Contribution to Reducing CO_2 from Product Usage

As many tens of times more CO_2 is emitted during product usage than during production, the Mitsubishi Electric Group has designated Reducing CO_2 from Product Usage and Expansion of Contribution to Reducing CO_2 from Product Usage as priority issues, and is working to improve its products.

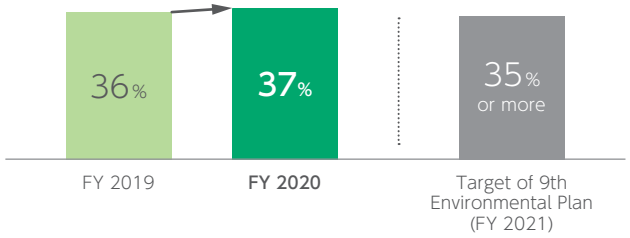
Targets of the 9th Environmental Plan (Fiscal 2019–2021) for Reducing CO_2 from Product Usage and Achievements in Fiscal 2020

Power consumed by customers during product use is viewed as corresponding to the amount of CO_2 emissions resulting from generating that power. Increasing product energy efficiency can reduce CO_2 from product use. Under the 9th Environmental Plan (fiscal 2019–2021), the Mitsubishi Electric Group's goal is to achieve an average reduction rate of 35% compared to fiscal 2001 for CO_2 emissions from product usage.

In fiscal 2020, we improved the energy efficiency mainly of power devices and air conditioners, while promoting sales of power devices, hot-water supply system equipment and other products with high energy efficiency. As a result, the average reduction rate for 98 targeted product groups came to 37% compared to fiscal 2001, and we thus achieved the objective.

In January 2020, the Mitsubishi Electric Group's targets of reducing greenhouse gases by 2030 were approved as science-based targets, certified by the Science Based Targets (SBT) Initiative. We will hereafter substantiate our roadmap for long-term reductions in greenhouse gas emissions and implement further measures.

Average Reduction Rates of CO_2 from Product Usage for 98 Product Groups with Fiscal 2001 as Base Year (Mitsubishi Electric Group)



Targets of the 9th Environmental Plan (Fiscal 2019–2021) for Expansion of Contribution to Reducing CO_2 and Achievements in Fiscal 2020

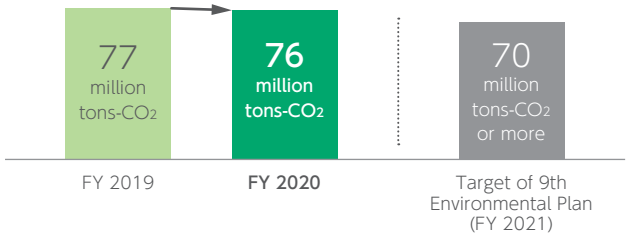
The Mitsubishi Electric Group is working to visualize and expand our Contribution to Reducing CO_2 from Product Usage. Contribution to reducing CO_2 is represented by the amount of generated CO_2 deemed saved by switching from older products to new, energy-efficient ones. The calculation is based on the following formula, which multiplies the effect of reducing CO_2 over the life of the product by the number of units sold.

Contribution to reducing CO_2 =
Effect of reducing CO_2 from product usage per unit ×
Number of units sold during the fiscal year

We use official standards and industry-mandated calculation method when computing our contribution to reducing CO_2. Where no calculation method is specified, we make calculations based on our own product scenarios. Calculations for interim products are based on GHG Protocol Scope 3 Guidance, with proportional division by product weight and percentage of sales.

In fiscal 2020, stagnant demand for capital expenditure both in Japan and abroad, together with a decline in new car sales across the world, adversely affected business operations in the industrial mechatronics division. As a result, our contribution to reducing CO_2 was lower than the previous year. On the other hand, energy efficiency has been improved mainly in power devices and air conditioners, and sales of products with high energy efficiency, such as power devices and hot-water supply systems and equipment, were promoted. As a result, we contributed to reducing CO_2 from product usage by a total of 76 million tons, and thus achieved the target.

Contribution to Reducing CO_2 from Product Usage (Mitsubishi Electric Group)



Breakdown of Products Included in the Calculation for Contribution to Reducing CO_2 from Product Usage

Products (Number of Product Groups)	Examples of Products	Standard/Benchmark Used for Calculation
End Products (82)	Plant monitoring control systems, railcar air-conditioning systems, onboard information systems (TIS, ATC, TIMS), monitor/protection control systems for power generation plants, circuit breakers, elevators, intelligent transport systems (ITS), satellite communications earth station facilities, optic/wireless access systems, air conditioners, televisions, refrigerators, heat exchange ventilation equipment, processing machines, robots, lighting fixtures / lamps, IH cooking heaters, etc.	Contribution from reducing power consumed by the product
	Energy-saving support equipment, elevator modernization, heat exchange ventilation equipment	Reduced power utilization through introduction of energy efficiency enhancing devices, contribution from upgrading to highly efficient components during refurbishment, previously wasted energy used by heat exchange
	Circuit breakers, switchgear	Reduction in leaked SF_6 gas (CO_2 equivalent)
	Photovoltaic power generators, turbine generators	Power produced minus energy used for power generation, increase in power generated by improving efficiency
Interim Products (32)	Compressors purchased separately from air conditioners	Contribution from incorporation of products with lower power consumption
	Inverters, motors	Contribution from incorporation of products with lower power loss
	Power devices	
	Electric power steering, alternators, starters	Contribution from incorporation of products with greater fuel efficiency, proportionally divided by weight
	Combined-cycle thermal power generators	Reduction of fossil fuel use by replacement of old thermal power generators. Contribution calculated as reduction in CO_2 emissions proportionally divided by sales

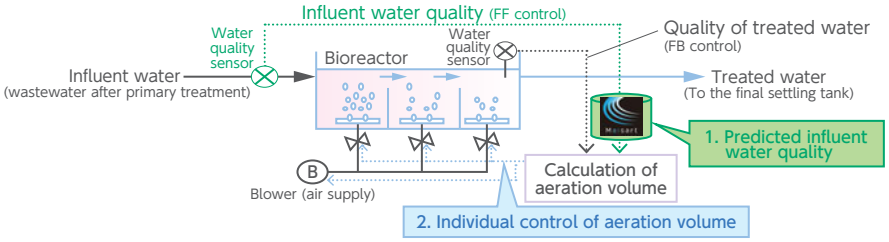
Note 1: Calculations for products using electricity are based on the national or regional CO_2 emission factors given in CO_2 Emissions From Fuel Combustion Highlights (2013 Edition).

Note 2: Calculations for thermal power generation use thermal power generation factors from the calculation method in the Initiative for Creating a Low-Carbon Society, issued by four electrical and electronics industry associations.

Note 3: Calculations for other forms of energy use and greenhouse gases use factors from the Greenhouse Gas (GHG) Emissions Accounting and Reporting Manual issued by the Japan's Ministry of the Environment and Ministry of Economy, Trade and Industry.

Topic 1 Contributing to Reducing Power Usage at Sewage Plants through AI Technology

Mitsubishi Electric has successfully developed an aeration volume control technology by taking advantage of its "Maisart®*1"-brand AI technology. This technology ensures excessive aeration (or air supply) to a bioreactor is kept in check. This is achieved by predicting the quality (concentration of ammonia) of water flowing into the bioreactor, where the oxidization process required for wastewater treatment takes place, with high accuracy several hours in advance. Feed-forward (FF) control, using the predicted data of the influent water quality obtained through AI technology, is combined with traditional feed-back (FB) control of the treated water quality. In this way, aeration volume control can be more responsive to changes in water quality. As a result, excessive aeration can be contained within a specific control compartment. The technology thus reduces aeration by 10%*2 compared to conventional methods, while maintaining the levels of treated water quality. It contributes to reducing electricity usage at sewage plants. In the future, we will verify the consistency of control and the effects on reductions in aeration volume during practical operations. We are aiming to commercialize an operation monitoring control system for sewage plants both in and outside Japan by the end of fiscal 2021.



*1 Stands for "Mitsubishi Electric's AI creates the State-of-the-ART in technology." Mitsubishi Electric's proprietary AI technology brand with the aim of making all devices smarter.

*2 Results of simulations using actual data from sewage plants

Topic 2 Improving Energy Efficiency of Multi-Split Air Conditioning Systems for Buildings by Incorporating AI

In July 2020, Mitsubishi Electric launched a new integrated air conditioning management system, the AE-200J (Ver 7.9), by incorporating its Maisart®-brand AI technology in a multi air conditioning system for buildings. This became the industry's first*3 AI-equipped multi-split air conditioning system for buildings. The system is connected to the highest-grade model of multi-split air conditioners for buildings, the Grand Multi, and is equipped with an "AI smart start-up" function that enables the system to automatically set an optimal start-up time. The system thus achieves comfortable room temperatures efficiently, and contributes to both greater comfort and energy efficiency.

*3 As of February 27, 2020, in-company survey

External unit of the Grand Multi multi-split air conditioner for buildingsJ (Ver7.9)

AE-200J (Ver 7.9) integrated air conditioning management system