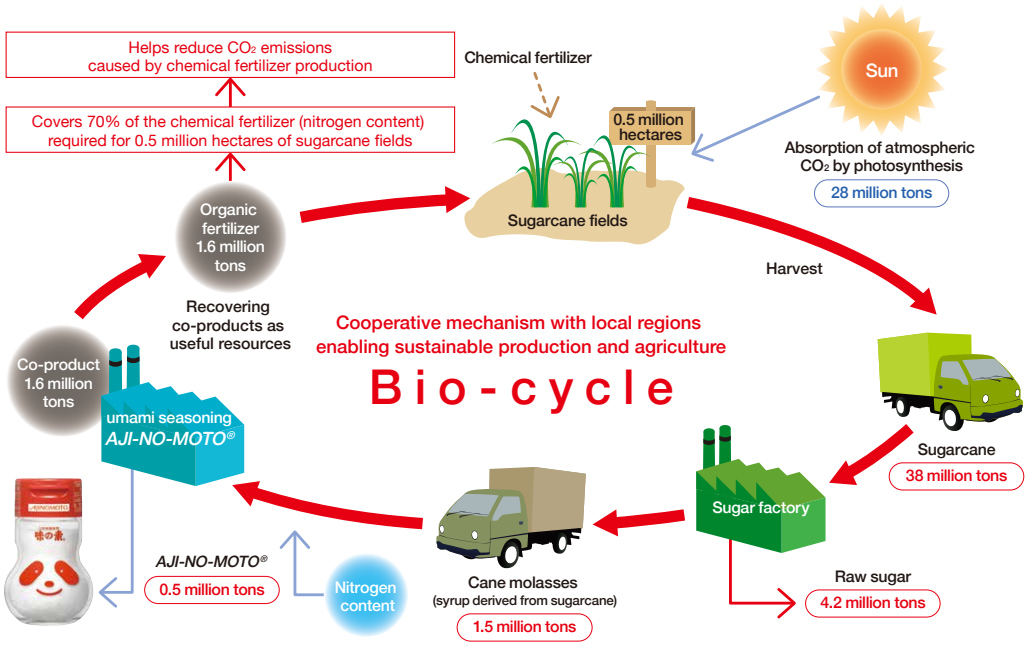
Reduction of greenhouse gas emissions in the value chain

Bio-cycles contribute to reductions in greenhouse gas emissions

Approach

GRI302-1

The Ajinomoto Group produces amino acids through fermentation processes from crops that are easily available in each region. We use as fertilizer and feed nearly 100% of the nutritionally rich by-products (co-products) that remain after extracting amino acids in the fermentation process. We call this type of circular amino acid fermentation processing a bio-cycle, and by introducing this in fermentation facilities around the world, we are working to reduce GHG emissions associated with production of ordinary chemical fertilizer and support sustainable agriculture.



* The chart assumes worldwide annual Group production of approximately 0.5 million tons of the umami seasoning *AJI-NO-MOTO®* using only sugarcane. The figures for sugarcane grown and sugar production are commonly used global figures. The figures related to resources used for producing *AJI-NO-MOTO®* are based on actual statistics from the Group.

Reducing environmental impact through on-site ammonia production

Performance

GRI302-1

> Integrated Report 2021 P63–64

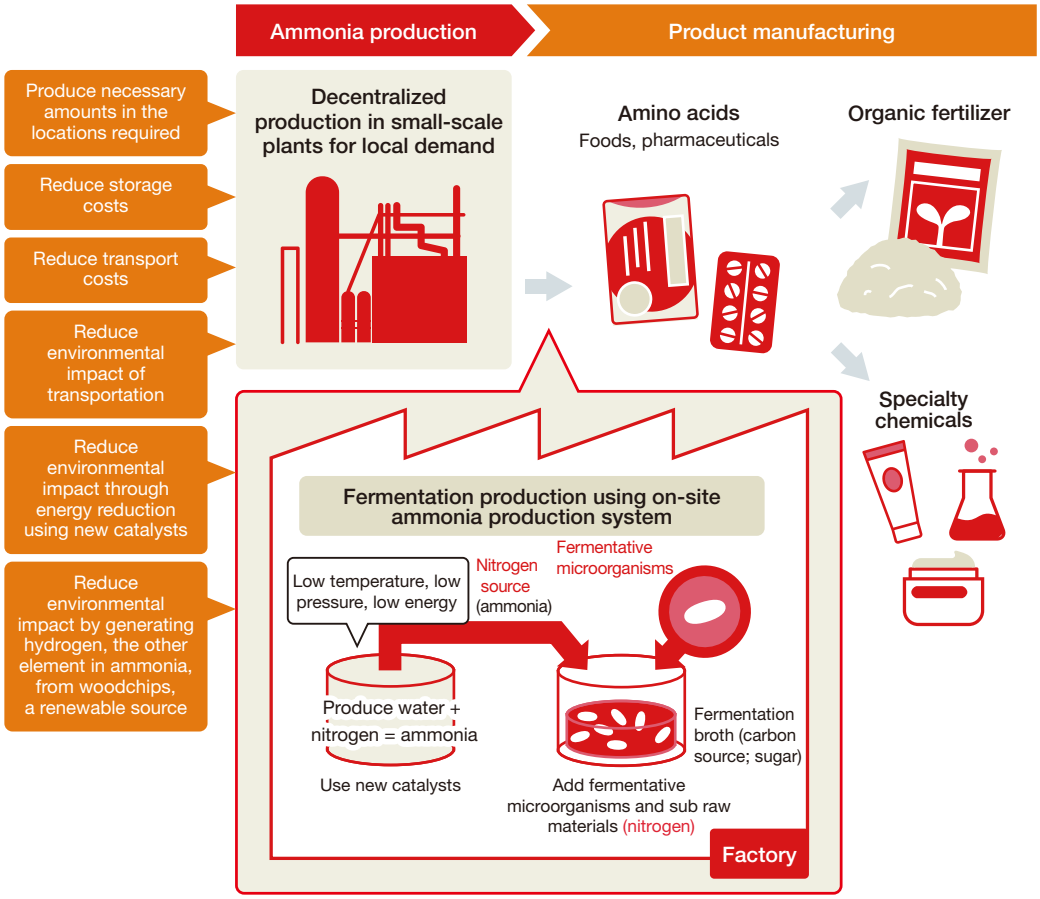
Currently, ammonia is produced worldwide using the Haber-Bosch process, and this generally uses natural gas as its raw material. This production method requires high-temperature and high-pressure reaction conditions, meaning that production is only possible in large plants. It also requires special equipment to transport the final product to where there is demand, and the transportation process itself has a significant environmental impact in terms of CO_2 emissions. The Ajinomoto Group procures ammonia externally as a raw material in the fermentation processes for amino acids, and to solve these problems, we are working toward practical implementation of on-site production to produce the necessary amount of ammonia where it is needed. In 2017, Ajinomoto Co., Inc., in partnership with Professor Hideo Hosono of the Tokyo Institute of Technology and others, established Tsubame BHB Co., Ltd., and we are working towards the commercialization of the world's first on-site production ammonia synthesis system using electride catalyst discovered and developed by Professor Hosono. Electride catalysts allow to synthesize ammonia even under

Climate Change Adaptation and Mitigation

low-temperature and low-pressure conditions, which enables production in small-scale plants, something considered difficult to accomplish under the Haber-Bosch process. The small-scale plants can be located in the area of consumption, which will reduce costs and the environmental impact of transportation.

In October 2019, we completed a pilot production facility at the Company's Kawasaki Plant, launching operations capable of production of several tens of tons per year. We are moving forward with studies with the aim of commercializing this around 2022. We are also developing a green hydrogen production technology to use local renewable materials (wood chips) to produce hydrogen, the raw material of ammonia. By combination of this technology and Tsubame BHB Co., Ltd.'s ammonia synthesis technology, we estimate that the CO_2 emissions generated in the production of ammonia will be cut to one-eighth.

On-site ammonia production system



Participation in RE100

In August 2020, the Ajinomoto Group announced its participation in RE100, an international environmental initiative comprising companies aiming to achieve 100% renewable energy for electricity. Companies participating in RE100 are from diverse fields such as information technology through to automobile manufacturing. Member companies are asked to publicly announce their goals to use 100% renewable energy sources such as solar power, wind power, hydroelectric power, biomass, and geothermal power in their business activities by the year 2050.

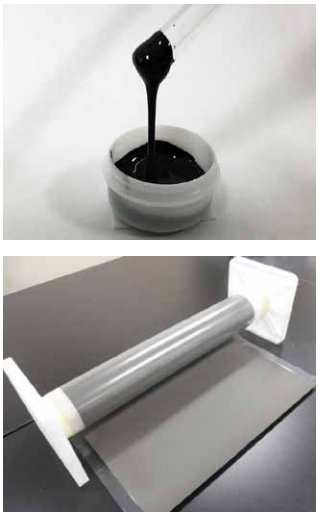
Climate Change Adaptation and Mitigation

Contribution to CO_2 reductions through new magnetic materials

Performance

> Integrated Report 2021 P59

As we enter the data society, we are seeing a rapid increase in demand for semiconductors used in PCs, servers, 5G base stations, and similar, and consequently societal demands for reduced CO_2 emissions by making these semiconductors more energy efficient. The electronic materials business is one of the core businesses of the Ajinomoto Group, in which we focus on providing interlayer insulating materials for semiconductor packages. We are leveraging our long-cultivated technical expertise and knowledge and involving stakeholders in the supply chain, and have developed new magnetic materials that enable power savings in ever-faster semiconductors. The innovative semiconductor package substrate attained through use of this magnetic material will contribute greatly to reduce electricity consumption and associated CO_2 emissions. The magnetic performance of this material also enables reductions in size of the semiconductor power supply functions, which corresponds to an approximately 1 cm^2 (10%) reduction in size for a package substrate for PCs. This also enables incorporation of a large number of these power supply functions into the semiconductor package substrate at a low cost, which helps with lower component counts thus achieving power savings, and contribute significantly towards the maintenance of a sustainable global environment.



Newly developed magnetic materials
(Top) Paste type (Bottom) Film type

Management of fluorocarbons

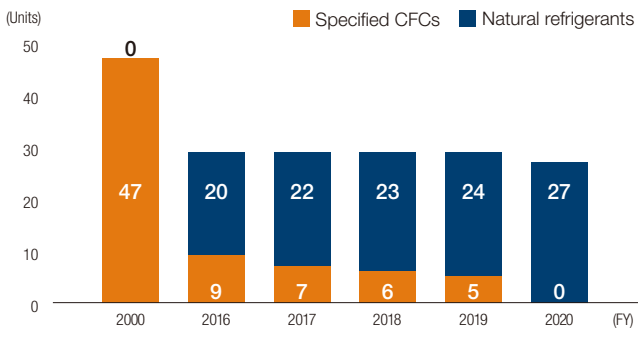
Performance

GRI302-1

The Ajinomoto Group aims to eliminate all HFCs by fiscal 2030 at factories with equipment that use fluorocarbons. Our intent is to switch to natural refrigerants or refrigerants with low Global Warming Potential (GWP) of less than 150 when installing new or upgrading existing equipment.

In 2001, when Japanese frozen food factories were not required to discontinue their use of equipment using specific CFCs, we started with an initiative to phase out the usage of freezers using these, and as of the end of March 2021, we have eliminated the use of those freezers. This was the first such achievement in this industry, which is still only approximately 20% free of CFCs. Looking forward, we will work towards the full elimination of CFC substitutes by fiscal 2030 and continue to decrease use of fluorocarbons in factories overseas.

Switching to fluorocarbon-free freezers in Japan



Climate Change Adaptation and Mitigation

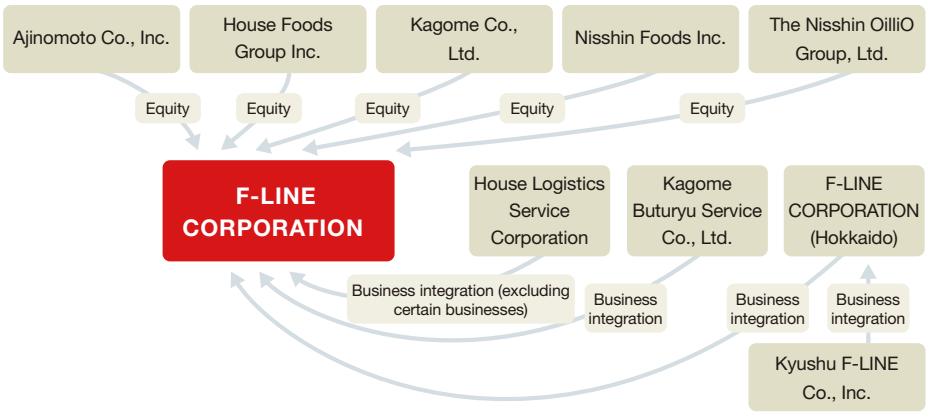
Performance

Initiatives in transportation

The Ajinomoto Group is working to establish a sustainable logistics system. The F-LINE Project launched in 2015 by six food manufacturers[1] operates joint transport in Hokkaido and Kyushu, as well as a joint mainline trunk transport in Hokkaido, in a spirit of compete on products, but distribute in cooperation. Furthermore, a joint logistics company F-LINE CORPORATION, established by five food manufacturers[2] including Ajinomoto Co., Inc., aims to provide efficient logistics throughout Japan by initiatives such as joint logistics.

[1] House Foods Group Inc., Kagome Co., Ltd., Nisshin Foods Inc., The Nisshin Oillio Group, Ltd., Mizkan Co., Ltd., and Ajinomoto Co., Inc.
[2] Five companies listed in above [1] excluding Mizkan Co., Ltd.

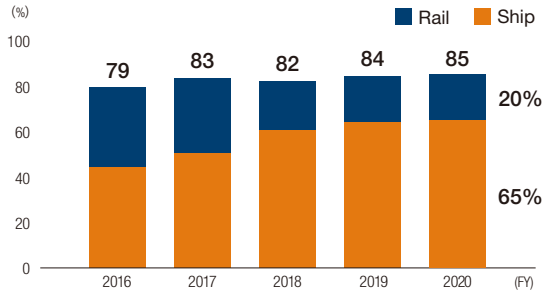
Launch of F-LINE CORPORATION, a joint-equity logistics company



Modal shift percentage

The Ajinomoto Group has pursued a modal shift[3] since 1995 in an effort to enhance transport capacity and make logistics more environmentally friendly. During fiscal 2020, Ajinomoto Co., Inc. achieved an overall 85% long-distance transport modal shift by using ships for transport.

Modal shift percentage of Ajinomoto Co., Inc. 500km or more



[3] Selecting rail or ship transport methods to generate a smaller environmental impact. Compared to trucking, railway container and ship transport result in CO_2 emissions at one-eleventh and one-sixth of the volume, respectively.

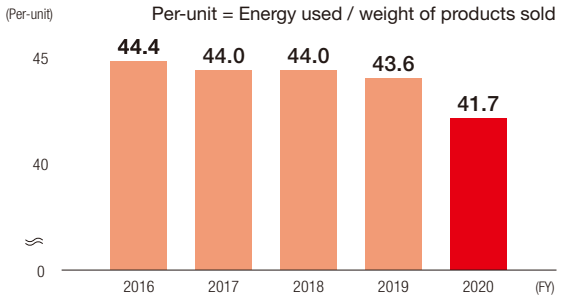
Climate Change Adaptation and Mitigation

GRI302-3

Per-unit energy use in logistics

Ajinomoto Co., Inc., Ajinomoto Frozen Foods Co., Inc., and Ajinomoto AGF, Inc. are considered specified consignors under the Energy Conservation Act. Each company is legally obligated to make efforts in reducing per-unit energy use (crude oil equivalent) within their cargo logistics by at least 1% per year on average over five years, reporting results to the Japanese government. The total usage by these three companies reduced by an average of 1.6% over the five years to fiscal 2020, by restructuring logistic network and improving modal shift ratio.

Per-unit energy use in logistics[1]



[1] Combined results for Ajinomoto Co., Inc., Ajinomoto Frozen Foods Co., Inc., and Ajinomoto AGF, Inc.

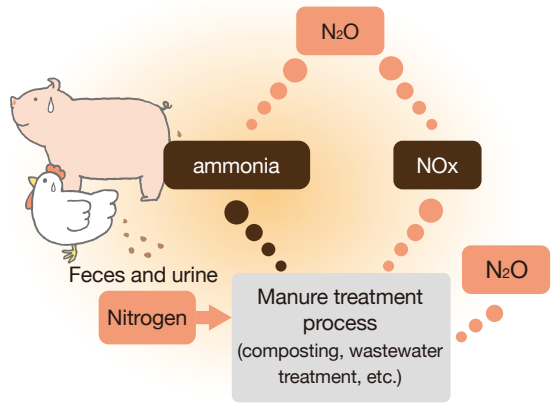
Reducing livestock nitrogen emissions with feed-use amino acids

Performance

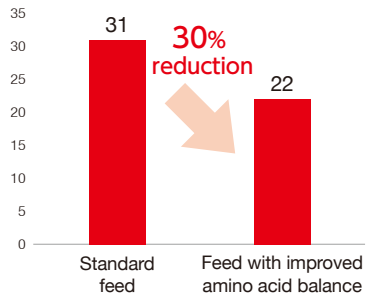
> P105

Feeds with poor amino acid balance lead to an oversupply of unnecessary amino acids. This oversupply is not utilized by the animals and excreted in large quantities as nitrogen compounds. During the waste treatment process, nitrogen compounds turn into nitrous oxide (N_2O), which increases environment impact at approximately 300 times the global warming potential of CO_2. Feed-use amino acids improve balance of feeds, reducing excretion and reduce excreted nitrogen compounds by approximately 30%. Amino acids thus help reduce the life-cycle CO_2 (LC-CO_2) emissions of feed while also helping diminish odor caused by ammonia derived from nitrogen compounds. Other benefits include reduced soil, surface water, and groundwater pollution.

N_2O cycle



Nitrogen emissions per pig (g/day)



Source: Takada et al., Japanese Society of Animal Science (2009)