

In light of the global movement toward carbon neutrality and the Japanese government's decarbonization goals, we at Fuji Electric have clearly stated in our Environmental Vision 2050, which outlines the long-term direction of our environmental activities, that we aim for carbon neutrality across the supply chain. In addition, we have revised the Fiscal 2030 Goals, which are our interim action goals, to establish a new target of greenhouse gas emission reductions across the supply chain, including our business partners as well as ourselves. To realize a decarbonized society, we aim to achieve carbon neutrality in the overall supply chain by 2050.

[Action Plan to Reduce Greenhouse Gas Emissions Emissions](#) ▾ |

[Reducing Greenhouse Gas Emissions During Production](#) ▾ |

[Reducing Society's CO₂ Emissions through Products](#) ▾ |

[Target for Reducing Greenhouse Gas Emissions Across the Supply Chain](#) ▾ |

Action Plan to Reduce Greenhouse Gas Emissions

The Paris Agreement was adopted by COP21 in December 2015. Japan ratified this agreement in November 2016 and began promoting initiatives toward achieving the agreement's emission reduction targets. The three main points of the Paris Agreement are as follows.

1. All countries are obligated to submit their greenhouse gas reduction targets to the United Nations every five years and to implement initiatives toward achieving these targets.
2. Countries are expected to strive to limit the rise in average temperature to less than 2.0°C above preindustrial levels and to make efforts to keep this rise below 1.5°C.
3. Countries should seek to achieve zero emissions of greenhouse gases on a real basis in the second half of the 21st century.

Following the adoption of the Paris Agreement, in 2016 the Japanese government released a plan to combat global warming. It also submitted a 2030 greenhouse gas emissions reduction target of 26% versus fiscal 2013 levels to the United Nations. For the electrical machinery and electronics industries, the key initiatives of the government's action plan are improving energy efficiency of production processes and helping to limit emissions with products and services.

In response to this policy, in fiscal 2018 we established two targets for 2030: a 31% reduction in greenhouse gas emissions versus fiscal 2013 and a 50 million ton reduction in CO₂ emissions in society through our products. In fiscal 2019 we formulated our Environmental Vision 2050 and clearly documented our approach to targeting a reduction of 80% or more in greenhouse gas emissions across the supply chain.

In fiscal 2021, we revised our Fiscal 2030 Goals in order to realize a decarbonized society.

- Greenhouse gas emissions throughout the supply chain (Scope 1+2+3) : Reduction of over 46% (compared to FY2019)
- Greenhouse gas emissions through production (Scope 1+2) : Reduction of over 46% (compared to FY2019)

In fiscal 2022, our Scope1,2 and Scope3(1-8,11) targets were approved as 1.5°C targets by the SBTi (Science Based Targets initiative).

Reducing Greenhouse Gas Emissions During Production

Reduction of Total Greenhouse Gas Emissions

Fuji Electric takes greenhouse gas (GHG) emissions as a metrics to assess our activities for realizing a society with net-zero carbon emissions. We define greenhouse gas emissions as the sum of CO₂ emitted through energy consumption and greenhouse gases such as HFC, PFCs, SF₆, and NF₃ emitted in the production process.

ESG

Contribution to SDGs

ESG Material Issues

Environmental Vision

Environment

Polices, Environmental Vision 2050

Basic Polices on Environmental Protection

Message from the Environmental Officer

Environmental Vision 2050

Approach to Disclosing Climate-related Information In Accordance with TCFD Recommendations

Environmental Management

Environmental Management Organizational Framework

Environmental Management Initiatives

Environmental Achievements

Environmental Management Targets and Achievements

Interplay between Business Activities and Environmental Impact

Environmental Accounting

Environmental data

Third-Party verification

Achieve a Decarbonized Society

Action Plan to Reduce Greenhouse Gas Emissions

Reducing Greenhouse Gas Emissions During Production

Reducing Society's CO₂ Emissions through Products

Target for Reducing Greenhouse Emissions Across the Supply Chain

Recycling-Oriented Society

Reducing Waste in Business Activities

Efficient Use of Water Resources

Initiatives for Reducing Environmental Impact of Products

Society that is in Harmony with Nature

Managing Chemical Substances

Preserving Biodiversity

Society

Governance

ESG Index

Comparison with ISO26000

External Evaluation

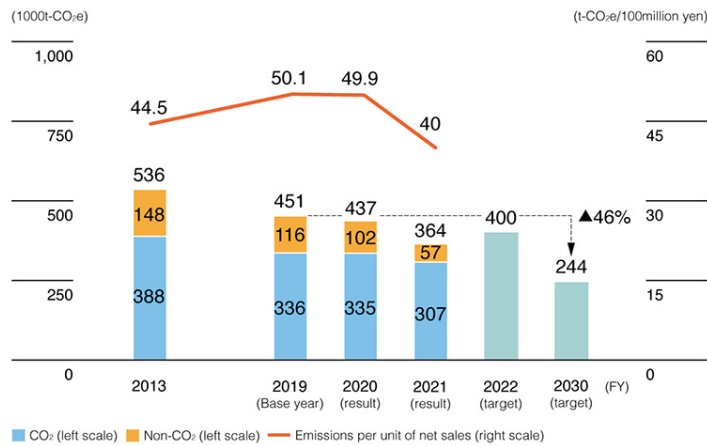
Activity Archives

Participation in initiatives

Even before formulating Environmental Vision 2050, we were working to reduce GHG emissions from production activities.

The new target set for fiscal 2030 aims at a more than 46% reduction of CO₂ equivalent on the fiscal 2019 results, and this is equivalent to a 69% reduction from the fiscal 2006 level (our base year for energy-saving activities) and an 85% reduction from fiscal 1990 (global base year for the Kyoto Protocol).

Greenhouse Gas Emissions



1. Scope

- (1) Japan: All production sites and consolidated production subsidiaries*
- (2) Overseas: Consolidated production subsidiaries (Fuji Electric Consul Neowatt (India) was included in the scope of consolidation in fiscal 2020)

2. Power coefficients

- (1) Japan: Based on Keidanren's Action Plan for Commitment to a Low-Carbon Society (0.439 kg-CO₂e/kWh for fiscal 2021)
- (2) Overseas: Latest average power coefficients for each country in IEA's Emission Factors 2021. Average values for 2019 used for fiscal 2021.

* Backdated to fiscal 2019, emissions from offices in Japan (approx. 5,000 t-CO₂e) are recorded under "use of leased assets" (category 8 of Scope 3) because we occupy office space as a tenant.

Activities to reduce greenhouse gas emissions during production in fiscal 2021 and their results

<Actual greenhouse gas emissions during production in fiscal 2021 and progress on the target>

Actual volume of greenhouse gases emitted during production at our facilities in fiscal 2021 totaled 364,000 tons, meaning that we achieved our target for this fiscal year, which was 460,000 tons. This figure represents a 16.7% year-on-year reduction.

Specific activities and reductions are as follows.

To achieve the fiscal 2030 emissions reduction target, we calculated the effects of specific measures, the results of which were factored in the plans for each fiscal year. Where the effects of the measures came short of achieving the target, we arranged in the plans additional investments for energy-saving activities, gas abatement equipment, and other measures, to develop an action-based plan for achieving the Environmental Vision 2050. (Percentages in brackets represent the ratio to the year-on-year reduction volumes)

- Energy-saving activities (installation of high-efficiency lighting, air conditioning, etc.): 4,000 tons
- Greenhouse gas replacement: -10,000 tons (2.38%)
- Power coefficient reduction effect: -1,000 tons (0.28%)
- Increased purchase of renewable energy: -1,000 tons (0.22%)
- Total emissions reduction based on the measures: -16,000 tons (3.76%)

Following are factors that had impact on emission volumes other than the reduction measures.

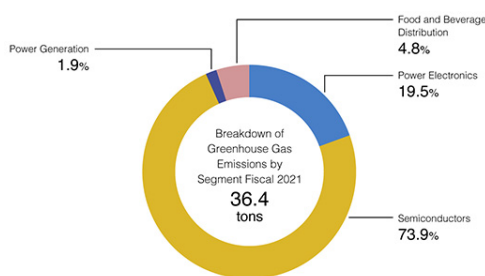
- Modified scope of calculation: -1,000 tons (0.31%) by temporarily removing the facilities in France and India
- Changes in calculation methods: -3,000 tons (0.77%) by replacing CO₂ coefficient with the one employed in the IPCC Fifth Assessment Report

- Business withdrawal: -85,000 tons (19.40%) by terminating the HD media business in July 2021
- Production capacity expansion: +33,000 tons (7.55%) in terms of the semiconductors, food logistics, etc.

Progress on the fiscal 2021 target

FY2021 target	FY2021 result	FY2022 target
460,000 tons/year	Achievement of the fiscal target 364,000 tons/year (16.7% reduction year on year) (19.4% reduction on FY2019)	400,000 tons/year

Breakdown of Greenhouse Gas Emissions by Segment



Utilizing Renewable Energy for Production

To utilize renewable energy, Fuji Electric first introduced a solar power generation system in 1996 as part of a PCS (power conditioning system) field test. Subsequently in 2005, we installed a solar generation system with 10 kW capacity (proprietary developed solar power module) following a field test, which is still in operation today. Beginning in 2005, we purchased seven years' worth of "green" energy certificates at one million kWh per year. From fiscal 2013 we were able to cover roughly 1.0 million kWh annually ourselves with the installation of mid-size (300-500kW) solar power generation equipment at production sites in Japan and overseas. In fiscal 2018 we installed solar power generation equipment on the roofs of our plants in China and developed a general purpose PCS for the electricity sales business. The first project under this initiative was to install the equipment at our own plants and conduct field testing. In fiscal 2019 we upgraded the equipment to a capacity of roughly 4.0 million kWh per year. However, the electricity generated only accounts for about 1% of the power we purchase. During fiscal 2021, Fuji Electric (Changshu) Co., Ltd. started a purchase of solar energy.

Solar power generation at Fuji Electric

Japan — four plants equipped with solar generators	: 0.62 million kWh
Overseas — four plants equipped with solar generators	: 1.61 million kWh
Three plants purchase in-house rooftop power	: 3.3 million kWh

Facilities with advanced solar energy deployment

Area	Facility	Renewable Energy in MWh	Ratio of RE to gross electric energy consumption
Thailand	Fuji Electric Manufacturing (Thailand) Co., Ltd. (in-house generation)	1,588	31%
China	Fuji Electric (Changshu) Co., Ltd.	1,527	30%
	Fuji Electric (Shenzhen) Co., Ltd.	921	2.7%
	Wuxi Fuji Electric FA Co., Ltd.	856	31%
Japan	Mie Factory, Fuji Electric Co., Ltd. (in-house)	399	1.7%

Area	Facility	Renewable Energy in MWh	Ratio of RE to gross electric energy consumption
	generation)		

▶ [Emissions trading status](#)

Topics

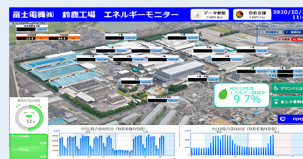
Reducing CO₂ emissions during production at the Suzuka Factory

At the Suzuka Factory—the mainstay factory of the Power Electronics Systems Industry business unit—we are carrying out energy-saving activities in which all employees can participate in an effort to reduce the amount of power we consume.

A total of 20 energy-saving management teams have been formed between departments on each floor of the plant. These teams formulate their own annual targets and action plans and follow-up on the results at monthly meetings. Uncovering areas where energy can be saved is made much easier with the use of an energy visualization system. By visualizing and identifying wasteful energy use, we can make a difference simply by turning off the power used when manufacturing equipment is idle on weekends and holidays, for example.

We are also taking steps to use lighting more efficiently. In addition to replacing globes with LEDs, we are reducing the number lights installed and arranging them more efficiently with a combination of broad-reaching illumination and focal lighting in order to ensure appropriate levels of illumination in each work area.

These initiatives delivered a reduction in energy consumption of roughly 9% year on year in fiscal 2020.



Energy Visualization System

Topics

Reducing non-CO₂ greenhouse gas emissions in production activities at Matsumoto Factory

The Matsumoto Factory is taking initiatives as Fuji Electric's main power semiconductor factory to reduce greenhouse gas emissions other than CO₂.

In production processes such as etching of semiconductor surfaces, PFC (perfluorocarbon) and other gases with high global warming potential are used. To mitigate the effects, we installed abatement apparatuses to perform thermal decomposition to prevent greenhouse gases from being released into the air.

Furthermore, in FY2021, we sequentially installed PFC, SF₆, and NF₃ abatement apparatuses on production lines that were not subject to the initial deployment of abatement apparatuses. As a result, we reduced greenhouse gas emissions by 2,130 tons in 2021 for these production lines. Moving forward, we expect that these apparatuses will be able to reduce greenhouse gas emissions by 7,000 tons a year.



Greenhouse Gas Emissions: Results and Future Measures

CO₂ emitted during production comes under Scope 1 and Scope 2 emissions.

- Scope 1: Direct greenhouse gas emissions from business activities such as fuel combustion.
- Scope 2: Indirect greenhouse gas emissions from the use of electricity and other resources supplied by other companies
- Scope 3: Indirect greenhouse gas emissions in the supply chain other than Scope 1 and Scope 2

The GHGs we use and their main uses are as follows.

- HFC (CFC substitute): Used as refrigerants, solvents, and for dry etching of semiconductors.
- PFC (perfluorocompounds): Used for dry etching of semiconductors.
- SF₆ (sulfur hexafluoride): Used as insulating gas and for dry etching of semiconductors.
- NF₃ (nitrogen trifluoride): Used for dry etching of semiconductors.

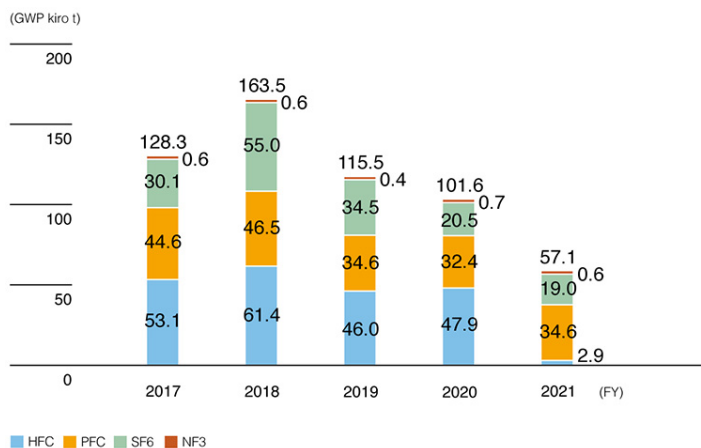
Greenhouse gases other than CO₂ (hereinafter GHGs) are calculated by multiplying direct emissions from our factories by the global warming potential (GWP), which is a CO₂ conversion coefficient.

Until now, we have worked to reduce CO₂ emissions mainly through energy-saving activities aimed at increasing energy efficiency. However, it became clear that we could not meet our medium-term target by simply expanding conventional energy-saving measures. For this reason, we reviewed our investment criteria and incorporated investments in high-efficiency air conditioners and LED lighting into a five-year renewal plan for each factory in order to reach our reduction target.

To reduce GHG emissions, moreover, we have formulated specific reduction plans for each factory and begun efforts to switch to alternative gasification and ensure more effective utilization. We are proceeding methodically with R&D and quality assurance related to alternative gasification.

In fiscal 2021, we pursued the technological development of production processes at our Fukiage Factory, which produces high-voltage circuit breakers. Through this initiative, we have replaced SF₆, used as an insulating gas, with more environmentally-friendly alternatives. Similarly, we installed additional thermal decomposition devices in our exhaust system on the semiconductor manufacturing lines that were established before 2010, to treat more than 90% of greenhouse gases contained in the exhaust. These efforts culminated in approx. 10,000 tons of greenhouse gases mitigated in overall emissions. Meanwhile, the Malaysia Factory terminated its HD media manufacturing business in July 2021, which resulted in the reduction of approx. 45,000 tons of HFC being used as solvents. Going forward, we will look to install more thermal decomposition devices for existing semiconductor production lines.

Greenhouse Gas Emissions Other than CO₂



2" >

- ▶ [Greenhouse Gas Emissions](#)
- ▶ [Breakdown of Scope 1 Emissions, Breakdown of Scope 1 and 2 Emissions by Country](#)

Smart Factory Initiative

Fuji Electric promotes the Smart Factory Initiative at production sites to optimize energy use through coordination between electrical and thermal energy technologies and production planning to use energy more efficiently.

Reducing Society's CO₂ Emissions through Products

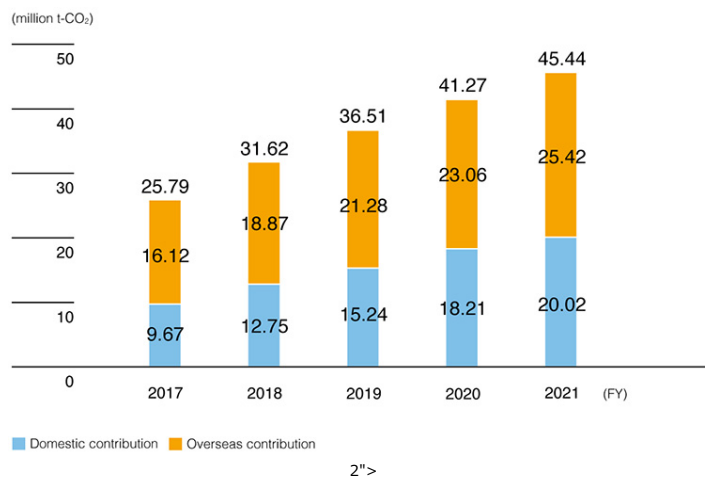
Fuji Electric aims to help reduce CO₂ emissions in society as a whole by innovating electric and thermal energy technologies.

The use of clean energy and energy-saving products by our customers also helps reduce CO₂ emissions during equipment operation. We calculate the CO₂ emission reduction effect of our products shipped after fiscal 2009 (products that have not yet reached their average service life) when they are in operation for one year.

CO₂ Emission Reduction Effect of Products Shipped in Fiscal 2021: Targets and Results

In fiscal 2021, we achieved our target with a reduction effect of 45.44 million tons thanks to the use of energy-saving equipment, such as inverters in the Power Electronics segment, IGBT modules in the Semiconductors segment and clean energy in the Power Generation segment. The increases in reduction effect were 1.79 million tons for the Power Electronics segment, 840,000 tons for the Semiconductors segment and 2.58 million tons for the Power Generation segment.

Reducing Society's CO₂ Emissions through Products



Products that Reduce CO₂ in Society: Clean Energy

Renewables, such as geothermal and hydroelectric power generation, are clean energy sources that contribute to the prevention of global warming. This is because they use the power of nature to generate electricity and do not emit greenhouse gases. If we could use clean energy to supply electricity to households served by existing CO₂-producing power plants, we could meet their electricity needs without emitting any CO₂ emissions. By promoting the proliferation of clean energy, Fuji Electric contributes to the reduction of CO₂ in society.

In fiscal 2021, in the Power Generation segment, we delivered two biomass power generation units (total capacity of 150 MW) that used biomass—recyclable biological resources such as woodchips and agricultural waste—as a fuel source. They are capable of providing approx. 900 million kWh of renewable energy per year, contributing to reducing CO₂ emissions in society by an amount equivalent to approx. 560,000 tons of CO₂ per year emitted by thermal power fuel sources.

Products Contributing to Reductions in Society's CO₂ Emissions—Energy-Efficient Equipment

Products supplied by the Power Electronics Systems Industry segment, such as inverters, can be incorporated into factory and other equipment in order to realize energy savings in motor control and various other areas. Meanwhile, uninterruptible power systems (UPS) can contribute to energy saving by improving efficiency through lower electricity consumption losses. Power semiconductors, an offering in the Semiconductors segment, are used as key devices in those

power electronics products, contributing to the energy efficiency through highly efficient energy conversion and power control.

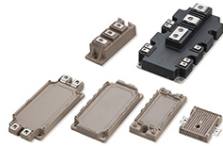
Product Introduction

Reducing power losses through the 7th Generation IGBT Modules

Aiming to realize power electronics devices with high-efficiency energy conversion and power control, we continue our developments of innovative devices and module technologies for attaining further reductions of the electricity consumption losses of our IGBT modules and expand the line of offerings of this key device for its 7th-generation family.

In fiscal 2019, we expanded our offerings of 1,700 V-blocking voltage items for large-scale wind power generation sub-systems. The 7th generation IGBT module has achieved approx. 20% reduction of power losses through lower heat generation and other factors, compared to its preceding generations, contributing to the mitigation of CO₂ emissions.

The sales of the 7th generation IGBT modules and other products grew through fiscal 2021, making approx. 500,000 tons of additional contributions by power semiconductors. We will continue our efforts to mitigate CO₂ emissions through a wider distribution of our semiconductor offerings.

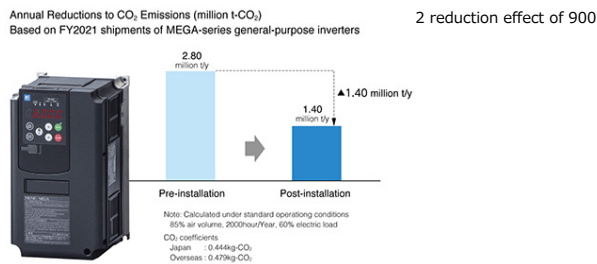


IGBT modules (7th generation)

General-purpose inverters: CO₂ reduction effect of 1.4 million tons/year thanks to energy-saving benefit.

Inverters are used in pumps, fans, conveyors, and the like to help their motors rotate intendedly. The power consumption of pumps and fans is proportional to the cube of the motor's rotational speed. Accordingly, systems with inverters, which optimize the rotational speed of the motor, can enjoy energy savings of around 50% compared with a damper-controlled system running at a constant rotational speed.

In fiscal 2021, we shipped around 17,700 units (100 kW equivalent) of the latest general-purpose inverters (FRENIC-MEGA (G2) series). This translates to a CO₂ emissions reduction effect of around 1.4 million tons per year when they are operated for one year. This reduction effect will continue for roughly 10 years (the average span of operation).



Target for Reducing Greenhouse Gas Emissions Across the Supply Chain

Fuji Electric announced its commitment to help realize a society with net-zero carbon emissions. Going forward, in addition to production activities, including procurement and transportation, we will aim to achieve carbon neutrality across the entire supply chain by working to reduce CO₂ emitted when are products are being used.

Scope 3 Emissions

Greenhouse gases (Scope 3) emitted indirectly upstream to downstream in Fuji Electric's entire supply chain have been calculated since fiscal 2012 based on guidelines*1 issued by the Ministry of the Environment.

In fiscal 2021, we reviewed the scope and method of our current Scope 3 emissions calculation fundamentally in view of a prospective application for the SBT certification, which would require

a third-party verification of the past performance retrospectively up to fiscal 2019. The scope of calculation was expanded to the emissions from all Fuji Electric products. The method of calculation was reformulated based on objective data.

In fiscal 2019, our internal working group started deliberating the scope and method of calculation for determining the emissions attributed to the use of our products. For this fiscal year, we estimated the emissions of all products based on the actual performance from fiscal 2018. In fiscal 2020, we reviewed the methods of aggregation and calculation concerning the seven products, which altogether account for at least 80% of the total emissions. In fiscal 2021, we recalculated the performance of fiscal 2019 and 2020 and submitted to a third-party verification (marked in bold letters in the table below).

To state specific details, Fuji Electric handles finished and semi-finished products (approx. 470,000 types).

To these, we applied the following calculation methods:

- Emissions of finished products such as electric furnaces, vending machines, and thermal power generators are annual power consumption x life expectancy x power coefficient.
- Emissions of semi-finished products such as transformers, inverters, and power semiconductors are annual power loss x life expectancy x power coefficient.
- Semi-finished products are Fuji Electric's products (components) that are integrated into client products to reach end clients.

We have defined the portion of emissions at the end client attributed to Fuji Electric to be the emission volumes due to the power consumption losses within our components. Loss ratio may be defined as (1 - efficiency). Therefore, improving the efficiency of our products will contribute toward reducing the Company's CO₂ emissions.

- In fiscal 2019 we delivered two combined-cycle LNG thermal power generation units (total capacity of 1,248 MW) in one batched delivery.
- In fiscal 2020 we delivered one coal fuel thermal power generation unit (650 MW) in one batched delivery.

Therefore we factored in the total emissions of these delivered units over their life cycles, which pushed up the emissions from product use for each fiscal year.

Scope of Calculations for Greenhouse Gas Emissions

- Scope 1: Direct emissions from fuel use and production processes at the Company
- Scope 2: Indirect emissions from use of electrical and thermal energy purchased by the Company
- Scope 3: Indirect emissions in the supply chain other than Scope1 and Scope2

*1 General Guidelines on Supply Chain GHG Emission Accounting, Version 2.1 by the Ministry of the Environment

Scope 3 Emissions

Category		Details	fiscal 2020	fiscal 2021	
Upstream	1	Products and services purchased	1,795	1,924	Purcl data
	2	Capital goods	103	170	Com equi
	3	Fuel and energy purchases (outside Scope 1/2)	52.9	50.6	Emis sites powe
	4	Transport and delivery (upstream)	13.6	15.5	Japa (esti Estin
	5	Waste discharged from business operations	5.93	7.16	Emis Com with
	6	Business travel	3.60	3.49	Emis empl emis
	7	Commuting	13.7	13.4	Emis and empl

Category		Details	fiscal 2020	fiscal 2021	
	8	Use of lease assets (upstream)	5.67	4.99	Japa (leas empl
Downstream	9	Transport/delivery (downstream)	-	-	Emis hand
	10	Processing of sold products	-	-	Exclu inter proci
	11	Use of products sold	54,453	177,383	Calcu famil entir
	12	Waste processing of products sold	-	-	Exclu prod recyc
	13	Use of lease assets (downstream)	0	0	No a
	14	Franchise	0	0	No a
	15	Investment	0	0	No a
		Total	56,447	179,572	



*Calculation methods have been revised as follows since FY2019.

- In Category 8 (Upstream leased assets), the emissions from our company's office spaces are excluded from SC1 and 2 amounts because these spaces are rental properties as tenants or leased assets.
- Calculation methods of Category 11 (Use of Sold products) have been revised as follows: Calculation ranges are our company's seven product families, which account for 80% or more of the entire emissions when all of our products are in use. The calculation methods of emissions from our products during entire product lifetime as follows
 - Finished products: The number of delivered products × Total annual power consumption (fuel consumption) × Lifetime × CO₂ coefficient
 - Intermediate products: The number of delivered products × Total annual power loss (energy loss of components) × Lifetime × CO₂ coefficient
 - Finished products include thermal power generation as prime contracts, industrial electric heating, showcases and others, which end users use as finished products.
 - Intermediate products include turbines/generators as subcontracts, power semiconductors, motors, transformers and others, which are incorporated in our clients' products which end users use.

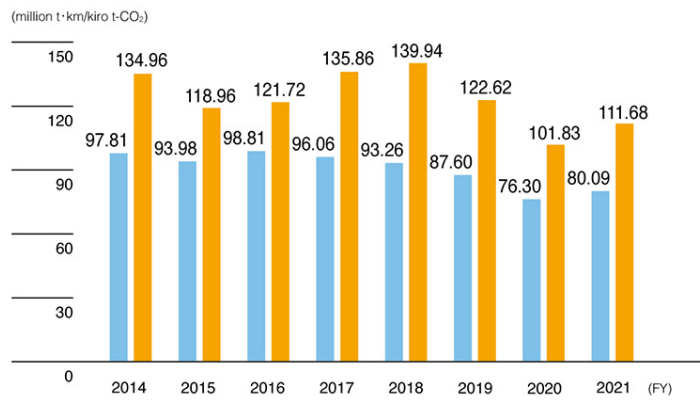
Energy Conservation Initiatives in Logistics

Fiscal 2021 saw global shortages of parts and raw materials, which necessitated the Company to ship smaller amounts of goods at higher frequency. As a result, Fuji Electric's logistics load increased 5.0% from the previous fiscal year while its year-on-year CO₂ emissions grew by 9.7%. Overall, the Company's CO₂ emissions per logistics load increased from the previous fiscal year.



method,* which has helped us improve our CO₂ emissions intensity per logistics load for the third straight year. (1% reduction year on year)

*A distribution method in which products are first shipped to regional delivery centers by 10-ton vehicles, then transported individually to each delivery destination by 4-ton vehicles. Compared with the individual delivery method of using only 4-ton vehicles, this method involves shorter mileage and thus reduces the environmental impact.



■ million t·km (million t·km) ■ CO₂ emissions (kiro t-CO₂)

2 reduction effect of 900 thousand tons/year thanks to energy-saving benefit.">