

Environment

To pass onto our children a bountiful mother Earth, and to ensure sustainable co-existence and shared prosperity for Murata and other citizens of our planet, we are committed to environmental protection activities centered on an Environmental Committee and Global Warming Prevention Committee covering all environment-related departments. In addition to reducing the environmental impact of our business activities, we have positioned environmental protection as one of our priority risk treatment measures in the process of long-term value creation.

Climate change policies

To date, Murata has established in-house standards for energy saving, and is developing measures to combat climate change through proactive investment in energy-saving systems.

Murata has also been highly evaluated by external institutions. We were awarded by CDP² in recognition of our third-party accreditation for greenhouse gas (GHG¹) emission volumes and our proactive disclosure initiatives.

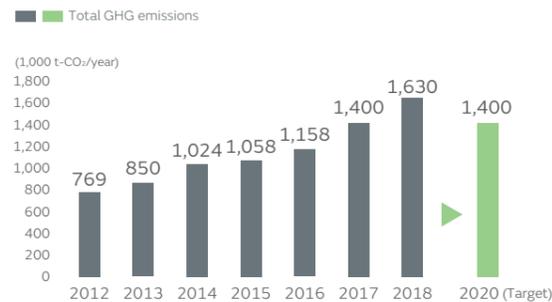
However, greenhouse gas emission volumes have been increasing rapidly due to increased production amid the recent expansion of operational scale, as well as engagement in large-scale mergers and acquisitions and development of new businesses. To halt and roll back the upward momentum in greenhouse gas emissions, we have set up a Global Warming Prevention Committee chaired by a Member of the Board of Directors, and promoted initiatives to conserve energy with the aim of achieving the greenhouse gas reduction target based on the Science Based Targets (SBT³) approach.

Going beyond conventional energy-saving measures centered on facility investment, we have also set up a new energy management system that combines proprietary sensor and IoT technologies, and have begun to optimize energy use within production processes.

We will also participate in the Japan Climate Leaders' Partnership, a grouping that ambitiously addresses climate change issues in Japan. Drawing on external expertise, we will launch our own in-house activities and consider the establishment of businesses that contribute to global climate change policymaking through collaborations with enterprises participating in this group.

These initiatives will be discussed in greater detail on our website.

Trends of total GHG emissions



In fiscal 2018, energy conservation and streamlining efforts enabled us to reduce approximately 40,000 t-CO₂.

At the same time, factors including the incorporation of new business sites as a result of mergers and acquisitions in fiscal 2017 saw us generating total greenhouse gas emissions⁴ of approximately 1.63 million t-CO₂ in fiscal 2018, a result that exceeded our target figure of 1.4 million t-CO₂ that we aim to achieve by 2021 based on SBT.

Taking these results into consideration, we will examine a variety of measures to enable us to achieve our SBT-based targets across the entire company, including new business sites acquired through mergers and acquisitions. These measures will include the introduction of renewable energy and carbon pricing in addition to energy conservation, and we will accelerate our implementation of such measures.

Third party accreditation⁵

Amid requirements for companies to implement initiatives against climate change, Murata believes that managing the amount of greenhouse gas emissions with reliable data certified by a third party and disclosing highly trustworthy data is our first step. Accordingly, we receive a third party accreditation regarding the amount of greenhouse gas emissions each year. In addition, we also receive certification on solar power generation, as we are proactively working on introducing it.

⁴ Calculation method of total GHG emissions

⁵ Third party accreditation
<https://www.murata.com/en-global/about/csr/environment/warming>

¹ Greenhouse gas: Refers to gases that cause the greenhouse effect.
² Carbon Disclosure Project: An international NGO (non-governmental organization) that investigates, evaluates, and discloses initiatives on the environment conducted by companies and cities.
³ Science Based Targets: Scientific targets based on quantitative data regarding long-term scenarios for reducing greenhouse gases.

Introduction of renewable energy

Murata is working on increasing the ratio of renewable energy in the electricity consumed as a result of its business activities. As a global company, we have proactively promoted introduction of solar power generation, not only in Japan but also in other areas such as China. In fiscal 2018, electricity derived from renewable energy, including our solar power generation facilities, amounted to approximately 23 million kWh of electricity in total, which contributed approx-

imately 15,500t-CO₂ to our greenhouse gas reduction efforts. We will continue to consider introducing renewable energy globally with the goal of contributing to environmental load reduction. Furthermore, we are preparing a business launch utilizing an energy storage system so that we can contribute to expansion of renewable energy not only within the Company but also across society as a whole.

Topic | Release of All-in-One Energy Storage System

In June 2019, we began sales of All-in-One Energy Storage System that integrates a storage battery with FORTELION^{*}, an olivine-type iron phosphate lithium-ion battery, and a power conditioner, so that users can have safety and peace of mind in case of emergency. By charging the storage battery with electricity generated from solar panels, the product can be utilized for a variety of purposes including emergency electricity supply and response to in-house consumption needs due to the end of FIT (feed-in tariff).

^{*} FORTELION is a trademark of Murata Manufacturing Co., Ltd.
https://solution.murata.com/ja-jp/products/ess_residential

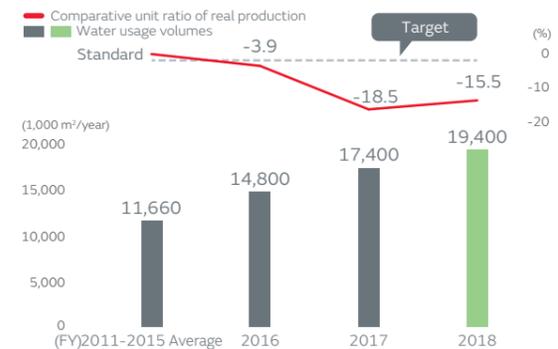


Water resource management

Murata encourages efficient use of water resources in its business activities. Based on the fiscal 2019-2021 mid-term target¹, we are working to reduce our water usage in order to achieve targets set by each business site and department. In addition, we are putting in place measures for water risk affecting business activities.

¹ CSR Activities: Targets and Results
<https://www.murata.com/en-global/about/csr/activities>

Trends for water use and unit of real production



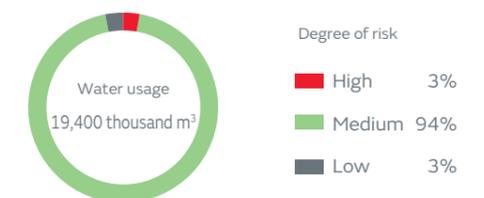
A 14% improvement against the fiscal 2016-2018 mid-term target (improved the average water usage in unit ratio of real production between fiscal 2016-2018 by 3% (compared to the average of fiscal 2011-2015)) enabled us to meet our targets. In fiscal 2019, at Toyama Murata Manufacturing Co., Ltd., we are installing equipment for processing wastewater for reusing it in production processes, which will enable us to reduce our water usage by 500,000 tons over the course of a year.

Responding to water risk

Using disclosure materials made available by WRI Aqueduct², WBCSD Global Water Tool³, and public and other authorities, we are evaluating water risk (risk of drought and flooding) after establishing in-house standards for appraisal. Drought risk for each business site is evaluated using three grades (high, medium, and low). Looking at water usage volumes by the appraisal grade, we concluded that 97% of sites were at locations where overall drought risk was low or medium. There were no business sites at a high risk of flooding, assessed in terms of frequency of flood occurrence and extent of impact. Going forward, we will conduct our activities with a view to setting CBWT⁴, which is a water target based on regional specifics and issues in the basin.

² Water risk evaluation tool developed by World Resources Institute (WRI)
³ Water risk evaluation tool developed by World Business Council for Sustainable Development (WBCSD)
⁴ Context-based Water Target (CBWT)

Water usage by water stress region

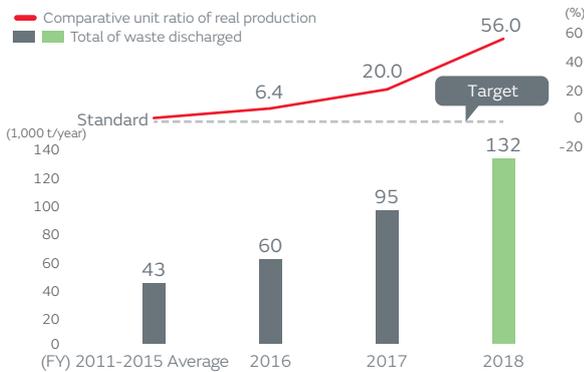


Waste management

Murata is engaged in waste management following basic policies of compliance, curbing generation, and zero emissions (zero landfills). Based on the fiscal 2019-2021 mid-term target*, we are working to reduce volumes of waste discharged in order to achieve targets set by each business site and department. Recently, we have been promoting resource recycling activities regarding the issue of plastics in particular.

* CSR Activities: Targets and Results
<https://www.murata.com/en-global/about/csr/activities>

Trends for waste emissions and unit of real production



Despite measures taken to reduce waste including the rationalization of usage volumes of solvents, we fell 29% short of the fiscal 2016-2018 mid-term target (improve the average waste emissions in unit ratio of real production between fiscal 2016-2018 by 3% (compared to the average of fiscal 2011-2015)). The reason for this was a dramatic increase in production volumes for lines with higher waste per basic unit values, in line with business expansion.

On the basis of this result, we are promoting introduction of wastewater processing facilities for in-house treatment of the 15% of total waste that is fluid, and plan to complete them during fiscal 2019.

Initiatives to recycle waste plastic

In recent years, there has been a growing need for initiatives to recycle plastic in response to restrictions on the import of waste in China and other Asian countries as well as ocean pollution. Especially in Japan, the amount of waste that cannot be recycled and goes to landfills has increased rapidly due to China's waste import restrictions. Given this situation, Murata regularly exchanges information with materials manufacturers and considers recycling methods that can produce higher quality raw materials than at present, in order to maintain "zero emissions."

Management of chemical substances

Murata is committed to supplying products with minimal impact on the global environment, to usher in a sustainable social system.

In addition to complying with legal and regulatory regimes such as the RoHS Directive and the REACH regulations, we have established in-house standards that incorporate global trends and customer requirements regarding environmentally harmful substances. Through the management system profiled below, we are taking aggressive measures to reduce or prevent use of environmentally harmful substances in our products.

Murata is also taking preemptive measures ahead of amendments of legislation regarding environmentally harmful substances.

Under the current RoHS Directive, use of 10 kinds of chemical substance in electronics and electrical equipment sold within the European Union is subject to restrictions. Among them, use of four types of specific phthalic acid esters were additionally restricted in the amendment implemented July 22, 2019. Acting in advance of the amendment of the RoHS Directive, Murata had prohibited the use of specific phthalic acid esters in newly developed products from July 2017. In addition, packaging materials and tools that come in contact with the products during the process of manufacturing and logistics are also subject to management, in order to prevent contamination by contact.

Through such measures, reducing use of environmentally harmful substances is another way in which Murata puts the safety of society, local communities and customers first.

Management of environmentally harmful substances at Murata

