



MUSASHI

Environmental Report

2015

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■ Period Covered

This report covers the activities in FY2014 (April 2014 to March 2015)

■ Organization

Information in this report refers to all consolidated organizations.

We primarily report on Musashi Seimitsu Industry Co.,Ltd. for activities in Japan.

■ Editorial Policy

Reference was made to the Environment Agency's guidelines on environmental reports in drawing up this document.

Company Profile

【 Company Profile 】

Company Name	Musashi Seimitsu Industry Co.,Ltd.
Headquarters	39-5, Daizen, Ueta-Cho, Toyohashi, Aichi
Founded	April 1938
Established	January 22, 1944
Capital	2,973 million yen
Employees (Group)	13,543 (As of March, 2015)
Employees (Japan)	1,322 (As of March, 2015)
Main Business Activities	Manufacturing and Sales of Transportation Equipment

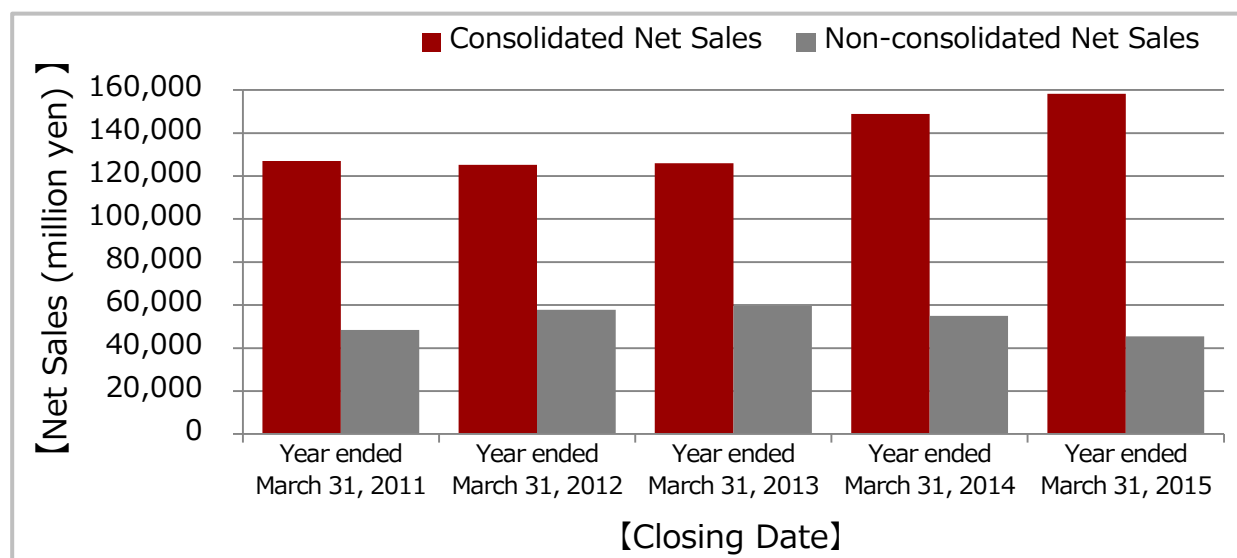
Japan	Head Office / Ueta Plant (Toyohashi, Aichi) Akemi Plant #1 (Toyohashi, Aichi) Akemi Plant #2 (Toyohashi, Aichi) Horai Plant (Shinshiro, Aichi) Suzuka Plant (Suzuka, Mie)
Affiliated Companies	Japan : Kyushu Musashi Seimitsu Co.,Ltd. etc. (2 affiliates) Overseas : EU, Asia etc. (18 affiliates)

【FY2014 Financial Result】

(Million Yen)

	Consolidated	Non-consolidated
Net Sales	158,209	45,429
Ordinary Income※	11,875	2,298
Net Income	6,379	1,363

※Conformed with Japan GAAP



Creating Environmentally Friendly Musashi Brand Products

As an organization Musashi is committed to conserving the global environment and the health and safety of our employees and local residents. We do this by both avoiding environmental pollution and also by continuously reducing the impact that our business activities have on the environment.

Whilst the automotive market for both two and four wheel vehicles is expected to grow over the coming years, stricter environmental legislation and increased local sourcing of materials is simultaneously reshaping the industry.

Under these circumstances, Musashi will be able to quickly embrace the many new opportunities for light weight, high efficiency and competitive products that we are able to offer.

By establishing a more efficient global management system we will focus our activities on an optimized balance of environmental measures and business efficiency.

In response to these needs, we have been developing cutting edge technologies by establishing design, analysis and testing facilities in order to create Musashi brand products which our customers' needs whilst protecting the environment. Our Light weight Differential Assembly equipped with MS Differential gears is a good example of this activity, and has already earned a successful reputation among customers around the world.



We have been striving to reduce our environmental footprint and prevent environmental pollution throughout the Musashi Group by further developing our Global Environmental Management System. This has delivered positive results in energy saving and resource conservation across the whole Group.

This report summarizes the global environmental protection activities and achievements of the Musashi Group in the financial year 2014/15. We hope that this report will help to give the reader a better understanding of the Musashi Group's activities in this field.

June 2015
Musashi Seimitsu Industry Co.,Ltd.
President & CEO Hiroshi Otsuka

Musashi Philosophy

Musashi Philosophy consists of 3 elements:

“Sprit of Foundation”, “Corporate Mission” and “Guidance for Conduct”

【Sprit of Foundation】

Shitsujitsu-Goken
(Simple and Sturdy)

Shisei-Ikkan
(Consistent Sincerity)

【Corporate Mission】

**We will continue to explore and develop
our original Monozukuri and thereby
contribute to the global society by
providing trusted and attractive products.**

【Guidance for Conduct】

The “Musashi Spirit”

1. Customer first
2. Integrity
3. Resourcefulness
4. Hard work
5. Cooperation for the common goal
6. Remember our rights and responsibilities

Environmental Policy

■ Basic Principle ■

Musashi recognizes that environmental preservation is one of the most important problems as a member of society. We preserve the global environment and enhance mankind's prosperity through its corporate activities for the society and the environment. We set the following guidelines toward achieving the goal to maintain the sprit of innovation.

■ Basic Policy ■

Musashi, as a good corporate citizen in global society, strives to achieve environmental management based on the guidelines stated below.

- ① Not only complying with the international rules and local laws, Musashi establishes the necessary self-imposed standards for meeting social and stake holders requirements.

Waste water, Air, Noise, Odor, Vibration, Waste, Hazardous materials, Soil contamination

- ② Musashi reduces the environmental load as much as possible in the business area of the organization. We shall endeavor to continuously maintain and improve our environmental management system.
- ③ Musashi ensures the effective use of energy and other resources in our business activities and pursues the appropriate management of chemical substances and reduction of waste.
- ④ Musashi will continue to actively engage with local groups and undertake further environmental conservation projects to protect and preserve our global environment.

We ensure that all individuals working in or for our organization are fully aware of these environmental policies and maintain harmonious ties with local communities.

We establish objectives and targets based on this policy and formulate an environmental action plan to achieve these objectives and targets, which we implement, evaluate and revise.

Also, we ensure that all individuals working in or for our organization are fully aware of these environmental policies by posting and disclosing such policies to the general public.

May 1, 2006

■ Global Business Development

In addition to announcing the expansion of production sites in China, the Vietnam plant has become consolidated in 2014. Also we are expanding global productions by starting full-scale operations in Mexico and Bangalore, India.

In light of this environment, it has been increasingly important to conduct more global environmental management. We actively give due consideration to the environment and contribute to protecting the environment and building a sustainable society to be a trusted enterprise in society.

Vietnam Plant

(Established in Nov. 2010)

(Musashi Auto Parts Vietnam Co.,Ltd.)



Mexico Plant※

(Established in March 2012)

(Musashi Auto Parts Mexico, S.A. de C.V.)



※ Non-consolidated as of March,2015

Bangalore Plant, India

(Established in Jun. 2013)

(Musashi Auto Parts India Pvt. Ltd.)



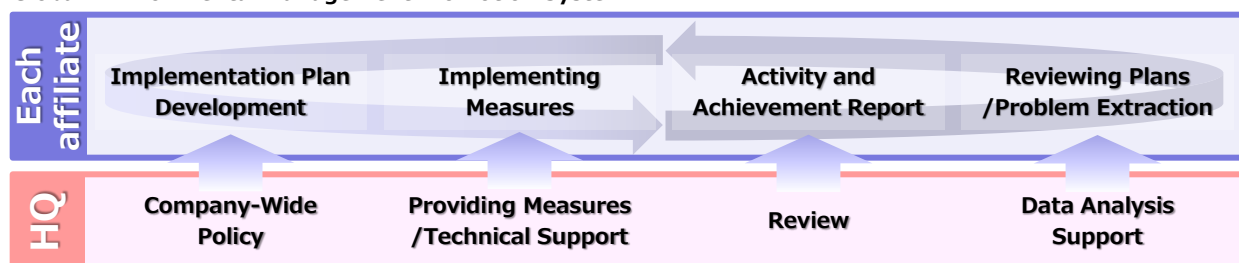
■ Global Environmental Management Promotion System

Musashi Group is advancing environmental management under the ISO 14001 standard. Based on the standard, we have conducted activities, the quantitative grasp of the environmental data, environmental improvement technologies and information-sharing regarding environmental measures.

Various environmental data in each region are shared across the Group each month and its achievement and activities are reviewed at the Global Top Meeting, representing all management. This collection of actual cases of environmental improvement has been published on the company intranet. We also share advance improvement activities in each region at the Global QC Circle Conference.

The Musashi Group is striving to reduce the environmental impact by planned and continuous promotion of activities across the Group.

Global Environmental Management Promotion System



At the Global QC Circle Conference



■ Musashi Group ISO14001 Certification Status

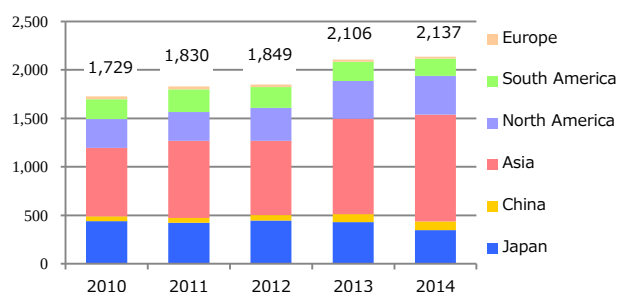
Since obtaining ISO 14001 certification in August 1998 in Japan, we have been promoting to obtain ISO 14001 certification to reduce environmental load of the Group. Currently, 11 consolidated companies and new plant have acquired or are in the process of acquiring ISO14001.

Countries	Name of Company	Date of Acquisition of ISO14001 Certification
Japan	Musashi Seimitsu Industry Co.,Ltd.	August, 1998
Japan	Kyushu Musashi Seimitsu Co.,Ltd.	November, 1998
US	Musashi Auto Parts Michigan Inc.	July, 1999
Thailand	Musashi Auto Parts Co.,Ltd.	February, 2002 (#1 and #2 Plant)
Indonesia	P.T. Musashi Auto Parts Indonesia	March, 2003
Canada	Musashi Auto Parts Canada Inc.	May, 2000
Brazil	Musashi do Brasil Ltda.	November, 2001
Hungary	Musashi Hungary Manufacturing, Ltd.	February, 2005
Brazil	Musashi da Amazonia Ltda.	June, 2008
India	Musashi Auto Parts India Pvt. Ltd.	March, 2003
China	Musashi Auto Parts (Zhongshan)Co., Ltd.	February, 2006
Vietnam	Musashi Auto Parts Vietnam Co.,Ltd.	Currently acquiring

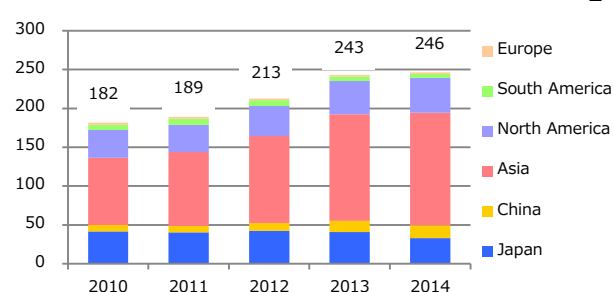
Musashi Group Environmental Impact

Musashi, including those outside Japan, have been continuously promoting environmental load reduction such as saving energy and conserving resources to contribute to the development of a sustainable society and planet.

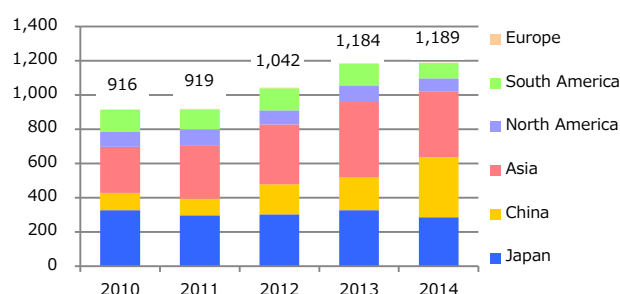
■ Energy Input (MJ)



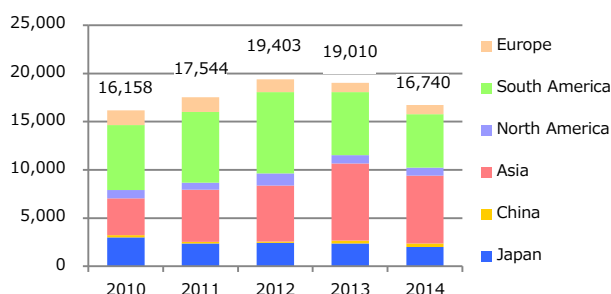
■ Greenhouse Gases* (1,000ton-CO₂)



■ Water Consumption (ton)



■ Waste Emissions (ton)



*Calculation protocol of Greenhouse gases refer mainly to WRI/WBCSD (2004), "The Greenhouse Gas Protocol (Revised Edition)" for Scope1 and Scope2. Scope2 is calculated using for 2010 electric power emission factor from International Energy Agency (2013), "CO₂ Emissions From Fuel Combustion Highlights 2013".

■ Introduction of Solar Street Lights (Thailand : MAP-TH)

For reductions in CO₂ emissions, all external lights on the factory premises were changed from mercury lamps to Solar lights generated by a solar panel. We will continue promoting the replacement .

Solar Street Lights



■ Switchover to LED Lighting in the Plant (Indonesia : MAP-IN)

For reductions in CO₂ emissions, about 2/3 of ceiling lights in KARAWANG Plant have been replaced to LED lighting, which led to cut CO₂ emissions by approx.33 tons per year. MAP-IN will be improved in the future to replace the lighting in the remaining area of KARAWANG Plant, machining process area of CIKARANG Plant (Forging, Heat Treatment area have been replaced in 2013)

LED Ceiling Lightings



■ Improvement of Operating Methods of Normalizing Furnace Mesh Belt (India : MAP-ID)

Since power usage of the forging equipment is rather high, based on the improvement of efficiency from Japan, MAP-ID conducted to reduce CO₂ by improvement of operating methods of the normalizing furnace such as setting change of the standby mode. This efforts enabled the reduction of CO₂ output by approx.11 tons per year.

Materials on the Mesh Belt to the Normalizing Furnace



■ Measures for Air Leakage (Vietnam : MAP-VN)

At the Vietnam Plant, MAP-VN was promoted to minimize air leakage during manufacturing processes. Inspecting piping joints, air gun, air filter and solenoid valves etc. parts with the air leak have been repaired or replaced. Those efforts enabled the reduction of CO₂ emissions by approx.28 tons per year.

Inspection for Air Gun and Filter



■ Shortening Machining Time of Differential Case (China : MAP-CH)

In the differential case machining line, chamfering methods of a screw hole have been improved. Thereby, the chamfering time have been shortened by 16% and improved machine utilization rate by improvement of tool life. These efforts have led to an annual 68 ton reduction in CO₂ emissions.

Differential Case Machining Methods Improved



■ Waste Tray Recycling System Established (America : MAP-MI)

MAP-MI has established a recycling system for the waste tray for product transportation which had been disposed in landfill March, 2014. This efforts enabled recycling of the waste tray by approx.19 tons per year and reducing landfill waste.



■ Recycling of Cylinder Oil for Forging (Canada : MAP-CA)

MAP-CA has started recycling of cylinder oil for forging. Nearly 6,000 liters of cylinder oil have been used annually in the forging process. By refining and recycling such waste oil, MAP-CA has achieved reduction of use of oil approx. by 3,000 tons and reductions of costs, wastes and carbon footprint[※].

[※]LCA-based analysis method at all stage of product life cycle.

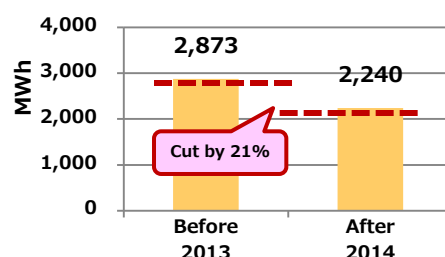
Recycled Cylinder Oil (From the Left: Used Oil, Recycled Oil, New Oil)



■ New Normalizing Furnace Heater (Brazil : MSB)

MSB has switched from the existing normalizing furnace heater in the forging process to a more efficient heater, which consumes less power, contributes to reducing standby power consumption while maintaining treatment conditions and product quality. This enabled the reduction of CO₂ output by approx.67 tons annually.

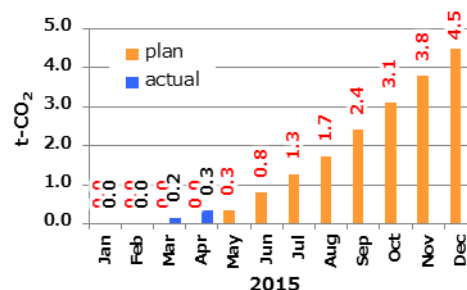
Comparison of Power Consumption



■ Introduction of Inverter Air Conditioners (Brazil : MDA)

MDA has reduced power consumptions by switching to inverter air conditioners from existing air conditioners. New inverter air conditioners auto adjust controls to maintain a constant, set temperature throughout regardless of the temperature. This is expected to reduce CO₂ emissions by approx. 4.5 tons annually in 2015 compared to 2014.

Plan to Reduce CO₂ by New Air Conditioners



■ LED Lighting in Plant (Hungary : MHM)

Bulbs in the Plant had been progressively replaced by LED lighting and completed in April, 2014. By replacing the metal halide lamp to LED lighting, MHM has reduced power consumption by approx. 65% while ensuring luminous intensity equivalent. This means a reduction of CO₂ emissions by approx. 136 tons per year.

LED Lighting for High Ceiling

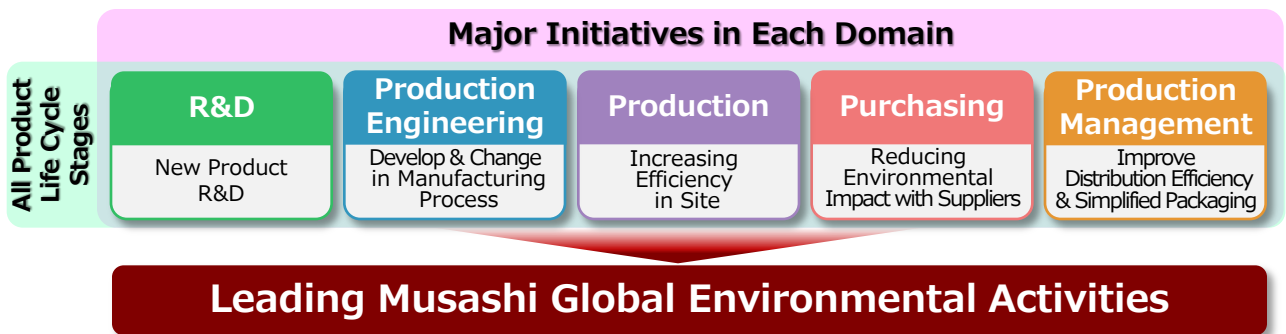


■ Current Status of Environmental Issues and Future Challenges

In Japan, “Climate change and energy issues” are a key issue for global environmental conservation. It is becoming more critical not only in production areas but also in the reduction of environmental impact throughout life cycles stages of the product such as the supply chain management and the environmental performance of products.

With the expansion of our businesses on a global scale, in domestic business, from environmental perspectives, reduction of environmental impact including energy conservation, saving resources and pollution prevention are required.

We need to step up efforts to reduce environmental impacts in all product life cycle stages to continue to be a frontrunner of environmental activities.



■ The Environmental Award from Customers

~ FY2014 Presentation of the Environmental Award for Suppliers ~

We have received the Environmental Award from our main customer, Honda Motor Co., Ltd. This means that we have implemented measures and showed exceptional progress in reducing environmental impacts.

We are accelerating our efforts to reduce environmental load across production life cycles.

The Environmental Award



■ Evaluation by External Organization

~An Environmentally Responsible Management Evaluation by DBJ~

We have received the highest mark in Development Bank of Japan (DBJ) Environmental Rating for offering environmentally friendly products, for our initiatives aimed at reducing its environmental burden.

This is because our environmental initiatives are higher than those of other industries or companies.

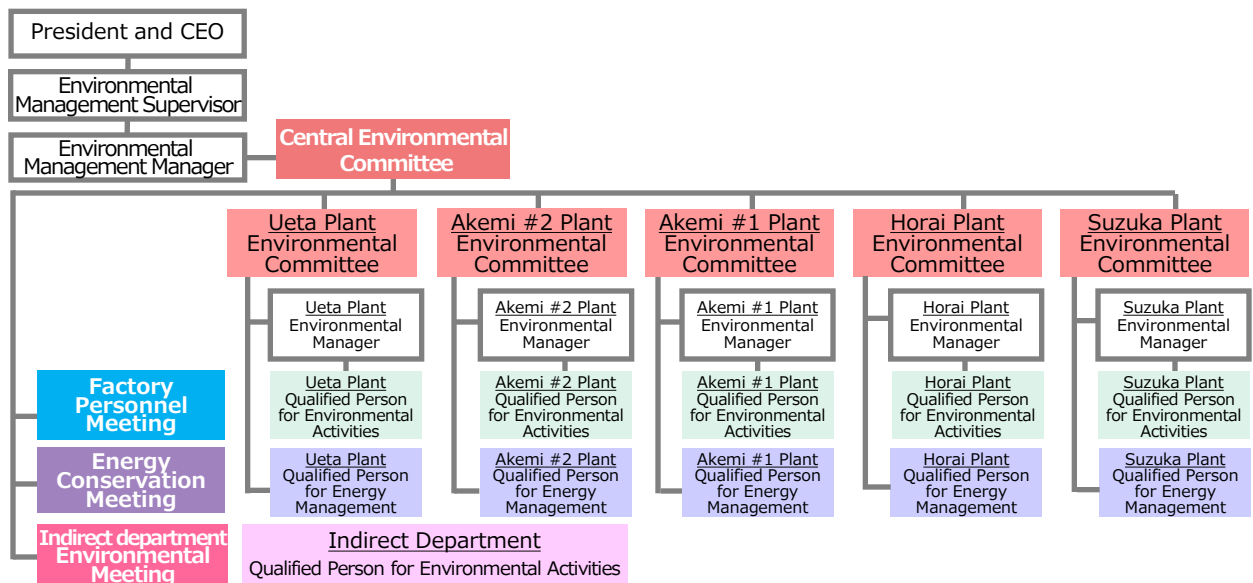
The Highest Mark in DBJ Environmental Rating



■ Environmental Management Organization

To establish a company-level environmental management, Musashi has formed the Central Environment Committee to orchestrate a Group-wide response to the environmental issues. Also, we are implementing the examination by an external certification body and internal auditing since we acquired ISO 14001 certification in August 1998.

In FY2014, we implemented an external audit in August 2014 and January 2015. There was one case of minor nonconformity in “environmental aspects and update of environmental aspects”, which was immediately corrected.



■ Environmental Laws and Regulations

We are implementing a compliance officer system for global workplaces with a designated employee in charge of compliance promotion. Companywide compliance is implemented thoroughly through the internal control committee made up of compliance officers, directors, executive officers, and monitoring investigations on a regular basis.

Regarding observance of environment-related laws and regulations, we confirm regularly the result of regulation values, notification circumstances and facilities that could have a major environmental impact.

■ Environmental Risks

We are taking safety countermeasures against possible accidents of the facilities that could have a major environmental impact, emergency communication protocols and equipment are in place, and we are investigating group wide deployment.

Each workplace prepares for accidents by putting in place emergency facilities, equipment, response procedures, and checking that all will function properly when accidents do occur through periodic drills. Our business partners also participate in such drills.

We cleared targets and improved for environmental impacts in each category below in 2014.

Category	Environmental Activity	Control Items	FY2014			FY2015 Target
			Target	Result	Achievement	
Global Warming Countermeasures /Energy Saving	Green-House Gas Reduction	CO ₂ Emissions per Unit (CO ₂ ton/ million yen)	1 % Reduction (baseline:2013)	2.2 % Reduction	◎	2 % Reduction (baseline:2013)
	Reduction of Transportation-Related CO ₂ Emissions	CO ₂ per Unit (CO ₂ ton/ million yen)	1 % Reduction (baseline:2013)	8.3 % Reduction	◎	2 % Reduction (baseline:2013)
Resource Saving	Water Consumption Reduction	Water Consumption (m ³)	6 % Reduction (baseline:2008)	8.2 % Reduction	◎	7 % Reduction (baseline:2008)
	Industrial Waste Reduction	Waste Volume per Unit (ton/ million yen)	4 % Reduction (baseline:2011)	3.3 % Reduction	△	5 % Reduction (baseline:2011)
	Promotion of the Recycling of Waste	Recycling Rate (%)	Recycling Rate 95 % or Higher	97.6 %	○	Maintain Recycling Rate 95 % or Higher
		Landfill Rate (%)	Landfill Rate 0.1%	0%	○	Maintain Landfill Rate 0.1%
Environmental Load-Reducing	Reductions in Emissions of Chemical Substances	PRTR*-Listed Substances (ton)	80 % Reduction (baseline:2000)	90.1 % Reduction	◎	80 % Reduction (baseline:2000)

<Target achieved> ◎ : 105% or higher, ○ : 95% to 105%, △ : 80% to 95%, × : 80% or lower

※A PRTR (Pollutant Release and Transfer Register) is a national or regional database of information on the environmental release and off-site transfer of potentially hazardous chemical substances from industrial and other facilities.

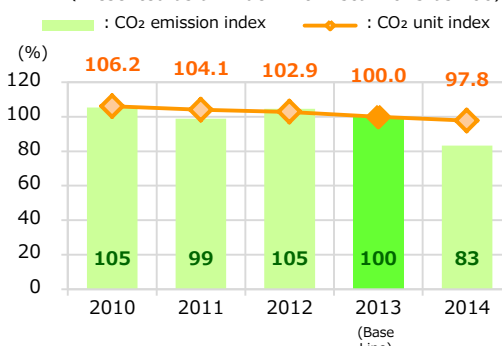
■ Reduction of GHG Emission

In fiscal 2014, CO₂ emissions have reduced by 17% from 2013 due to CO₂ emission reduction initiatives in each production level and decrease of domestic production. CO₂ consumption rate, an expression of energy efficiency was reduced by about 2.2% from the fiscal 2013 level by changing the forging process and machining methods.

In the years ahead, we will strive to reinforce energy reduction by improving process and production as well as introduction of energy saving equipment.

CO₂ Emissions and Unit Energy Consumption

(Presented as an index with fiscal 2013 as 100)



■ Reduction of Industrial Waste

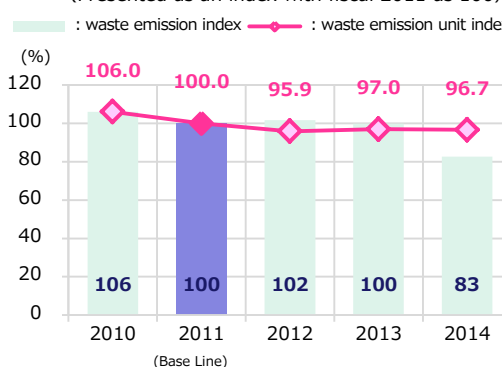
In the fiscal year 2014, we achieved further reduction of industrial waste by 17% in comparison with the fiscal year 2011 due to reduction of water-based cutting fluid and decrease of domestic production. As for the industrial waste per unit of sales is reduced by 3.3% compared to the fiscal 2011 level.

Also, direct landfill waste amount remains zero and its recycling rate is over 95 %.

We engage in initiatives to generate less industrial waste by reducing water-based cutting fluid and sludge produced by the treatment of wastewater.

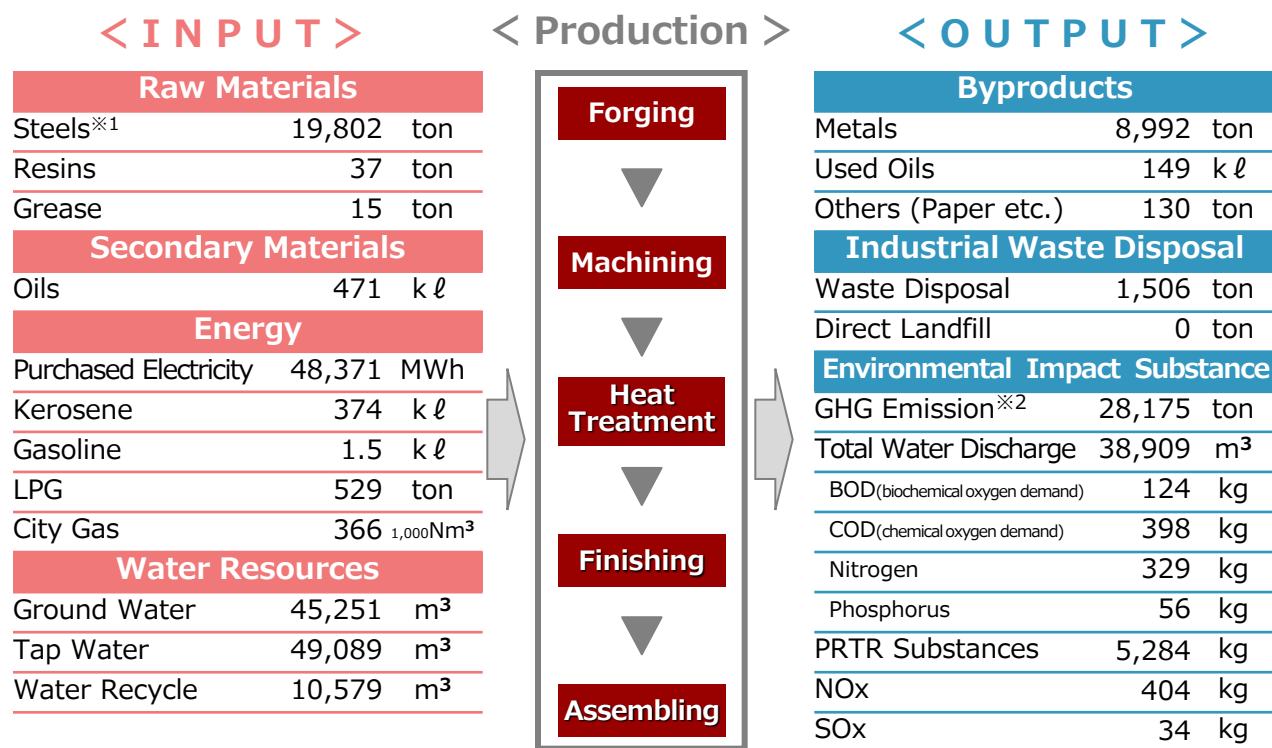
Industrial Waste and Unit Waste Emission

(Presented as an index with fiscal 2011 as 100)



■ Fiscal 2014 INPUT & OUTPUT (materials, energy flow)

We ascertain the annual environmental loads created by all stages of its business activities, namely from raw material procurement to production, transportation, distribution, use and disposal. The data is used to set target for reduction of CO₂ and waste.



Calculation Period: April 1, 2014 to March 31, 2015

※1 Excluding supplier processed parts.

※2 The subjects of CO₂ emissions have been those under the Energy Saving Act. Accordingly, the actual emission factor in the "CO₂ Emission Factors of Each Electricity Utility" publicized by the Ministry of the Environment of Japan in November 2014 was used.

Environmental Accounting

We introduced environmental accounting to collect data on our environmental conservation costs. "Investment" is the investment for tangible fixed assets in FY2014, "Expense" is the expense for environmental measures in FY2014.

			(million yen)	
Cost Classification		Main Initiatives	Investment	Expenses
(1) Costs within the Business Area			8.8	88.6
Break down	(1)-1 Pollution Prevention	air pollution, water pollution, soil pollution etc.	1.9	28.7
	(1)-2 Global Environmental Preservation	heat treatment process integration, compressor update etc.	6.4	3.8
	(1)-3 Circulation of Resources	waste treatment, recycling costs etc.	0.5	56.1
(2) Upstream and Downstream Costs			0.0	0.0
(3) Management Activity Costs		ISO regular inspection, environmental education, environmental labor costs etc.	1.3	75.3
(4) Research and Development Costs		development products that conserve energy and resources (size and weight reduction)	5.0	143.6
(5) Social Activity Costs		community clean-up activities, Musashi woodland project etc.	0.0	1.2
(6) Costs for Environmental Damage			0.0	0.0
(7) Other Costs			0.0	0.0
Total			15.1	308.8

The production Engineering Division is promoting improvement of manufacturing process and product with minimal environmental impact based on the following policies.

【Product Design Area】

- Pay attention to the environmental impacts at every stage of the product life cycle, from design and manufacture to distribution and disposal, aiming to “provide and create reliable products that are supported by our customers”
- For complying with environmental laws and regulations, we conduct chemical substances and environment recyclability evaluation through LCA^{※1}.

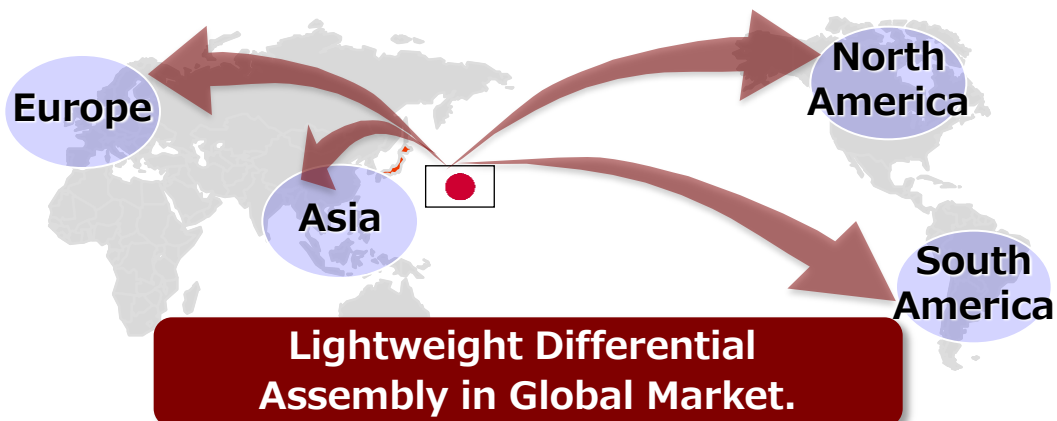
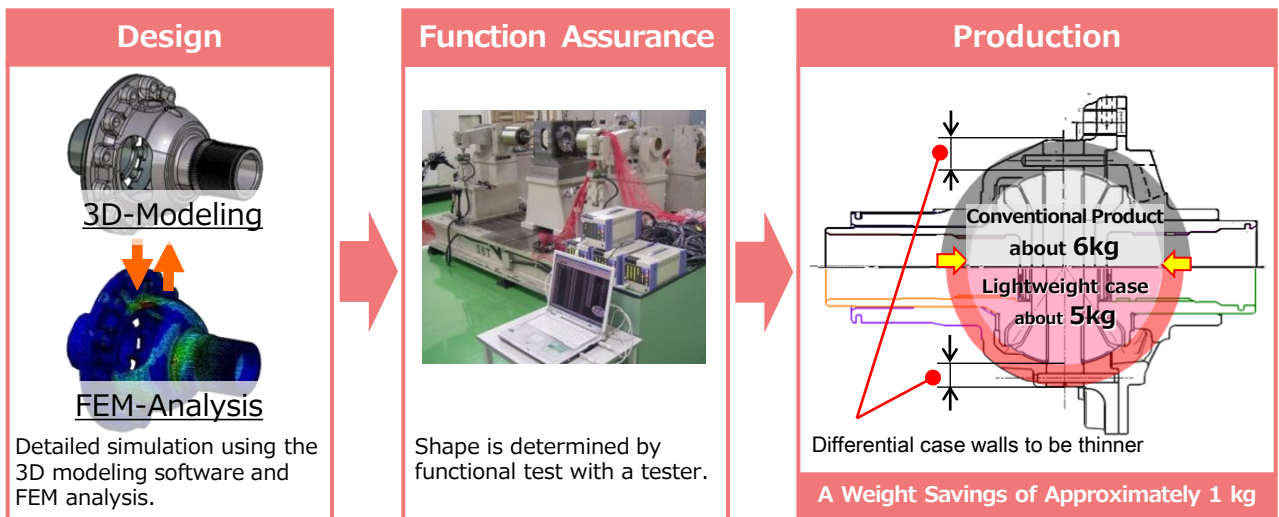
【Production Engineering Area】

- In process design, we promote to simplify manufacturing process.
- Introduce cutting-edge equipment with less environmental load and reduce the environmental impact.

■ Global Expansion of Lightweight Differential Assembly

The driving system (transmission etc.) can be made more compact and lighter, which can improve fuel consumption. The differential design with lightweight differential case allows us to realize a 15-percent weight savings^{※2}. The mother R&D center with a FEM analysis^{※3} and function assurance system are pushing forward to develop a lightweight differential assembly to our global customers.

Lightweight Differential Case Development Flow



※1 LCA (Life Cycle Assessment) is a technique to assess environmental impacts associated with all the stages of a product's life from cradle to grave (i.e., from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling).

※2 We achieved weight saving by more than 10% than conventional products. It differs according to models. (compared with our products)

※3 Numerical simulation based on the finite element method to predict behavior and strength of complex geometrical objects such as a differential case.

Forging Engineering Division is continuously promoting process-saving with full consideration of the environmental effects.

Main initiatives are as follows:

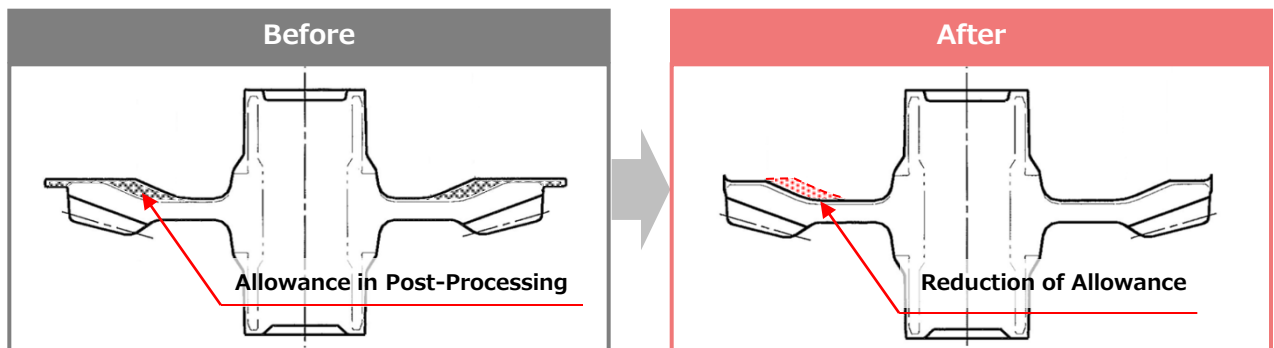
- **Process Design by Accumulated Forging Technology**
- **Formability Verification Through Simulation Technology**
- **Challenge to a High-Efficiency Forging**

■ High-Efficiency Hot Forging (Challenge to Yield Optimization)

In forging area, we are continuously challenging to reduce the processes and machining allowance as “load reduction” and “process less” in post-processing steps are constantly required. In the present instance, we have reduced our annual CO₂ emission by 11.7ton by “reducing machining allowance in the lathing process” and “disusing of trimming in forging” through the repeated simulations for optimal molding.

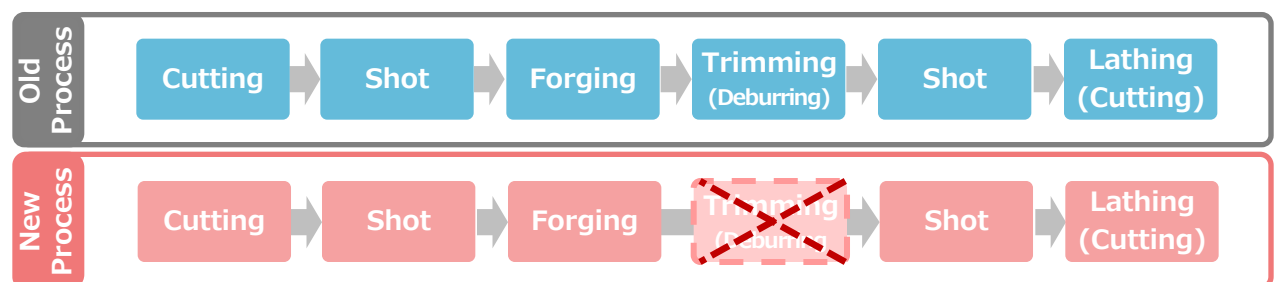
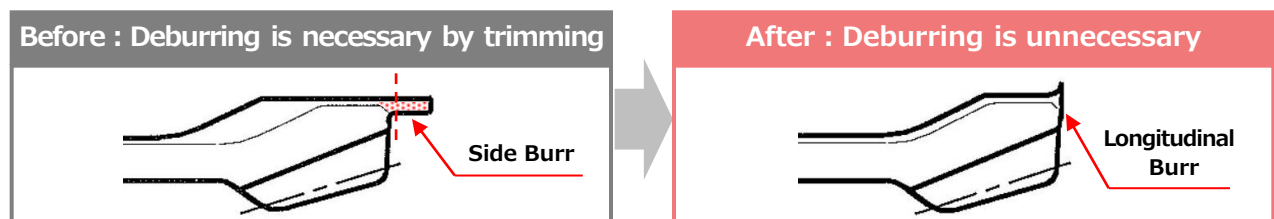
● Reduction of Machining Allowance (Yield Optimization Improvement)

We succeeded in reducing allowance at the back of the tooth by repeating moldability simulation verification. This effort realized drastic reduction in the amount of allowance in post-processing step, lathing as well as reduction in machining times. This resulted in reduction of CO₂ emission by about 10 ton annually.



● Disusing of Trimming Process in Forging

We disused “trimming process”(deburring) by utilizing a simulation with accumulated forging designs, which we predict underfill and overfill in forging and enabled reduction of CO₂ emission by about 1.7 ton annually.



■ Switch Over to LED Lighting (Ueta Plant)

Ueta Plant is promoting use of LED lighting in a planned manner.

In fiscal 2014, 6 security lights in the parking area, 28 of fluorescent lights in the office and inspection area have been replaced to LED lighting. This effort saved power consumption by below 60 % and about 3 ton of CO₂ emission.

LED Lighting

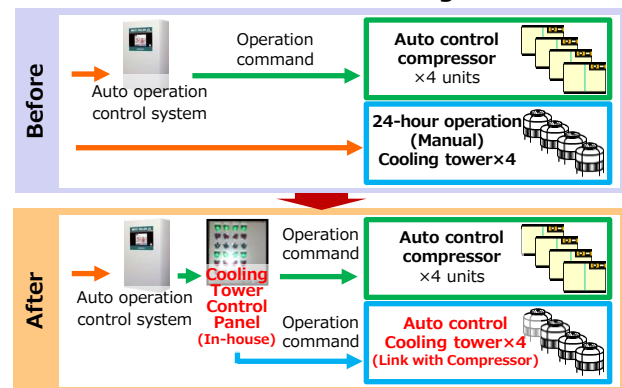


■ Automatic Control of Cooling Tower (Akemi #1 Plant)

In fiscal 2014, we applied an automatic control to the cooling tower for the compressor. Although the compressor had been auto controlled by controlling the number of operating units, the cooling tower had been manually controlled.

Therefore, we manufactured an automatic control circuit for the cooling tower to link to the compressor operation. This enabled reduction of CO₂ emission by about 12 ton annually.

Automatic Control of Cooling Tower



■ Energy Saving by Efficient Operation of Normalization Furnace (Akemi #2 Plant)

We improved operation method of the normalization furnace in forging which consume the most power by improving equipment installation, operation control circuit for shut-down and material wait time as well as reviewing operation shift.

As a result, CO₂ emission fell to 51 ton per year.

Improved Normalization Furnace

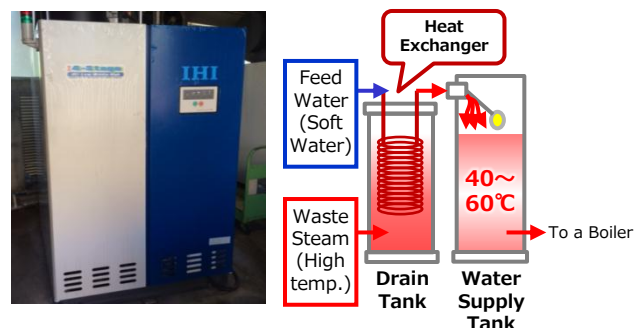


■ Update of an Once-Through Boiler and Recycle of Exhaust Steam (Kyushu Musashi Seimitsu Co.,Ltd)

Kyushu Musashi Seimitsu Co.,Ltd uses three once-through boiler as a heat source in production. Due to the its age and thermal inefficiency, one boiler was replaced in 2013, two in 2014. We employed a boiler with an economizer[※] to use waste steam heat for feed water heating when flashing. This enabled reduction of CO₂ emission by 22 ton annually.

※Heat collection from the exhaust gas.

Image of the New Boiler and Recycle of Exhaust Stream



■ Transportation Efficiency

Production Management Division is focusing on the following points in order to improve transportation efficiency by working closely with customers and transport companies, and pursuing CO₂ emissions reduction during shipping.

- Cutting Transportation Distance of Chartered Trucks
- Improving Load Efficiency of Chartered Trucks
- Flexible Transport Arrangement to the Production Change

Since FY2013, we have applied “pick-up” method which is our customers CO₂ reduction program, and in FY2014, reduction of CO₂ emission has expanded at all the points of our supply chain.

■ Reduction of CO₂ Emissions during Shipping

① Cutting Transportation Distance of Chartered Trucks by “Pick-Up Transportation”

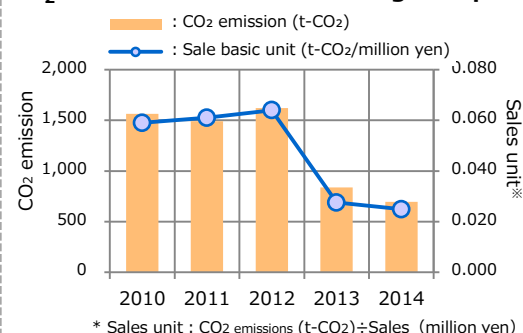
This FY2015, we have expanded “pick-up transportation” we set forth a year ago. This reduced CO₂ emissions by chartered trucks and thereby contributing to a reduction in CO₂ emission throughout the supply chain.

② Improving Loading Efficiency and Cutting Transport by Special Racks

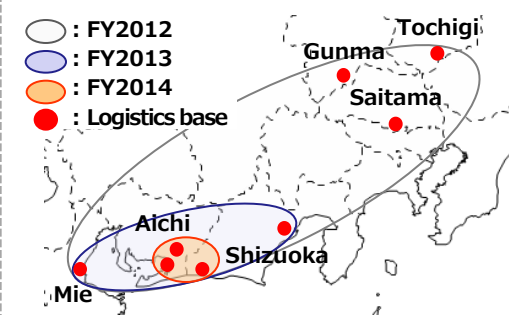
Special racks for a package delivered from HQ to Suzuka plant has been introduced which is allowed to use the interspaces above containers. As a result, the loading efficiency was improved to contribute halving the number of trucks per day.

※Logistic system that a maker goes to a supplier production base to pick up parts etc.

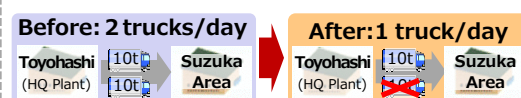
CO₂ Emissions and Sales Unit during Transport



Transportation Areas of Chartered Trucks



Effect of Introduction of Special Racks



Environmental Initiatives in Purchasing

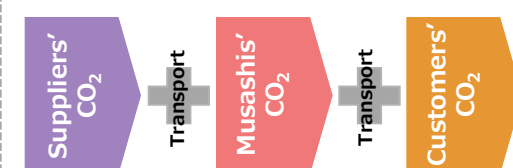
■ Environmental Burden Reduction Activities Across the Entire Supply Chain

Cooperation with customers is necessary to provide environmentally-friendly products. Purchasing division issues “Green Purchasing Guidelines” and promoting reduction of environmental impacts throughout product life cycles across the supply chain through meetings with suppliers and visiting suppliers.

■ Suppliers’ CO₂ Emission Survey

From a product lifecycle perspective, the survey started in 2010 with the aim of recognizing CO₂ emission of purchasing and use of raw materials at the suppliers’ level. We will continue initiatives to recognize the data and to reduce CO₂ emission in the entire supply chain.

CO₂ Emissions in the Entire Supply Chain



Data Grasp Rate of the Suppliers’ CO₂ Emission

Survey Year	Grasp Rate
FY2010	89%
FY2011	82%
FY2012	100%
FY2013	100%
FY2014	100%

As a global company, we will continue efforts towards social contribution and nature conservation activities tailored to the needs of communities in each region to contribute to the sustainable mutual development of both society and the local community.

■ India : Tree Planting/Cleanup Activities

People in MAP-IN plant trees in the factory site every year. Also, cleanup activities in the surrounding area are organized every Tuesday. Now all employees participate to beautify the regional environment.



■ Vietnam : Donations for Local Schools

MAP-VN is devoted to providing scholarship and donating Personal computers for the benefit of children in special need for future growth for the region.



■ China : Activity for “Left Behind Children”※

In addition to continuing support for senior citizens who live by themselves or children who live separately with parents, MAP-CH has been cleaning up neighboring kindergartens and nursing homes every year.



※Their parents are working in the urban areas who have left their children home to live with grandparents. It has become a social problem.

■ Japan : Community Clean-up Activities

Musashi organizes “community clean up activities” every year. More than 500 people including employee's families and retirees took part in 2014.



■ Japan : Musashi Summer Festival

Our summer festival is open to everyone in the local area and has become a very popular event for the community. Many different food stalls and events are available throughout the day along with a spectacular firework display in the evening.



■Indonesia : Planting Mangrove Trees

MAP-IN donated 2,000 mangrove trees for protection against rises in sea level due to global warming. Some of our employees were involved in planting them.



■Thailand : Planting in Nature Park

MAP-TH takes part in tree planting activities every year to improve employees' environmental awareness and environmental protection in Khao-I-To Waterfall park.



■Brazil : Collaboration with the Community

In addition to MDA initiates waste recycling and wastewater treatment in industrial area, MDA is conducting the environmental education targeting at the local elementary school on World Water Day.



■Canada : The Earth Day※ Activities

MAP-CA organizes clean up activity on Earth Day every year. They are also supporting the operations of local schools by purchasing goods.



※ An annual event, on which day events worldwide are held to demonstrate support for environmental protection (April 22)

■Japan : Musashi Woodland Project

We initiated our “Musashi Woodland Project” in 2009 with the intention of raising awareness of the flora and fauna in woodland areas, along with the potential impact of global warming on such areas. This is an activity participated by Musashi employees and its family members to maintain local woodland areas. Every spring and fall many participants from Musashi can be seen helping to maintain this area of woodland.



Environmental Data

Overseas

■ Thailand Musashi Auto Parts Co.,Ltd. (MAP-TH)

Employees : 1,610

<Energy Consumption>			<Waste Generated>		
Items	Unit	Results	Items	Unit	Results
Electricity	MWh	61,316	Quantity	ton	3,764
Liquefied Petroleum Gas (LPG)	ton	583			

■ Indonesia P.T. Musashi Auto Parts Indonesia (MAP-IN)

Employees : 2,587

<Energy Consumption>			<Waste Generated>		
Items	Unit	Results	Items	Unit	Results
Electricity	MWh	69,131	Quantity	ton	123
Diesel	k ℓ	113			
Gasoline	k ℓ	92			
Natural Gas	1,000Nm ³	568			
Liquefied Petroleum Gas (LPG)	ton	351			

■ India Musashi Auto Parts India Private Ltd. (MAP-ID)

Employees : 3,011

<Energy Consumption>			<Waste Generated>		
Items	Unit	Results	Items	Unit	Results
Electricity	MWh	33,040	Quantity	ton	3,049
Type-A Heavy Oil	k ℓ	5,128			
Diesel	k ℓ	5,225			
Liquefied Petroleum Gas (LPG)	ton	1,003			

■ Vietnam Musashi Auto Parts Vietnam Co.,Ltd. (MAP-VN)

Employees : 421

<Energy Consumption>			<Waste Generated>		
Items	Unit	Results	Items	Unit	Results
Electricity	MWh	8,952	Quantity	ton	383
Liquefied Petroleum Gas (LPG)	ton	68			

■ China Musashi Auto Parts(Zhongshan)Co.,Ltd. (MAP-CH)

Employees : 1,031

<Energy Consumption>			<Waste Generated>		
Items	Unit	Results	Items	Unit	Results
Electricity	MWh	20,540	Quantity	ton	374
Diesel	k ℓ	0			
Liquefied Petroleum Gas (LPG)	ton	49			
City Gas	1,000Nm ³	351			

Environmental Data

Overseas

■ US, Michigan Musashi Auto Parts Michigan Incorporated (MAP-MI)

Employees : 642

<Energy Consumption>			<Waste Generated>		
Items	Unit	Results	Items	Unit	Results
Electricity	MWh	44,068	Quantity	ton	585
Natural Gas	1,000Nm ³	2,967			

■ Canada Musashi Auto Parts Canada Incorporated (MAP-CA)

Employees : 551

<Energy Consumption>			<Waste Generated>		
Items	Unit	Results	Items	Unit	Results
Electricity	MWh	25,061	Quantity	ton	836
Natural Gas	1,000Nm ³	709			

■ Brazil, Pernambuco Musashi Do Brasil Ltda. (MSB)

Employees : 884

<Energy Consumption>			<Waste Generated>		
Items	Unit	Results	Items	Unit	Results
Electricity	MWh	28,136	Quantity	ton	4,287
Diesel	kl	12			
Natural Gas	1,000Nm ³	408			
Liquefied Petroleum Gas (LPG)	ton	21			

■ Brazil, Amazonia Musashi Da Amazonia Ltda. (MDA)

Employees : 573

<Energy Consumption>			<Waste Generated>		
Items	Unit	Results	Items	Unit	Results
Electricity	MWh	12,334	Quantity	ton	2,009
Diesel	kl	1			
Liquefied Petroleum Gas (LPG)	ton	235			

■ Hungary Musashi Hungary Manufacturing, Limited (MHM)

Employees : 196

<Energy Consumption>			<Waste Generated>		
Items	Unit	Results	Items	Unit	Results
Electricity	MWh	5,486	Quantity	ton	956
Natural Gas	1,000Nm ³	48			

■ Ueta Plant

Employees : 803 (at March 2015)

<Energy · Water Consumption>

No.	Items	Unit	Results
1	Electricity	MWh	15,314
2	Kerosene	kℓ	147
3	LPG	ton	480
4	Water	m ³	51,350

<Water Quality>

Date : May 22, 2014

No.	Control Items	Unit	Regulation Value*	Measured Value
1	pH(hydrogen ion concentration)	-	5.8~8.6	6.8
2	BOD(biological oxygen demand)	mg/ℓ	25(20)	4.0
3	COD(chemical oxygen demand)	mg/ℓ	25(20)	9.7
4	Nitrogen Content	mg/ℓ	120(60)	6.2
5	Phosphorus Content	mg/ℓ	16(8)	1.6
6	SS(suspended solids)	mg/ℓ	30(20)	<1

<Air>

Date : Dec. 17, 2014

No.	Control Items	Object Facility	Unit	Regulation Value	Measured Value
1	Dust	Heater, West Plant	g/Nm ³	0.30	<0.003
		Heater, South Plant	g/Nm ³	0.30	<0.002
2	Sulfur Oxide	Heater, West Plant	Nm ³ /h	1.8	<0.002
		Heater, South Plant	Nm ³ /h	0.87	<0.002
3	Nitrogen Oxide	Heater, West Plant	ppm	180	49
		Heater, South Plant	ppm	180	39

<Waste>

No.	Items	Unit	Results
1	Amount	ton	515
2	Amount Sent Directly to Landfills	ton	0

*Self-imposed standards except BOD, bracket () shows daily average effluent standard

■ Akemi Plant #1

Employees : 166 (at March 2015)

<Energy · Water Consumption>

No.	Items	Unit	Results
1	Electricity	MWh	8,276
2	Kerosene	kℓ	121
3	LPG	ton	43
4	Water	m ³	18,658

<Water Quality>

Date : March 5, 2015

No.	Control Items	Unit	Regulation Value*	Measured Value
1	pH(hydrogen ion concentration)	-	6.0~8.5	7.1
2	BOD(biological oxygen demand)	mg/ℓ	10	1.0
3	COD(chemical oxygen demand)	mg/ℓ	10	4.5
4	Nitrogen Content	mg/ℓ	20	12
5	Phosphorus Content	mg/ℓ	2	1.3
6	SS(suspended solids)	mg/ℓ	10	<1

<Air>

Date : Feb. 18, 2015

No.	Control Items	Object Facility	Unit	Regulation Value	Measured Value
1	Dust	Heater, Plant #1	g/Nm ³	0.10	<0.003
		Heater, Plant #2	g/Nm ³	0.10	<0.002
		Heater, Plant #3	g/Nm ³	0.10	<0.003
		Heater, Plant #1	Nm ³ /h	0.053	<0.0009
2	Sulfur Oxide	Heater, Plant #2	Nm ³ /h	0.053	<0.002
		Heater, Plant #3	Nm ³ /h	0.28	<0.002
		Heater, Plant #1	ppm	150	67
3	Nitrogen Oxide	Heater, Plant #2	ppm	150	64
		Heater, Plant #3	ppm	150	33

<Waste>

No.	Items	Unit	Results
1	Amount	ton	161
2	Amount Sent Directly to Landfills	ton	0

■ Akemi Plant #2

Employees : 223 (at March 2015)

<Energy · Water Consumption>

No.	Items	Unit	Results
1	Electricity	MWh	17,165
2	City Gas	1,000Nm ³	366
3	LPG	ton	7
4	Water	m ³	18,110

<Water Quality>

Date : Feb. 3, 2015

No.	Control Items	Unit	Regulation Value*	Measured Value
1	pH(hydrogen ion concentration)	-	6.0~8.5	7.3
2	BOD(biological oxygen demand)	mg/ℓ	20	2.0
3	COD(chemical oxygen demand)	mg/ℓ	20	5.3
4	Nitrogen Content	mg/ℓ	20	NCW
5	Phosphorus Content	mg/ℓ	2	NCW
6	SS(suspended solids)	mg/ℓ	30	<1

<Air>

Date : Feb. 2, 2015

No.	Control Items	Object Facility	Unit	Regulation Value	Measured Value
1	Dust	Normalizing Furnace	g/Nm ³	0.10	<0.002
2	Sulfur Oxide	Normalizing Furnace	Nm ³ /h	0.014	<0.002
3	Nitrogen Oxide	Normalizing Furnace	ppm	150	<5

<Waste>

No.	Items	Unit	Results
1	Amount	ton	286
2	Amount Sent Directly to Landfills	ton	0

*Self-imposed standards except BOD, bracket () shows daily average effluent standard

■ Horai Plant

Employees : 115 (at March 2015)

<Energy · Water Consumption>

No.	Items	Unit	Results
1	Electricity	MWh	7,542
2	Kerosene	kℓ	107
3	Water	m ³	6,055

<Air>

Date : Dec. 22, 2014

No.	Control Items	Object Facility	Unit	Regulation Value	Measured Value
1	Dust	Heater	g/Nm ³	0.30	< 0.002
2	Sulfur Oxide	Heater	Nm ³ /h	1.7	<0.003
3	Nitrogen Oxide	Heater	ppm	180	57

<Water Quality>

Date : Feb. 11, 2015

No.	Control Items	Unit	Regulation Value*	Measured Value
1	pH(hydrogen ion concentration)	-	5.8~8.6	7.5
2	BOD(biological oxygen demand)	mg/ℓ	20	6.1
3	COD(chemical oxygen demand)	mg/ℓ	160(120)	13
4	Nitrogen Content	mg/ℓ	120(60)	30
5	Phosphorus Content	mg/ℓ	16(8)	2.1
6	SS(suspended solids)	mg/ℓ	200(150)	4

<Waste>

No.	Items	Unit	Results
1	Amount	ton	534
2	Amount Sent Directly to Landfills	ton	0

*Self-imposed standards except BOD, bracket () shows daily average effluent standard

■ Suzuka Plant

Employees : 15 (at March 2015)

<Energy · Water Consumption>

No.	Items	Unit	Results
1	Electricity	MWh	75
2	Water	m ³	167

<Water Quality>

Date : Aug. 27, 2014

No.	Control Items	Unit	Regulation Value*	Measured Value
1	pH(hydrogen ion concentration)	-	5.8~8.6	6.7
2	BOD(biological oxygen demand)	mg/ℓ	20	10
3	COD(chemical oxygen demand)	mg/ℓ	160(120)	33
4	Nitrogen Content	mg/ℓ	120(60)	85
5	Phosphorus Content	mg/ℓ	16(8)	10
6	SS(suspended solids)	mg/ℓ	200(150)	4

<Air>

No.	Control Items	Object Facility	Unit	Regulation Value	Measured Value
Not Applicable					

<Waste>

No.	Items	Unit	Results
1	Amount	ton	10
2	Amount Sent Directly to Landfills	ton	0

*Self-imposed standards except BOD, bracket () shows daily average effluent standard

■ Kyushu Musashi Seimitsu

Employees : 715 (at March 2015)

<Energy · Water Consumption>

No.	Items	Unit	Results
1	Electricity	MWh	30,313
2	Kerosene	kℓ	2
3	Type-A Heavy Oil	kℓ	21
4	Gasoline	kℓ	19
5	LPG	ton	718
6	Water	m ³	227,359

<Water Quality>

Date : Jan. 22, 2015

No.	Control Items	Unit	Regulation Value*	Measured Value
1	pH(hydrogen ion concentration)	-	5.8~8.6	7.2
2	BOD(biological oxygen demand)	mg/ℓ	600	57
3	COD(chemical oxygen demand)	mg/ℓ	-	-
4	Nitrogen Content	mg/ℓ	240	NCW
5	Phosphorus Content	mg/ℓ	32	13
6	SS(suspended solids)	mg/ℓ	600	44

<Air>

Date : Sep. 12, 2014

No.	Control Items	Object Facility	Unit	Regulation Value*	Measured Value
1	Dust	Private Generator	g/Nm ³	0.1	0.01
2	Sulfur Oxide	Private Generator	Nm ³ /h	3.23	0.69
3	Nitrogen Oxide	Private Generator	ppm	950	770

<Waste>

No.	Items	Unit	Results
1	Amount	ton	608
2	Amount Sent Directly to Landfills	ton	0

*Self-imposed standards except BOD, bracket () shows daily average effluent standard



MUSASHI Environmental Report 2015

Musashi Seimitsu Industry Co.,Ltd.

39-5 Daizen, Ueta-cho, Toyohashi, Aichi 441-8560

Date of Publication : July 2015

Publisher : General Affairs Division

Manager : Toru Uchida