

# The Earth



Promoting carbon-neutral, resource-recycling, and sustainable procurement of natural rubber while balancing economic activities, and working in harmony with local communities and nature. We will address customers' demands for a decarbonized society in a timely manner, as well as promote research and development and the provision of products and services as a company that plays a part in this effort.

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## The Environment

[TCFD Related Information](#) >

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# Management

## Our position

Our society today faces various issues such as the depletion of natural resources, climate change, and the destruction of ecosystems, and all business activities have an impact on the environment. It is also true that environment changes can pose a risk of preventing business continuation. For this reason, Yokohama Rubber works to minimize its environmental burdens in all of its business processes. As part of these efforts, the company conducts assessments with respect to the items of the "prevention of global warming," the "recycling and circulation of resources," "resource conservation," and "safety and comfort" in the design review process for new products, to provide customers with environment-friendly products.

To clearly express this way of thinking and these activities, we have formulated the "[Yokohama Rubber Environmental Policy](#)" to declare ourselves as a world-leading environment-friendly enterprise both inside and outside the company. In addition, specific actions that should be taken by employees are stipulated in the "[Yokohama Rubber Group Action Guidelines](#)".

## Policy

### Yokohama Rubber Basic Environmental Policy

Following the principle of dealing fairly with society and valuing harmony with the environment, we shall assert our world-class strengths in technologies for protecting the environment.

- Continued improvement of environmental management.
- Action to combat global warming.
- Contributing to the creation of a sustainable recycling society.

### Yokohama Rubber Environmental Policy

Following the principle of dealing fairly with society and valuing harmony with the environment, we shall embody "Caring for the Future" for the global environment and assert our world-class strengths in technologies to protect it.

1. Under leadership of top management, Yokohama Rubber will globally initiate environmentally-conscious measures in all of its activities, and will put this into practice across its entire organization.
2. Yokohama Rubber will respect international norms, deepen communication with its stakeholders and will strive to make contributions to local communities and to society as a whole by promoting collaboration to working with the value chain.

3. Yokohama Rubber will strengthen its environmental management system and will aim to achieve zero environmental risk by continually striving to help improve the environment by using approaches to mitigate its impact with chemical substance management, prevent environmental pollution, and reduce sensory nuisances.
4. Yokohama Rubber will comply with all related laws, regulations, and agreements as well as endeavor to continually implement activities that help improve the environment.
5. Yokohama Rubber will promote decarbonization measures, such as energysaving activities and the introduction of renewable energy, and strive to conserve and recycle resources in order to realize a carbon-neutral and circular economy.
6. Yokohama Rubber will strive to conserve biological diversity and use biological resources sustainably in its business activities.
7. Yokohama Rubber will promote harmony with local communities as part of its commitment to work with and become a company that is trusted by local communities.
8. Yokohama Rubber shall publish this policy and make it known to all.

## **Yokohama Rubber Group Action Guidelines (Excerpt)**

We shall harmonize our activities with the global environment.

### **<Basic Stance of the Yokohama Rubber Group>**

1. As members of a corporate group with the highest levels of contribution to the environment, we shall take up the challenge of environment-related issues and help to build a sustainable society.
2. We shall construct and operate mechanisms for companywide management in order to observe environmental laws and regulations in each host country and region.

### **<To practice our basic stance — our action>**

1. We shall observe all laws and regulations for prevention of air pollution, water pollution, soil contamination, etc.
2. In accordance with laws and regulations, we shall control environment-burdening substances, strive to reduce environmental risks deriving from them, and exclude prohibited chemical substances from our product manufacturing processes.
3. In all stages of our business activities, we shall eliminate the waste of resources and energy, and reduce emissions of CO<sub>2</sub> and other greenhouse gases.
4. In all stages of our business activities, we shall promote the reduction of industrial waste derivation and final disposal volumes.
5. In order to preserve biodiversity, we shall engage in various activities in accordance with our Guidelines on Biodiversity.

## **Message from a manager**

With the aim of achieving harmony with the global environment in line with international protocols, and in order to sustain our business management, the Yokohama Rubber Group is promoting policies of "realization of a low carbon society," "realization of a resource recycling oriented society," and "preservation of biological diversity" while assuring the global consistency of our corporate environmental management.

For realization of a low carbon society, we sell only environment-friendly products that have passed our new product design reviews, and work to reduce greenhouse gas emissions (GHG) throughout the entire value chain in accordance with the medium to long-term targets.

For realization of a resource recycling-oriented society, we promote the recycling of regenerated rubber and reduction of industrial waste, and aim to achieve zero emissions at all of our production sites.

For preservation of biological diversity, we conduct surveys and preservation activities with a view to reducing water risks at our domestic and overseas production sites as well as ensuring the stable supply of natural rubber overseas.

We believe that the tree-planting and sapling-making activities in local communities and disaster areas we have done under

the Yokohama Forever Forest Program will be understood as the expression of our intention to work together with local communities in order to "continue to protect our planet."

We promote these activities in collaboration with our subsidiaries in China, Asia, North America, and Europe.

Shuichi Fukutani  
General Manager,

Head of Environmental Protection Promotion Department, Corporate Social Responsibility Division

## Vision for FY 2023

- Sell only environment-friendly products.
- Achieve carbon neutrality of our own activities by 2050.
- Reduce GHG emissions from our own activities by 28% by 2030 (compared with FY2019 level). (\*Equivalent to a 38% reduction compared with 2013 level)
- Promote the introduction of solar power generation systems and switching to using renewable energy-derived electricity.
- Promote the effective use of water resources in line with the characteristics of water risks.
- Develop biodiversity preservation activities at production sites.
- Achieve the goal of planting 1.3 million trees under the Yokohama Forever Forest Program by 2030.
- Promote ESG initiatives in the procurement of resources including natural rubber.
- Achieve zero environmental risks.

## Environmental Grievance Mechanisms

In the event of a caution, guidance, or recommendation received from a governing authority, we immediately take action in accordance with the emergency response standards specified in our corporate-wide guidelines.

Our environmental protection promotion department will provide advice on countermeasures while receiving advice from the legal division, and the entire company will join forces in the response.

In addition, we have a system of receiving environmental complaints from local residents living in the vicinity of our factories.

From external environment-related information received at each of our sites, we select ones involving environmental risks and opportunities, enter that information in the "external information acceptance ledger," and then determine whether the information constitutes an external complaint based on our corporate-wide guidelines.

If such information is identified as an external complaint, it will be handled in accordance with the emergency response standards of our corporate-wide guidelines.

For types of information that are not identified as an external complaint, an environmental management representative of the site will, as he or she deems necessary, contact the relevant department accordingly.

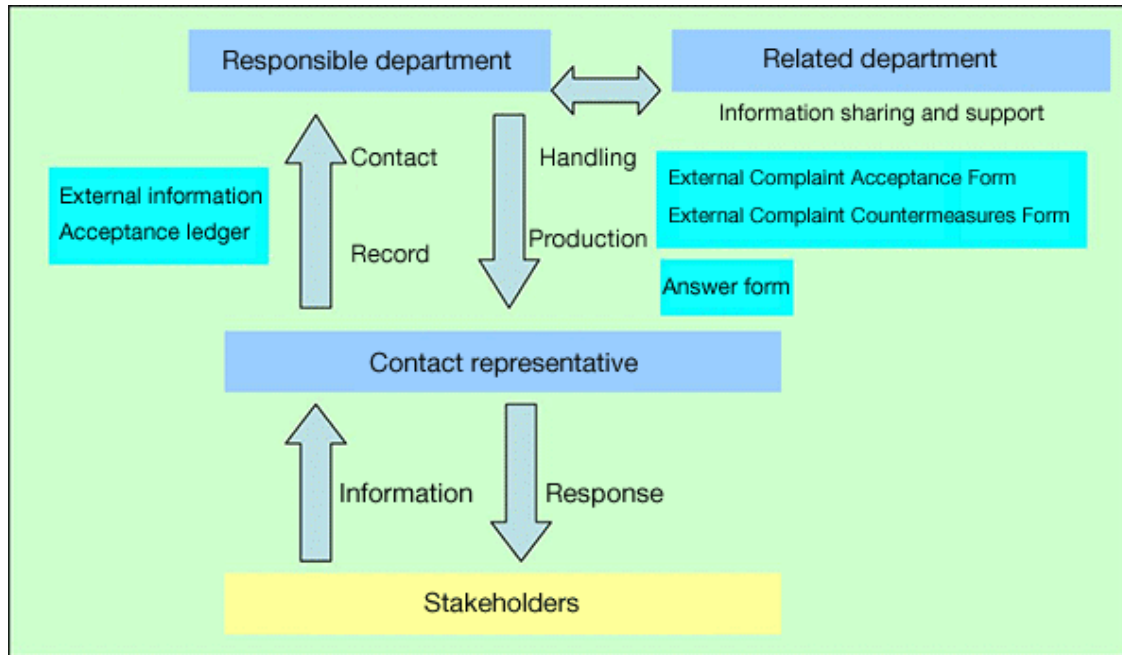
In the event of a caution, guidance, or recommendations received from a governing authority, an "external information receiving form" will be issued and simultaneously sent to our environmental protection promotion department, other Yokohama Rubber sites, and to the committee secretariats of our corporate tire production environmental task force and the MB (industrial products) production environmental task force, respectively.

At the completion of the response, an "external complaint response form" will be sent to our environmental protection promotion department.

The environmental management committee secretariat of the site will submit an answer using an "answer form" to the complainant, after reporting the entire process from the receipt of the information to the proposed answer to the complainant in writing to the site manager and gaining his or her approval.

We also have internal and external monitors to regularly check the effectiveness of the system.

## External information and complaint handling flow



## Environmental Risk Management

Based on our corporate emergency readiness and response guidelines, the environmental manager of each of our sites compiles accidents and emergencies that may have a significant impact on the environment into a List of Accidents and Emergencies and updates it every year.

In addition, in order to confirm the effectiveness of the response procedure, the environmental management representative of each site verifies the procedures for responding to the accidents and emergencies identified at the site, and provides necessary training in accordance with the relevant guidelines.

Environmental risk assessment is conducted at all of our domestic and overseas production sites. In FY2022, we conducted environmental risk assessment at all of the production sites, achieving an executing rate of 100%.

Should a case identified as an environmental accident or emergency have occurred, the responsible site will take preventive and emergency measures in accordance with our emergency readiness and response guidelines, and will report to the local governing authority in the event that environmental standards are exceeded.

Immediately after the occurrence of such environmental accident, the information will be conveyed to the relevant departments by means of a "Zero Report" in accordance with the emergency response management guidelines stipulated by the responsible department, and then, such information will be conveyed to the relevant department by using an Environmental (1) Accident, (2) Trouble, (3) Serious Near Miss, (4) Near Miss Report, as a general rule within 24 hours from the occurrence.

In FY2022, there have been no reports of a pollution or contamination incident.

The environmental manager of the responsible site will follow up the status of corrective measures after the accident or emergency in order to ensure the prevention of a recurrence and the prevention of similar accidents, and the site manager will review the procedures after the accident or emergency.

The environmental protection promotion department will work on countermeasures and the prevention of recurrence from both professional and general corporate perspectives.

The environmental managers of other sites who have received the accident/emergency information will apply the same approach based on the information to prevent the occurrence of similar accidents at their respective sites.

In addition, a corporate-wide environmental management committee will investigate the cause of the accident or emergency to make sure that countermeasures are implemented, and will follow up on the implementation to prevent recurrence, and will make the investigation findings available for reference at the ISO 14001 requirements management review.

## Priority action items to be addressed

Considering the level of impact of business activities and the level of social interest, the following have been established as our priority action items to be addressed by the Yokohama Rubber Group.

Energy >

Water and  
wastewater >

Biodiversity >

Effluent and  
waste >

Emissions >

Materials >

Products and  
Services >

# Energy

## KPI

Item	FY 2021 results	FY 2022 results
<b>Total energy consumption</b>	(Consolidated) 1,879,142MWh * Crude oil equivalent: 474,991 KL	(Consolidated) 1,837,184MWh * Crude oil equivalent: 464,331 KL
<b>Total renewable energy consumption</b>	(Consolidated) 28,669MWh	(Consolidated) 41,352MWh
<b>Total external energy consumption * Reported as Scope 3 (Other emissions)</b>	56,735,901 MWh	60,455,880 MWh

## Responsible Departments

Each business location

※Activities are conducted by each business location, and the Global Warming Countermeasures Committee that the Environmental Protection Promotion Department serves as a secretariat for implements company-wide policy discussions and activities.

In 2022, the committee structure was revised and changed to the Carbon Neutrality Promotion Committee.

## Our position and Targets

### Why is “Energy” a critical issue to be addressed?

#### Explanation of the reason and background

The Yokohama Rubber Group, which conducts production activities in twelve different countries (Japan, United States, the Philippines, China, Thailand, Russia, Vietnam, India, Taiwan, Indonesia, Mexico and Israel) around the world, uses a large volume of energy in the production process. We define energy as one of the most critical issues for us to address since the reduction of energy consumption will accelerate the solution of climate change issues posing a global-scale problem and the effective use of depleting resources while at the same time reducing costs.

### Our policy and position relating to energy

The Yokohama Rubber Group states its environmental position in the "[Yokohama Rubber Company-wide Environmental Policy](#)", we work to minimize our environmental impacts. To that end, in addition to developing and adopting environment-friendly technologies from the design and manufacturing stage, we work to use energy in the most sustainable and appropriate manner possible and to reduce energy consumption throughout the value chain while collaborating with people involved in the provision of related products and services.

We will keep trying to use energy most wisely while making efforts to reduce energy use in accordance with international protocols concerning the proper use of energy, the regulations of countries where we operate (laws equivalent to the Act on the Rational Use of Energy, and the Act on Promotion of Global Warming Countermeasures of Japan), and the policies of related organizations.



## Vision and targets

In line with the globally shared goal of achieving carbon neutrality by 2050, the Yokohama Rubber Group is working to reduce total greenhouse gas (GHG) emissions as an indicator for reducing energy consumption.

- Long-term target:
  - Achieve net zero CO2 emissions (carbon neutrality) in our activities by 2050
- Mid-term target:
  - Reduce CO2 emissions from company activities by 38% by 2030 compared to fiscal 2013  
※This activity is the same level of effort as our goal of 28% reduction by 2030 (compared to 2019).
  - Encourage suppliers to collaborate with us in line with our targets.

## Measures to pursue our vision

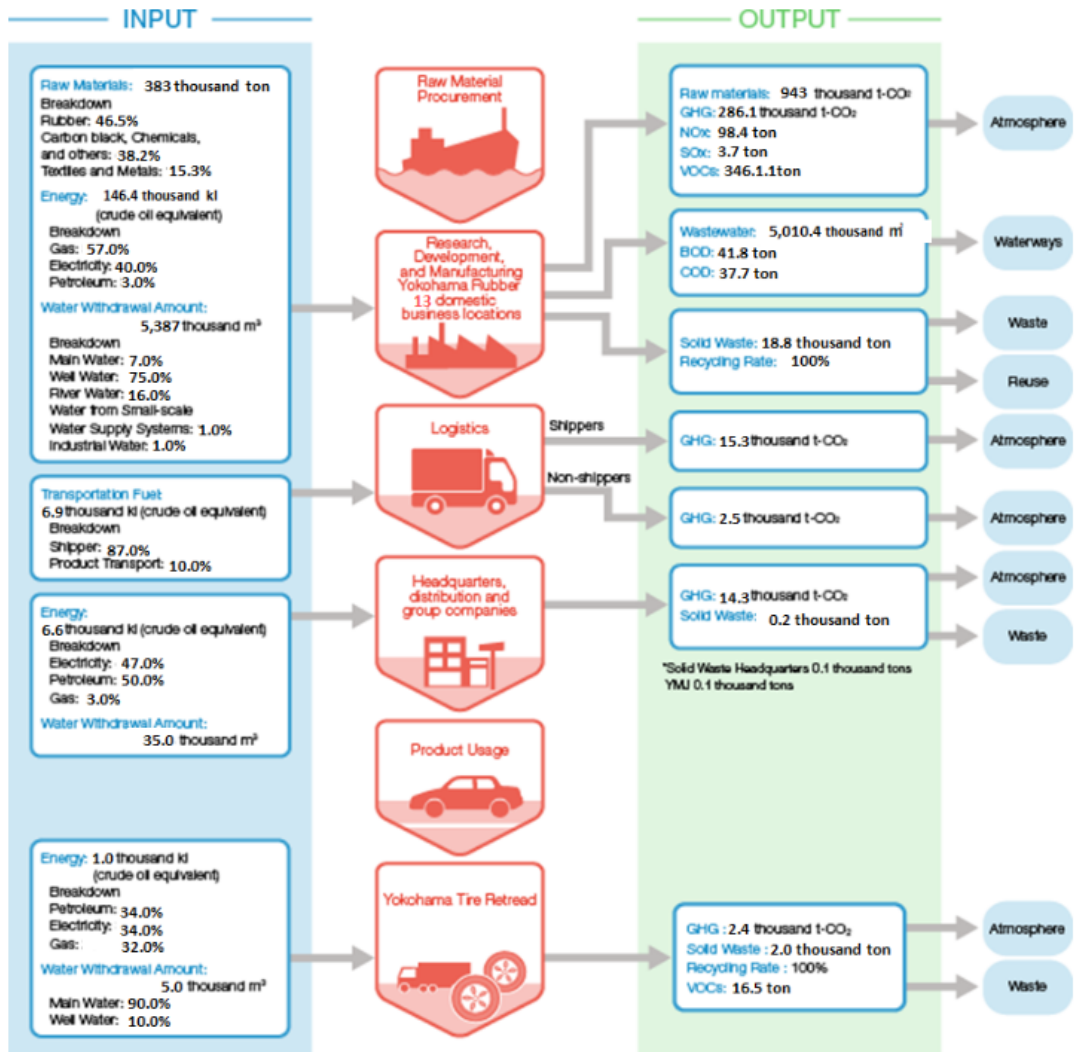
We will implement the following measures aimed at promoting the appropriate use and reduction of energy through our overall business activities:

1. Promote a modal shift in logistics.
2. Conduct energy management in production  
Promote the effective use of energy through system improvements, cost saving improvements, process improvements, the development of management systems, the introduction of production systems, and the introduction of new energy (including renewable energy) in the production process.
3. Promote energy reduction activities by establishing seven energy-saving subcommittees.
4. Promote the development and sales of eco-friendly products in order to reduce the amount of energy use resulting from product use.

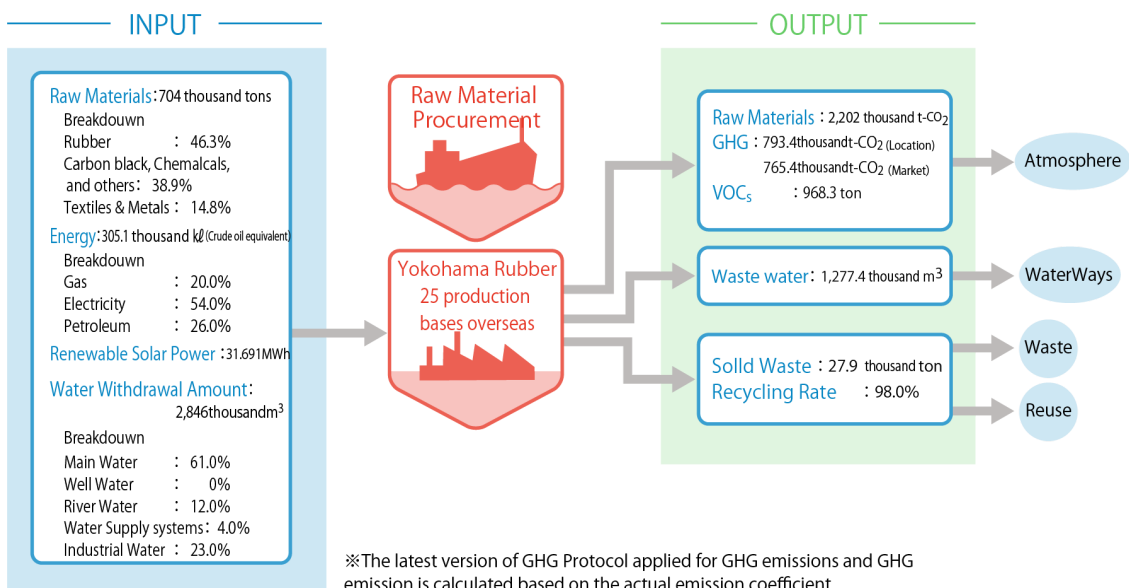
## Review of FY 2022 Activities

In Japan, Yokohama Rubber achieved an 18% reduction in GHG emissions on a non-consolidated basis compared with 2013 levels, as a result of promoting system improvements (development of energy-saving vulcanization system, and utilization of co-generation), cost saving improvements (increased use of LEDs, and improvement of facility operation rate), process improvements (optimization of rubber kneading process), and the introduction of new energy (introduction of solar power generation system).

Overall picture of the environmental burden in Japan



Overall picture of the environmental burden overseas

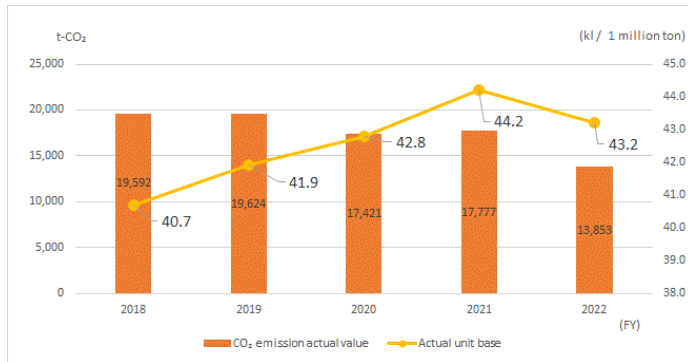


# Introduction of Initiatives

## Reduction of energy usage and CO<sub>2</sub> emissions in logistics

- Target: We are working on the reduction of CO<sub>2</sub> emissions in line with the corporate mission of the Yokohama Rubber Group.
- Results: In FY2022, we continued to review transportation routes, reduce warehouse transportation volume, and improve loading efficiency, achieving 22% reduction from the previous year with emissions being 13,853t-CO<sub>2</sub>.  
The standard energy consumption unit improved by 2.3% to 43.2 kl/million ton-kilometer.

CO<sub>2</sub> emissions and emissions per unit of output



\* Yokohama Rubber on a non-consolidated basis



Rail transport for Shinshiro to Kyushu shipments

## Energy management

1. Visualization of energy use
2. Control of peak power by means of demand control equipment
3. Heat insulation for plant building roofs
4. Reduction of boiler fuel by updating the water supply system of boiler facilities to reduce the boiler drainage rate (introduction of a device to automatically control the number of air compressors in operation)



Boiler facilities Water supply system

Switched the agitation motor from an air type to an electric type.



Air motor



Electric motor

Conducted diagnosis on the steam drain trap to control steam energy loss.



Steam drain trap (Upper photo: defective trap, lower photo: new trap)

Controlled air leakage loss by managing (closing) the air source valve when not in operation.



Air valve management during non-operating hours (closed)

Installed the detachable heat insulation material at the uninsulated part of the once-through boiler to control heat radiation loss.



Removable heat insulator

Used air leak visualization equipment to detect air and steam leaks in order to control loss increase resulting from air leaks at each plant in Japan.

Energy loss was improved by branching the piping system of steam-type unit heaters and adding individual valves based on the result of manufacturer energy conservation diagnosis.



Separated the steam system and installed a motor valve

Liquefaction efficiency of air conditioning refrigerant was improved by installing a high-efficient refrigerant liquefaction heat exchanger on the outdoor compressor unit of the air conditioner.

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High-efficiency refrigerant liquefaction heat exchangers

High-efficiency refrigerant liquefaction heat exchangers were additionally installed on air conditioners and coolers to improve their heat-exchange efficiency.

## Full Operation of Co-generation Systems

At tire plants using a large volume of energy and steam, it is possible to achieve a significant reduction in CO<sub>2</sub> emissions through the adoption of co-generation systems that supply energy and steam simultaneously. As of 2022, the co-generation system is operating at three domestic plants. As a result of continuous 24-hour operations, 72% of the energy and nearly all of the steam used by these plants are now supplied by the co-generation systems, contributing to the reduction in CO<sub>2</sub> emissions and the reduction of the amount of power purchased from the electric company and power consumption during peak time. This system has also been adopted at our Thai plant.



Mie Plant co-generation system



Mishima Plant co-generation system



Shinshiro Plant co-generation system



Thai Plant co-generation system

## Improving the efficiency of motors and pumps for production equipment

The booster pumps of the pressure testing machine were switched to air hydro pumps with intermittent operation control, and the duct fan V-belt was replaced with an energy-saving type, which has led to an effective reduction of power consumption.



Air hydro pumps

The hydraulic unit for a multi-axis automatic lathe has been converted to an inverter type to reduce power consumption during standby time.



Hydraulic unit inverter conversion

We are switching other existing motors to high-efficiency ones.



High-efficiency motor





## Improving the efficiency of cooling-water pumps for production equipment

In conjunction with the renewal of the calendar equipment hotbed device, the heat exchange system was changed (from direct mixing to indirect heating) to reduce steam consumption.

In winter, when the water temperature in the cooling-water tank drops, the circulating cooling tower equipment is deactivated to reduce electricity consumption.



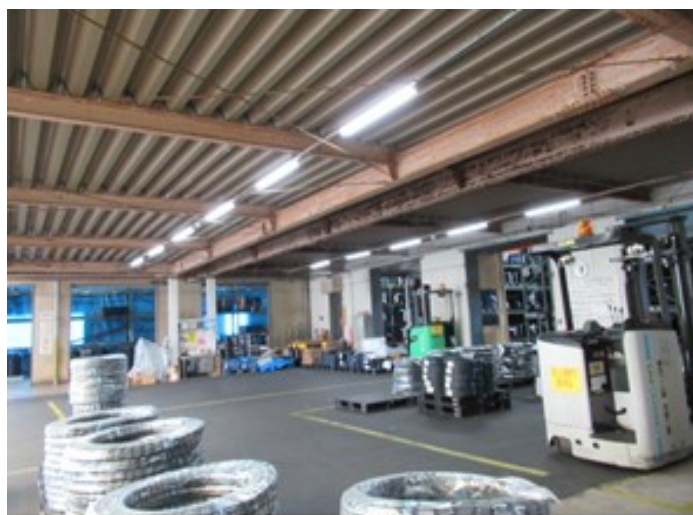
Cooling-water pump



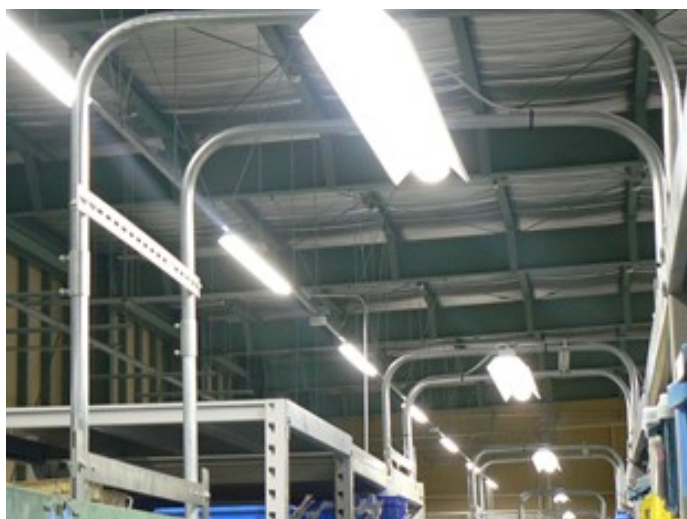
Optimizing the chiller tank

## Adoption of LED lights

We are replacing ceiling lights, in our domestic and overseas sites, which were previously mercury or fluorescent lights, with LED lights or other high-efficiency lighting products. In addition, the use of human detecting sensor control has been promoted, achieving the highly effective reduction of electricity consumption.



Conversion to motion sensors and LEDs





Mercury lighting → LED lighting



Replacement of lighting

## Solar power generation

We are proceeding with the installation of environment-friendly solar power (renewable energy) generation facilities. Solar power generation was introduced in the plants in India and China (Suzhou) in FY2017, in the plant the Philippines in FY2019, and in the Shinshiro-Minami Plant in FY2023.



Solar power generation (Suzhou, China) installed capacity: 3,000 kw



Solar power generation (Hangzhou, China) installed capacity: 80 kw



Solar power generation (India) installed capacity: 200 kw



Solar power generation (Mie) installed capacity: 500 kw



Solar power generation (Philippines) installed capacity: 4,000 kw



Solar power generation (Shinshiro-Minami) installed capacity : 1,040kw

## Biogas

Food waste used to go to a landfill at the Tirunelveli Plant in India. In addition to a hygiene-related issue, the generation of methane, whose emission factor is 25 times higher than that of CO<sub>2</sub>, used to be a persistent problem. To cope with this, we built a biogas plant and began to process 250kg of food waste per day to generate gas in

FY2019. In 2022, LPG gas consumption was reduced by 352kg, resulting in a reduction of 1.06t-CO<sub>2</sub>.

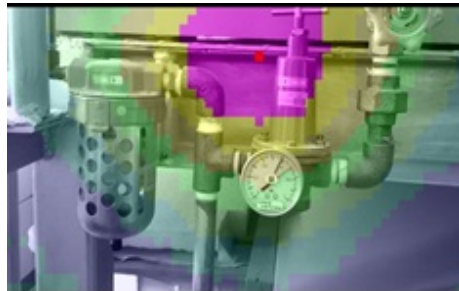


## Energy-saving monthly activities

Under the slogan of "Let us care for our region and earth: Start winter energy saving toward carbon neutrality," after sharing recognition on the significance of energy saving, that is, "strengthening corporate competitiveness through cost reductions, responding to fossil fuel depletion, reducing impact on the global environment, and fulfilling corporate social responsibility," and after carrying our adequate preparations, the production department, the equipment maintenance department, and administration department made concerted and united efforts and accumulated multiple small effects and results during the "Energy-Saving Month" of February. For example, in an energy-saving diagnosis, the maintenance department conducted inspection on equipment and found steam and air leakage, and repaired the leaks.



Education activities during the Energy Saving Month



Leakage inspection and visualization



Leak repair

## Energy saving subcommittee

An "energy saving subcommittee" meeting was organized by energy saving staff from domestic plants to follow up on annual energy saving reduction plans, and the status of investment in energy-saving equipment and progress. The committee also share useful information by introducing improvement cases at each plant to further promote energy reduction.



Activities of the Energy Saving Subcommittee

## Activities to enhance energy management based on guidance from consultants

We are working on the enhancement of energy management (adoption of a just-in-time system for energy) through various means such as reductions of energy loss in line with production variation (switching equipment on and off).

The bases in Japan and overseas benefit from guidance provided by consultants every year.

## Future challenges

We are going to continue to expand the introduction of co-generation systems to achieve the reduction of total energy usage.

Regarding the increase of renewable energy usage ratio, we are going to expand the introduction of solar power generation, etc. and increase the ratio of renewable energy used at our bases.

# Water and wastewater

## KPI

Item	FY 2021 results	FY 2022 results
Water intake	(Consolidated) 8,494 thousand m <sup>3</sup>	(Consolidated) 8,247 thousand m <sup>3</sup>
Percentage of recycled and reused water* <sup>1</sup>	(Consolidated) 144%	(Consolidated) 155%
Total water consumption* <sup>2</sup>	(Consolidated)14,252 thousand m <sup>3</sup>	(Consolidated)14,695 thousand m <sup>3</sup>
Water sources significantly affected by water intake	(Consolidated) NA <Endangered species> There are endangered species in the Miya River (Mie), Kanogawa River (Mishima), and Kaname River (Hiratsuka) (red list of threatened species) <Intake of water from protected areas> Not applicable. There is no intake of water from protected areas.	(Consolidated) NA <Endangered species> There are endangered species in the Miya River (Mie), Kanogawa River (Mishima), and Kaname River (Hiratsuka) (red list of threatened species) <Intake of water from protected areas> Not applicable. There is no intake of water from protected areas.

※1 Percentage of water recycled/reused = Amount of water circulated ÷ Ratio of water withdrawal

※2 Total water consumption = total water withdrawal + circulated water - total wastewater (also considering circulated water)

## Responsible Departments

Each business location

※Performance is managed by the Production Environmental Task Force.

## Our position and Targets

### Why is “Water” a critical issue to be addressed?

#### Explanation of the reason and background

The Yokohama Rubber Group use water in two ways; one is direct use, in which, water is used as cooling water for boilers and production facilities at production sites, and the other is indirect use, in which water is used by our suppliers to provide us materials and services.

Regarding direct use, the degree and composition of water risks vary (physical risk, regulatory-related risk, and reputation risk, etc.) depending on what geographical region our production site is located. Therefore, it is important for each site to effectively use precious water resources in line with the local condition.

In addition, for the indirect use of water in the production process for raw materials such as natural rubber as well, we think that it is necessary to take the appropriate responses as necessary after confirming the situation. This is based on our

understanding that if it becomes impossible to procure raw materials due to water-related risks at suppliers, it could directly lead to serious problems that affect our operations.

## Water use policy

Our domestic bases are blessed with rich water resources, which allows us to use water effectively as a recycled resource\*. However, some of our overseas bases are located in areas with limited water availability. For this reason, it is necessary to conduct water risk assessment in each area where our site is located and work to ensure that water is properly managed by the site. We also find it is necessary to check the usage status of water at suppliers, and work together with each supplier to take countermeasures in the event that significant risks are found.

For this reason, after reviewing the situation from FY2015 to FY2017, we made a decision on our policy. We will also broadly disclose information on the progress of these efforts through various means such as external questionnaires (CDP water security questionnaire, etc.) and our website.

※We use water based on formal procedures such as agreements with each region (regional administration).

## Water risk assessments

In production site areas using a lot of water, we use existing water risk assessment tools such as the WRI's Aqueduct to check the results of potential water risk assessment. We use existing tools and locally available information to make a comprehensive judgment on water risks.

Based on the obtained results, we identify the highest risk among representative water risks (physical risk, regulatory-related risk, and reputation risk, etc.) for each base, and consider what measures should be taken for them in descending order of priority.

## Vision and targets

We will promote 3R initiatives for water at all of our business sites, and in their areas including the supply chain, and strive to use water in a sound manner and conserve water resources. In this way, we will contribute to an appropriate water cycle on a global scale.



## Measures for vision achievement

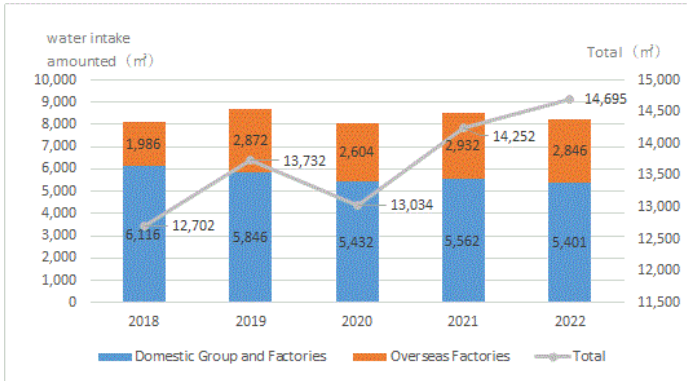
At domestic and overseas production sites, we conduct the following initiatives aimed at reducing the standard consumption unit of water intake by 1% year-on-year.

- Reinforce countermeasures to reduce water usage at the sites subject to higher physical risks (high water shortage probability).
- Thoroughly manage drainage water quality at the sites subject to higher regulatory risks.
- Enhance area communication at the sites subject to higher reputational risks.

# Review of FY 2022 Activities

Transition of water intake and total water consumption are shown below.

In FY2022, water intake amounted to 8,247,000 m<sup>3</sup>, which is a 2.9% reduction from the previous year, despite increased production. On the other hand, total water consumption amounted to 14,695 thousand m<sup>3</sup> with increased use of recycle water, resulting in 3.1% increase from 2021 level.

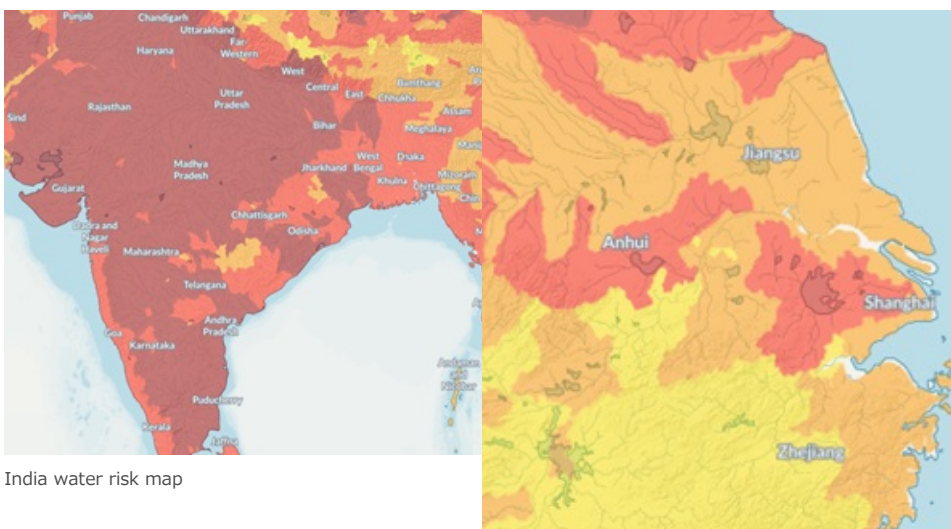
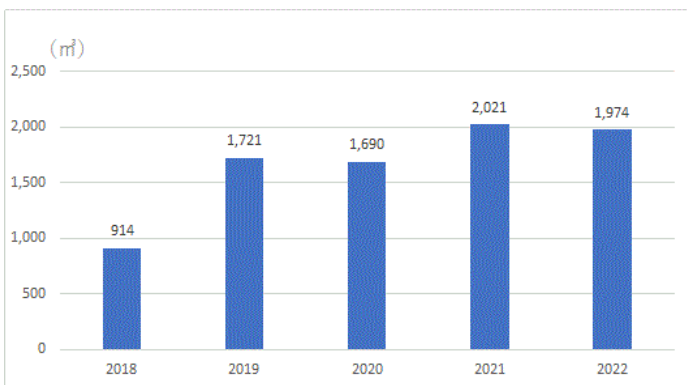


Water risk assessment is conducted by using results from existing water risk assessment tools such as the WRI's Aqueduct and locally available information to classify water volume risk (India and the Philippines), water quality risk (Japan, U.S., Thailand, Vietnam, Russia and Taiwan), and water volume and quality risk (China and Indonesia), and to conduct manage risks by country.

As a result of water stress assessment, it was found that areas with "Extremely High" or "High" water stress were China, India, the Philippines, Vietnam and Israel.

Water intakes of these countries and areas are shown below.

In FY2022, water intake amounted to 1,974,000 m<sup>3</sup>, resulting in 2.3% decrease from the previous year level.



India water risk map

China water risk map



Source : [Word Resources Institute Aqueduct Water Risk Atlas](#)

[Examples] Level of water risk severity, based on data from the World Resources Institute (WRI)

- We made a report by responding to a questionnaire relating to the CDP Water program and the supply chain again in FY2022. The breakdown of water intake quantity is 65% in Japan and 35% overseas.
- We make effective use of water at all bases through continuously taking measures to prevent leakage and improving equipment for using recycled water. In particular, a closed water circulation system is being introduced to many overseas production sites to address physical (water shortage) risks.
- Regarding wastewater, we regularly check that the quality of the water being discharged does not pose any problems. We also make sure that such wastewater meets the water quality standards of the countries and regions where our bases are located.

## Introduction of Initiatives

At our domestic production sites in Mie and Onomichi, we have made capital investments in leakage control of facility and facility pipes and equipment for using recycled water.

At our overseas production site in India, we introduced the closed system at the time of constructing the plant.

In Thailand and China, we collect rainwater and use it as cooling water and daily life water for restrooms.

In addition, water treatment facilities have been installed at production sites to prevent the deterioration of drainage water quality.

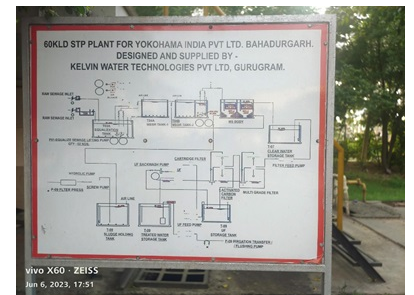
At the Nagano Plant, a water circulating system has been introduced to recycle drainage water as cooling water, etc.

On the other hand, we are conducting "biodiversity conservation activities" to examine the impact of drainage water on rivers in Mie, Shinshiro, Mishima, and Ibaraki, and examine its impact on the rivers serving as a source of well water in Hiratsuka.

## Future challenges

We will build a system to ascertain data on global water usage status, and implement the following initiatives.

- Formulation of Yokohama Rubber Group standards (guidelines) for the proper water management
- Enhancement of awareness toward water-related initiatives and their necessity within the Company
- Joint implementation of initiatives for water use throughout the supply chain



Water treatment facilities at our production base in Italy



Nagano-water recycling system



# Biodiversity

## KPI

Item	FY 2021 results	FY 2022 results
<b>Implementation rate of biodiversity conservation activities for ecosystems near production facilities</b>	(Consolidated) 50% (13 domestic business locations, and 9 overseas locations)	(Consolidated) 50% (12 domestic business locations, and 9 overseas locations)
<b>Biodiversity in each area, and impact</b>	Yokohama Tire Retread Co., Ltd. (YTRH) Vicinity of Lake Utonai	Yokohama Tire Retread Co., Ltd. (YTRH) Vicinity of Lake Utonai
<b>Habitats being safeguarded or restored</b>	Satoyama (traditional community-managed forest) conservation in Toyooka Village, Nagano Prefecture; Satoyama conservation in Tsuchiya district, Hiratsuka City, Kanagawa Prefecture; conservation of <i>Caretta caretta</i> (Loggerhead turtle) egg-laying sites along the Ominato Coast in Ise City, Mie Prefecture, and conservation of breeding grounds of <i>Sialia sialis</i> (Eastern bluebird) at Virginia Plant	Satoyama (traditional community-managed forest) conservation in Toyooka Village, Nagano Prefecture; Satoyama conservation in Tsuchiya district, Hiratsuka City, Kanagawa Prefecture; conservation of <i>Caretta caretta</i> (Loggerhead turtle) egg-laying sites along the Ominato Coast in Ise City, Mie Prefecture, and conservation of breeding grounds of <i>Sialia sialis</i> (Eastern bluebird) at Virginia Plant
<b>Total number of species included in the IUCN Red List of Threatened Species or in Japan's domestic list of species requiring special conservation efforts</b>  <b>&lt;Categories of threatened species&gt;</b> <ul style="list-style-type: none"> <li>• Critically endangered (CR)</li> <li>• Endangered (EN)</li> <li>• Vulnerable (VU)</li> <li>• Non-threatened (NT)</li> <li>• Least concern</li> </ul>	<p>Rivers receiving wastewater CR+EN: One species: <i>Anguilla japonica</i> (Japanese eel) (Kaname River, Hinokijiri River) VU: Two species: <i>Oryzias latipes</i> (Japanese rice fish) (each river) and <i>Liobagrus reinii</i> (Torrent catfish) (Tenryu River) NT: Five species: <i>Veronica undulata</i> (Kaname River), <i>Diplonchus japonicus</i> (Ferocious water bug) (Sonobe River), <i>Cottus pollux</i> (Japanese fluvial sculpins) (Kuroda River), <i>Pelophylax nigromaculatus</i> (Black-spotted Pond Frog) (Tenryu River), <i>Mauremys japonica</i> (Japanese pond turtle) (Goten River)</p> <p>On premises of plants and satoyama VU: One species: <i>Cephalanthera falcata</i> NT: Four species: <i>Sasakia charonda</i> (Great purple emperor), <i>Psilotum nudum</i> (Whisk fern), <i>Calanthe discolor</i>, <i>Cynops pyrrhogaster</i> (Japanese fire belly newt) Least concern: One species: <i>Vanellus cinereus</i> (Grey-headed lapwing)</p> <p>Beaches near to where wastewater flows out EN: One species: <i>Caretta caretta</i> (Loggerhead turtle) (Ominato coast)</p>	<p>Rivers receiving wastewater CR+EN: One species: <i>Anguilla japonica</i> (Japanese eel) (Kaname River, Hinokijiri River) VU: One species: <i>Oryzias latipes</i> (Japanese rice fish) (each river) NT: Five species: <i>Veronica undulata</i> (Kaname River), <i>Diplonchus japonicus</i> (Ferocious water bug) (Sonobe River), <i>Cottus pollux</i> (Japanese fluvial sculpins) (Kuroda River), <i>Pelophylax nigromaculatus</i> (Black-spotted Pond Frog) (Tenryu River), <i>Mauremys japonica</i> (Japanese pond turtle) (Goten River)</p> <p>On premises of plants and satoyama VU: Two species: <i>Cephalanthera falcata</i> and <i>Butastur indicus</i> NT: Four species: <i>Sasakia charonda</i> (Great purple emperor), <i>Psilotum nudum</i> (Whisk fern), <i>Calanthe discolor</i>, <i>Cynops pyrrhogaster</i> (Japanese fire belly newt) Least concern: One species: <i>Vanellus cinereus</i> (Grey-headed lapwing)</p> <p>Beaches near to where wastewater flows out EN: One species: <i>Caretta caretta</i> (Loggerhead turtle) (Ominato coast)</p>

# Responsible Departments

Each business location

※Activities are conducted by each office, with the Biodiversity Committee (which the Environmental Protection Promotion Department serves as a secretariat for) implementing company-wide policy discussions and activities.

## Our position and Targets

### Why is “Biodiversity” a critical issue to be addressed?

#### Explanation of the reason and background

Our Company is engaged in business that is dependent on resources available from nature (blessings of nature) including natural rubber. In addition, many production plants use large amounts of water in production processes, emitting heat and carbon dioxide. The very existence of our operation sites can disturb and break apart the local ecosystem through land modifications, as well as variation in microclimate. We recognize that negative effects on the natural environment caused by these kinds of business activities are not unrelated to the loss of biodiversity currently advancing on a global scale.

To address these issues, Yokohama Rubber Group established its Biodiversity Guideline in 2010, and has been working on the conservation of biodiversity through its value chain locations. For years, we have been running the Yokohama Forever Forest Program to plant trees and to provide saplings in areas around our production sites. We also perform various biodiversity conservation activities to ensure that the plants and animals living in our production site premises has positive effect on the surrounding regional ecosystem. In January 2023, we joined the "30by30 Alliance for Biodiversity," a coalition of companies and other organizations directing all-Japan efforts to achieve "30by30," an international goal of conserving and protecting more than 30% of land and sea by 2030 toward the goal of nature positive. In the same month, we endorsed the philosophy of the Task Force on Nature-related Financial Disclosures (hereinafter referred to as TNFD) and participated in the "TNFD Forum," an international stakeholder organization that supports the establishment of a framework for the disclosure of nature-related financial information, as well as in "Keidanren Initiative for Biodiversity Conservation." In December 2023, the Biodiversity Guideline was revised to reflect national and international trends.

#### Yokohama Rubber Group Biodiversity Guideline

The Yokohama Rubber Group revised its Biodiversity Guideline in December 2023, based on the adoption of the Kunming-Montreal Biodiversity Framework at the 15th Conference of the Parties (COP15) to the UN Convention on Biological Diversity in December 2022, and the Japanese Government's Cabinet decision on the National Biodiversity Strategy 2023-2030 in March 2023. We will continue to work for the conservation, restoration and rehabilitation of biodiversity throughout the value chain.

#### <Basic Policy>

Yokohama Rubber Group's businesses depend on the blessings of nature (ecosystem services) and they impact biodiversity at the same time. To achieve a “world living in harmony with nature”, based on this recognition, Yokohama Rubber Group complies with global goals, initiatives, and regulations such as the Kunming-Montreal Global Biodiversity Framework and reduces negative impacts on biodiversity throughout its entire business and promotes the restoration/regeneration of nature to contribute to a nature positive world.

## <Action Guidelines>

- 1. Recognize the issue of biodiversity as a business challenge and continually monitor the sustainable use of natural resources and biodiversity conservation.**

Yokohama Rubber Group recognizes the issue of biodiversity as a business challenge and promotes sustainable use of natural resources and biodiversity conservation. Furthermore, we regularly assess risks and opportunities related to nature and build a system in which management monitors them.
- 2. Understand the relationship between business and impacts on biodiversity and its dependency on nature by scientific approaches.**

We strive to understand the relationship between our business and impacts on biodiversity and its dependency on nature in relevant locations throughout the entire value chain from the procurement of raw materials to disposal of products by scientific approaches. We identify business activities that greatly impact biodiversity, set goals, and conduct continuous monitoring.
- 3. Reduce negative impacts caused by our business activities, while increasing positive impacts.**

We strive to avoid/reduce negative impacts on biodiversity caused by our business activities such as land use, resources use including natural rubber and water, climate change, pollution, and alien species accompanied by our business activities, and restore/regenerate nature to increase positive impacts, thereby contributing to biodiversity conservation.
- 4. Promote the sustainable use of natural resources throughout the entire value chain through technological innovation.**

In addition to the negative impacts in the production phase such as use of resources, we also aim to suppress negative impacts caused downstream of the value chain including the disposal phase, and promote innovative technological development to promote sustainable use of resources.
- 5. Have the integrated perspective to solve social issues including biodiversity and climate change.**

We promote solutions that are effective for eliminating the trade-off relationship of biodiversity and climate change and increasing the effects of activities at the same time. We also act from an integrated perspective to solve social issues such as human rights, labor issue, and poverty. We give particular consideration to the rights of indigenous peoples and local communities, and to gender equity.
- 6. Promote biodiversity conservation in collaboration with suppliers to increase sustainability of natural resources.**

Our business uses various natural resources such as natural rubber and water. We strive to promote conservation of such resources and ensure traceability in collaboration with suppliers including farmers to increase the sustainability of natural resources throughout the supply chain.
- 7. Support employees so they can contribute to biodiversity conservation.**

We support employees in biodiversity conservation in the course of their work as well as in local communities through raising their awareness of biodiversity and behavior change leading to practice.
- 8. Build a trust relationship through communication and collaboration with stakeholders to increase the effectiveness of initiatives.**

We build a trust relationship with various stakeholders such as national agencies and municipalities, non-governmental organizations (NGOs), research/educational institutes, and local communities and strive to improve initiatives and enhance capabilities to increase the effectiveness of our initiatives.
- 9. Actively disclose information on a regular basis about efforts for biodiversity conservation in accordance with these policies.**

We actively disclose information about our efforts related to biodiversity in accordance with these policies by making use of various opportunities on a regular basis to gain understanding of internal and external stakeholders to promote sustainable management.

## Vision and targets

### Short-term and medium-term goals

#### 1.Sustainable Natural Rubber Procurement

Item	Targets	Achieved year	Progress in FY2022
Number of natural rubber plantations surveyed	Cumulative total of 500	FY2023	Total 437 units (Cumulative total of 500 units achieved in February 2023)
Percentage of natural rubber suppliers surveyed (Tier1)	100%	FY2023	85% (relative to supply)
Implemented grievance mechanisms	Completed	FY2023	Completed

#### 2.Promoting Agroforestry (※)

Item	Targets	Achieved year	Progress in FY2022
Number of saplings provided to natural rubber plantations for agroforestry	Cumulative total of 130,000 trees	FY2030	Cumulative total of 53,000 trees
Number of farmers introducing agroforestry	Cumulative total of 170	FY2030	Cumulative total of 63 units

※Agroforestry is a term created from the words agriculture and forestry, and refers to the grazing of livestock and cultivation of crops between planting trees. Yokohama Rubber is promoting agroforestry in natural rubber plantations.

#### 3.Yokohama Forever Forest Programs

Item	Targets	Achieved year	Progress in FY2022
Number of trees planted and saplings provided	Cumulative total of 1.3 million trees	FY2030	Cumulative total of 1.2 Million trees

Yokohama Rubber's business activities depend on ecosystem services generated from natural capital such as forests, soil, water, air, and biological resources, including natural rubber. We recognize that management that takes natural capital into consideration and biodiversity conservation are important issues for sustainable business activities.

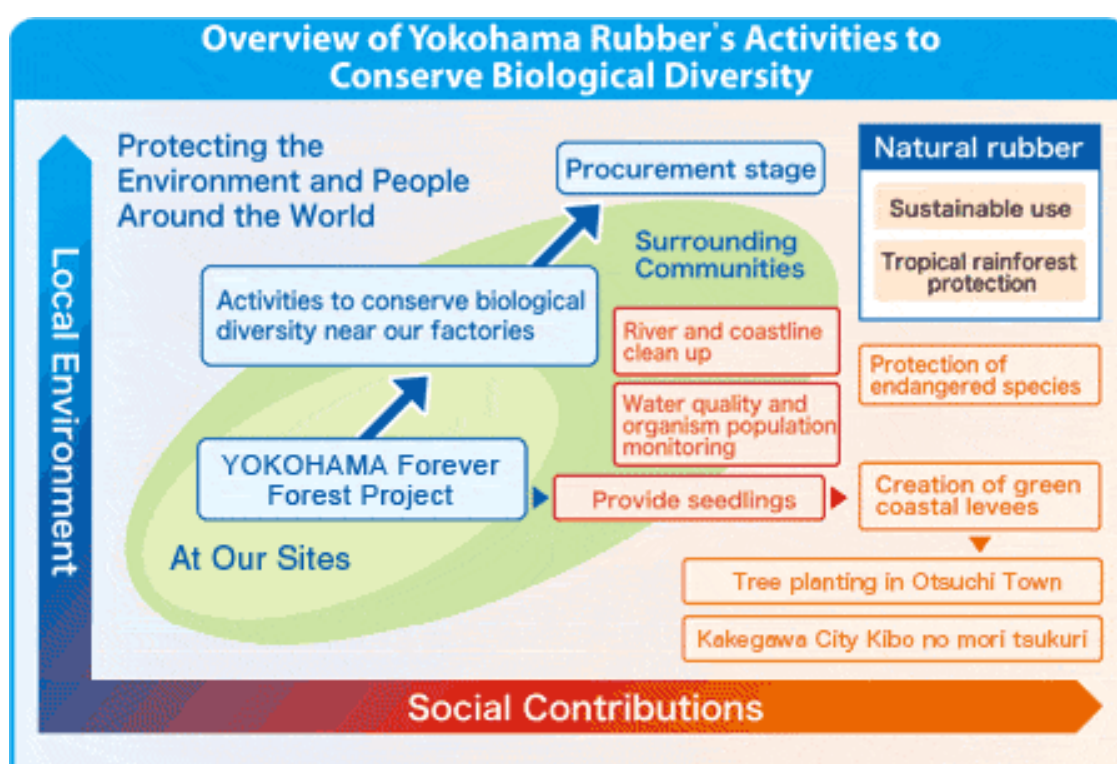
Yokohama Rubber is committed to the realization of a society that coexists in harmony with nature through its business activities.

In the preservation of biodiversity, we evaluate the impact that our business activities have on the natural environment and upon ecosystems, and then implement conservation activities in order that this impact can be further mitigated.

Additionally, we aim for harmony with nature and the development of employees with an awareness of the environment.

YOKOHAMA Forever Forest project achieved its goal to plant 500,000 seedlings in both our domestic and overseas production sites and related department sites in September 2017. Going forward, the project is working toward the new target of planting 1.3 million trees by 2030 through afforestation at production sites and related department sites and the provision of seedlings to communities.

### <Overview of Yokohama Rubber's Activities to Conserve Biological Diversity>



### Measures for vision achievement

Among all our business activities, we think that our dependence on biodiversity and business risks are especially high in the raw material procurement stage and the production stage.

In the raw material procurement stage, natural rubber procurement is considered to have the highest biodiversity impact, while in the production stage, land use and water intake and discharge by our production sites have the highest biodiversity impact. Our production sites are located in widely varying conditions in terms of geography, history, and culture.

Since ecosystems surrounding these sites also differ, we believe it is necessary to accurately understand the biodiversity situation surrounding each site and we deploy our biodiversity activities in stages. After gaining a general picture of the site location, including what bodies of water and vegetation exist in the area, whether any nature reserves are nearby and whether it is close to residential areas and other factories, we conduct surveys on the water quality of rivers that could be possibly affected by our production activities, and monitor living organisms that are found in the areas surrounding the production site.

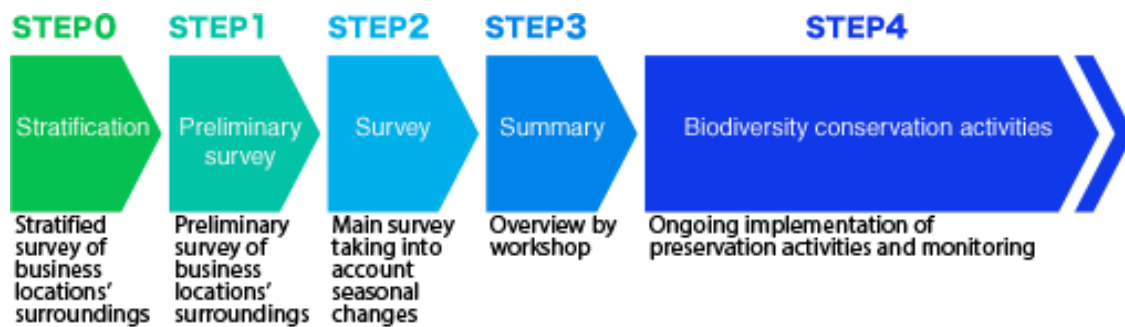
In particular, we select a number of specific living creatures for continual monitoring targets. Through continuing such monitoring throughout the year, we assess the impact of our business activities, determine which organisms require conservation practice and conduct such conservation activities, and disclose the findings.

As part of water quality surveys, we measure the water temperature, electrical conductivity, pH, etc. For the monitoring of living organisms, we conduct bird-watching, vegetation survey, insect and also observe aquatic organisms.

	Business location	Location	Water quality*	Aquatic life	Vegetation	Wild birds	Insect	Other
In Japan	Mie Plant	Within premises	○	○	○	○	○	
		Outside premises	○	○	○	○	○	Loggerhead turtle
	Mishima Plant	Outside premises	○	○		○		
	Shinshiro Plant	Within premises	○	○		○		Increasing <i>Semisulcospira libertina</i>
		Outside premises	○	○				Amphibians
	Onomichi Plant	Within premises			○	○	○	
		Outside premises	○	○	○	○		
	Hiratsuka Factory	Within premises	○	○	○	○	○	
		Outside premises	○	○	○	○	○	
	Ibaraki Plant	Within premises	○		○	○	○	Creating an environment for Grey-faced buzzard (Amphibians, Reptiles)
		Outside premises	○	○	○	○		
	Nagano Plant	Outside premises	○	○	○	○		
	Yokohama Tire Retread Hokkaido Plant	Outside premises	○	○	○	○	○	
	Yokohama Tire Retread Nagoya Plant	Outside premises	○	○	○	○	○	Biotope
Yokohama Tire Retread Onomichi Plant	Outside premises	○	○	○	○	○		
Yokohama Mold	Outside premises	○	○	○	○			

Overseas	YTMT (Thailand)	Within premises	○			○	○		
	YTRC (Thailand)	Within premises	○	○		○			
	Y-CH (China)	Outside premises						Laojunshan Project	
	CHZY (China)	Within premises				○	○	○	
		Outside premises	○	○		○	○	○	
	CSZY (China)	Within premises				○	○	○	
	YTPI (Philippines)	Within premises				○	○	○	
		Outside premises				○	○	○	Watershed conservation
YTMV (United States)	Within premises				○	○		Mammals	
YTVI (Vietnam)	Outside premises				○				

※Presence or absence of biodiversity activities



## Yokohama Forever Forest Program

A cumulative total of 699,000 trees had been planted in the Program by the end of 2022. The Total number of saplings to had been planted and provided in the program reached 1,198,000. This marked an 92% achievement rate for the target of planting and providing 1.3 million trees by 2030. In order to assess the growth and environmental impact of our Forever Forests, we conduct surveys on the tree growth (measurement of tree heights and chest-height diameters) and wild birds observed within plant premises. From the result of surveys on the growth amount of saplings, we have calculated the amount of carbon dioxide absorbed and fixed by all the trees planted in the Forever Forest Program. We estimated found that the entire our Forever Forests had absorbed 1,649 tons of CO<sub>2</sub> by the end of 2022.

In wild bird surveys at the Hiratsuka Factory, 61 species of wild birds have been observed on the plant premises to date. From In the third year of our tree planting initiative, we began to see *Turdus chrysolaus* (red-bellied thrushes) that have a preference for forests. We believe this reflects how the Forever Forest is functioning as it should as a forest for wild birds. We also observed *Phylloscopus coronatus* (eastern crowned warblers) and *Acrocephalus orientalis* (oriental great reed warblers), which are normally seen near bodies of water) were observed, which seems to show that our Forever Forest is serving also as a stopping point for migrating wild birds during their travel. Furthermore, it has been observed that the forest is used by *Zosterops japonicus* (warbling white-eyes) and other various wild birds to build nests and raise their children, suggesting that the forest contributes to the breeding of wild birds as well.



From April 2023, we have resumed the participation of "Komatan", a group with a high specialty in birding and watch birds together.

## Review of FY 2022 Activities

### Various initiatives underway to make natural rubber a sustainable resource

Yokohama Rubber announced the "Sustainable Natural Rubber Procurement Policy" in October 2018, which is an undertaking to make natural rubber a sustainable resource. We also joined the international platform Global Platform for Sustainable Natural Rubber (GPSNR) as a founding member and began taking action as part of the platform. Furthermore, we revised our procurement policy in September 2021 to incorporate GPSNR's policy framework into our procurement policy, clarifying our intention to achieve the sustainability of natural rubber at a higher level. In 2019, Yokohama Rubber started a survey on rubber farms in the Surat Thani province of Thailand, visiting 437 farms by the end of December 2022. So far, we have not found any human rights violations or illegal deforestation; however, through the survey, we have learned about problems faced by farmers and issues we need to work on. We continued the survey and reached our target of covering 500 households by the end of February 2023. Not only the information we have gained through the survey, but also the communication and partnership we have developed with the local farmers through the survey activities have proved to be highly valuable. We are planning to continue these survey activities on an ongoing basis.

In January 2020, Yokohama rubber signed a Memorandum of Understanding (MOU) with the Rubber Authority of Thailand (RAOT) to collaboratively support the management of natural rubber farmers and improve traceability in order to ensure the transparency and soundness of the supply chain.

Under the MOU, seminar events for natural rubber farmers have been held since December 2020. To date, five such events have been held, attended by a total of 250 farmers, and a total of 75 tons of fertilizer utilizing RAOT's findings has been provided free of charge.



## Communication with communities

The biodiversity panel discussion held as one of the programs presented in the open-house event "Think Eco Hiratsuka" held by the Hiratsuka Factory has been presented on-line since 2020. In March 2023, Dr. Shinichi Takagawa, General Manager of the OEMC Task Force Office of the Nature Conservation Society of Japan delivered a keynote lecture under the theme of "Our Conservation Activities to Contribute to Global Goals: Making Use of OEMC," which was followed by the introduction of the activities by our Ibaraki Plant aiming at becoming a plant that can serve as a habitat for *Butastur indicus* (grey-faced buzzard), where participants enjoyed deep-dive discussions into the topics. The event was attended by many people including our employees from production sites of both Yokohama Rubber and its Group companies, people from relevant administrative organizations, local residents and people from environmental non-profit organization.

## Employee education

We are working on biodiversity conservation through our business activities, and in order to ensure that all employees are aware of the blessings of biodiversity and act accordingly, we are working to spread awareness of biodiversity among employees through human resources development. One of the mandatory training courses for young employees covers biodiversity. In FY2022, it was conducted online due to the COVID-19 pandemic.

# Introduction of Initiatives

## Hiratsuka Factory

Since FY2013, the Hiratsuka Factory has been engaged in biodiversity conservation activities aimed at protecting the water resources of the Kaname River system that flows through the region. Our employees have participated in hands-on monitoring activities conducted in the lower reach of the Kaname River, in which a total of 346 employees took part. In conjunction with the monitoring, we carried out activities of uprooting alien plants, such as *Ambrosia trifida* (giant ragweeds), *Sicyos angulatus* (burr cucumbers), etc. As a result of the activities, we could decrease non-native plants; however, there arose an issue over the effectiveness of the conservation activities, that is, we could not clearly answer the question of "whether the decrease in alien plants actually led to the protection of biodiversity." As the result of the reviews, we determined to suspend the conservation activities in the lower reach of the Kaname River.

Currently, we are continuing activities in a satoyama area in a city located upstream of the Kaname River. Specifically, we have been engaged in conservation activities, including the installation of handmade biotopes in croplands in valleys and the regeneration of abandoned cedar forests in valleys since 2015 with the aim of water source cultivation of the Kaname River and restoring the original landscape of the satoyama. We have also started to collaborate with people from the local university to conduct a survey on changes in the brightness level caused by the thinning of cedar trees. We zoned the area in the valleys with this environment into several plots, and decided on target species, the content of activities, and the target image, so that we can understand the effects and goals of the activities. Due to the COVID-19 pandemic and a number of other reasons, we suspended the activity during FY2022.

Responding to a call from the Kaname River Basin System Network, we have engaged in river cleaning with the local government and groups in March every year. Due to the COVID-19 pandemic and a number of other reasons, we suspended the activity during FY2022.



Forest floor change in cedar forest and seedlings of deciduous tree



Trail camera set up in the forest



A Japanese raccoon appeared in the survey area

In May 2017, we manually made a “dragonfly pond” within the premises, and began activities allowing us to feel a close connection to living creatures through observing dragonflies, butterflies, frogs etc. gathering at the pond.

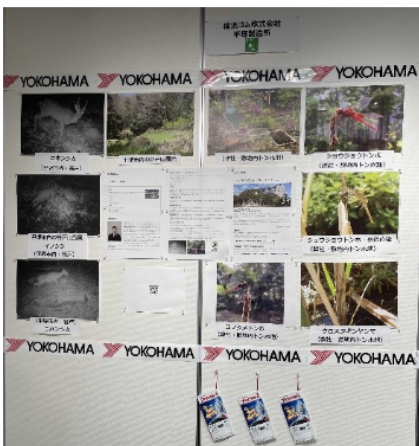
In March 2017, the Hiratsuka Factory obtained the "Association for Business Innovation in Harmony with Nature and Community® (ABINC) certification" as a factory showing consideration for biodiversity. The factory was acknowledged for their activities to conserve biological diversity and ongoing surveys on the amount of CO<sub>2</sub> absorbed and fixed by the growing trees of the Forever Forest planted in and around the business site in 2007. The factory still keeps having the certification updated.



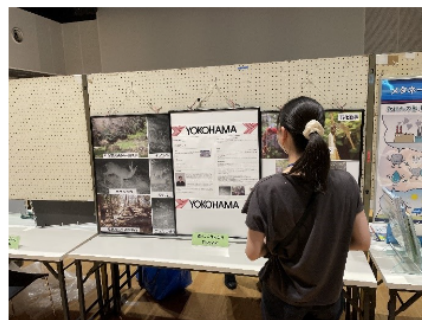
ABINC certification

We also have joined the "Hiratsuka Biodiversity Promotion Council," a biodiversity initiative promoted by Hiratsuka City, expanding activities for ecosystem conservation in Hiratsuka.

In addition, we display panels at "Sagami Nature Forum" hosted by the Nature Conservation Society of Kanagawa in February every year. At the "Hiratsuka Environmental Fair" hosted by Hiratsuka City every July, we show images from our biodiversity activities around the Hiratsuka Factory.



Sagami Nature Forum



Hiratsuka Environmental Fair

## Mie Plant

Biodiversity conservation activities have been continuously carried out by the following three teams:

- Black Team: Conducting surveys on water quality and aquatic organisms such as *Oryzias latipes* (Japanese ricefish) in the rivers (Hinokijiri River and Hotosu River) into which drainage water is discharged from the plant
- Noppo Team: Removing invasive alien species and measuring the number of native plants, and conducting surveys on *Caretta caretta* (loggerhead sea turtles) laying eggs on the coast (Ominato Coast) to which the water of the rivers flow down
- Chibikko Team: Creating a biotope in and around the plant's rainwater regulation pond, conducting surveys on water quality, and living creatures such as dragonflies, and aquatic organisms

After Ise Municipal Minato Elementary School was opened, we resumed on-dispatch classes in 2021. We presented a picture-story show to explain the meaning of tree planting and hosting an event to remove the invasive species of *Oenothera laciniata* (cutleaf evening primroses), and conducted beach cleanup activities with children responding to a request from the school.

Due to the COVID-19 pandemic, we could not organize tree-planting and biodiversity conservation activities that we have been implementing every year; however, we restarted to provide environmental educational programs by inviting elementary students to the factory in 2023.

In March 2022, our Mie Plant obtained the "Association for Business Innovation in Harmony with Nature and Community® certification (ABINC certification)" as a factory showing consideration for biodiversity.



Aquatic life survey at Hinokijiri River



Root cutting of alien plants and coastal cleaning on the Ominato coast



Biotope restoration activities for biodiversity conservation activities inviting elementary school students

## Mishima Plant

The Mishima Plant is blessed with abundant water resources, with an agricultural waterway using springwater from Shirataki Park in front of Mishima Station running on the east side of the factory and the Goten River, a first-class river, into which drainage water is discharged from the factory, flowing on the west side. Working in three teams nicknamed "Loaches", "Soft-shell Turtles" and "Eels", factory employees conduct surveys on the water quality of Goten River and organisms living and around the river since 2013.

The Goten River serves as a nesting place for insects such as dragonfly larvae of *Macromia amphigena* (koyama dragonflies) and *Calopteryx atrata* (haguro dragonflies), fish such as *Opsariichthys platypus* (freshwater minnows), *Nipponocypris temminckii* (dark chubs) and Amur catfish, and reptiles such as *Pelodiscus sinensis* (soft-shell turtles) and *Trachemys scripta elegans* (red-eared turtles). As a rare case for a factory surrounded by residential buildings, the Mishima factory serves as a nesting place for *Alcedo atthis* (common kingfishers), the symbol bird of Mishima City. However, since we found a lot of garbage dumped into the river, we have been cleaning the river after monitoring in order to contribute even in small ways to keeping the Goten River clean and beautiful. In May 2019, the Numazu Civil Engineering Office of Shizuoka Prefecture, the Mishima city government and our Mishima Plant signed a "River Friendship Agreement," and since then, we have been collaboratively engaged in river improvement work with people from the Numazu Civil Engineering Office using the "stream barbs construction method." As a result of the continuous activities, we were able to confirm that creatures that had almost disappeared after river dredging began to return again.

We also found *Ranunculus nipponicus* var. *japonicus* (Japanese water-crowfoots) and *Psilotum nudum* (whisk ferns), which are on Shizuoka Prefecture's Red List of Vulnerable Creatures and were not used to be seen in the downstream side from the plant in the Goten River. In the future, we would like to invite local residents to join these activities. Dealing with an increase in natural disasters and heavy rainfalls, we have been continuing the activities to the extent possible.



Construction of "barbed construction" in collaboration with river jurisdiction



Team activities



Catfish, soft-shelled turtles, and red-eared slider turtles observed plant drainage outlet



The endangered species II species, *Ranunculus nipponicus* var. *japonicus*, *Psilotum nudum* discovered downstream of plant drainage outlet

## Shinshiro Plant

FY2022: The Shinshiro Plant conducted biodiversity conservation activities as part of the factory's risk management work. The activities included surveys on the water quality of the Noda River and the Kuroda River, which have a direct impact on the local environment, and monitoring of creatures. We also conducted conservation activities at Yotsuya senmaida (terraced rice paddies in Yotsuya) serving as one of the water source areas of the Toyokawa River for water source cultivation as an activity to contribute to conserving the local environment. A total of 75 people in three teams working at three areas, Yotsuya senmaida, the Noda River and the Kuroda River, and the factory biotope, to advance conservation activities suitable to the local ecosystem.

As the impact from the COVID-19 pandemic finally subsided, we gradually increased the number of participants, and started the Nodagawa Firefly Project, a new activity to conduct in collaboration with local people, in addition to regular activities, such as surveys on water quality and monitoring of creatures.

In addition to creating a waterside biotope and integrally developing a woodland and grassy areas within the plant premises, we have worked on the creation of a "Forever Forest" and engaged in monitoring activities in collaboration with local people, neighboring companies and groups. In February 2022, the Shinshiro Plant, in recognition of these efforts, obtained the Association for Business Innovation in Harmony with Nature and Community® certification (ABINC certification). In November of the same year, the Shinshiro Plant also obtained the blue-chip company certification of the "Aichi Biodiversity Company Certification Program", which was established by Aichi Prefecture to certify companies making excellent efforts for the conservation of biodiversity.



Aichi Biodiversity Company Certification

<Water source area in Yotsuya senmaida, Shinshiro City>

This area has been served a water source for the industrial cooling water. We worked to secure a habitat for biological communities, help maintain clear streams and near threatened species, protect and restore water-related ecosystems, and support a desirable ecological habitat in the senmaida.



Conservation activities at Yotsuya Senmaida



Monitoring of creatures and *Cynops pyrrhogaster* (Japanese fire belly newt)

<Noda River and Kuroda River: Water quality and aquatic life monitoring survey>

We confirmed that drainage water discharged from the Shinshiro Plant and Shinshiro-Minami Plant does not adversely affect water quality and aquatic life in the local rivers, and carried out activities to maintain and sustain this status.



Monitoring of living creatures in the Noda River, and identified *Eriocheir japonica* (Japanese Mitten crab), shrimps living in fresh water and *Nipponocypris temminckii*



Water quality and aquatic life monitoring survey in the Kuroda River

### <Biotope in the plant>

The Shinshiro Plant takes cooling water used in the plant from the nearby Noda River and discharge used water into the Noda River. Since 2010, we have been observing living creatures at the biotope in order to demonstrate that it is possible to create an environment where living creatures can live even with plant effluent by introducing effluent water to the biotope inside the plant. We also conduct maintenance and restoration work around the biotope every year.



Dragonfly larva and Near-threatened *Rana ornativentris* discovered in the factory biotope



Biotope restoration

### <Nodagawa Firefly Project>

Responding to residents in the neighborhood saying there used to be a lot of fireflies in the past, we launched a five-year plan called "Nodagawa Firefly Project" aiming at the returning of fireflies as one of the pillars for the environmental conservation of the Noda River used by the plant for water intake and water discharge.



Collaborative aquatic life survey with fourth graders



Releasing *Semisulcospira libertina* that serves as food for firefly larvae



Cabbage farm for fireflies



Uprooting of alien plants on plant premises



Pulled out tall goldenrod

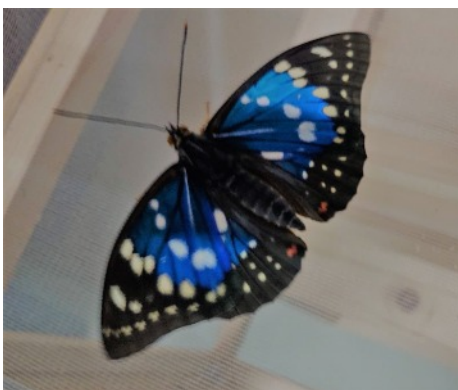
15 employees from the Shinshiro Plant supported and participated in a bus tour to experience tree-planting for transforming areas cleared of cedar and cypress trees into satoyama (village forest) organized by the Shinshiro Shitara Ecosystem Network Council. We provided a total of 490 saplings of deciduous broad-leaved trees, including *Quercus variabilis* (oriental oak), *Quercus serrata* (konara oak), *Cerasus jamasakura* (yamazakura cherry), which are local native tree species, and helped the participants with tree planting.



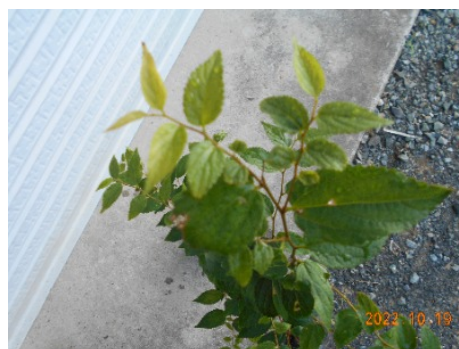
Tree planting experience bus tour (Misono, Toei-cho, Kitashitara-gun, Aichi Prefecture)



Since in the Misono district, *Sasakia charonda* (great purple emperor butterflies), Japan's national butterflies, has been observed, we plant locally collected *Celtis sinensis* (Chinese hackberry) to feed larvae to protect and breed the butterflies. We also collaborate with the local NPO Misono Yume Mura Okoshitai to grow and plant a lot of saplings of *Celtis biondii* *Pamp*, that is listed in the Endangered species (EN) of Aichi Prefecture, to protect and preserve this precious species.



Giant purple emperor butterfly found in Misono district



Aichi prefecture endangered species *Celtis biondii* *Pamp*



## Onomichi Plant

At the Onomichi Plant, we began conservation activities in 2013 at the Fujii River Water Park, a park by the river on the east side of the plant that runs into the part of the Seto Inland Sea, and the plant premises. In the Fujii River Water Park, we survey water quality of the river and also aquatic creatures, birds, and vegetation in and around the river. We also observe wild birds and insects within the plant premises.

In the surveys of aquatic life in the Fujii River, we found aquatic insects such as *Ephemera strigata* (a species of green drakes), *Mnais costalis* (broad-winged damselflies) and *Asiagomphus melaenops* (yamasanae dragonflies), and fish such as *Gnathopogon elongatus* (tamoroko), *Odontobutis obscura* (dark sleepers) and *Rhinogobius nagoyae*, and crustaceans such as *Eriocheir japonicus* (Japanese mitten crabs) and *Palaemon paucidens* (lake prawns); however, due to the COVID-19 pandemic, we conducted only bird-watching and river-cleanup activities in 2022.

Within the plant premises, the Forever Forest grove formation, along with bushes, grasslands, rain-fed ponds and wetlands led to providing a variety of environments for living creatures, constituting an inhabiting environment for dragonflies, butterflies, crickets and grasshoppers. It was also found that the factory site contributes to the nesting of *Alauda arvensis* (skylarks), the formation of territories of *Lanius bucephalus* (bull-headed shrikes) and *Phoenicurus aureus* (Daurian redstart), and the wintering of *Horornis diphone* (Japanese bush warblers). We conduct these activities three times a year in collaboration with our consultants and people from the Wild Bird Society of Japan Hiroshima Branch.

The "Fujii River Evening," which was to be held in June 2022, was canceled due to the COVID-19 pandemic; however, at the Children's Environmental Festival held in August 2022 at the Onomichi City Environmental Resource and Recycling Center, we exhibited panels showing our conservation activities at the Fujii River, fixed-point observation, and other biodiversity activities by Onomichi Plant employees. In addition, in June 2023, we held the "Fujii River Evening" for the first time in four years, we exhibited materials about our conservation efforts and fixed-point observation, and offered saplings for free.



Bird watching at the plant



White-eye (observed within the factory premises)



Bird watching at Fujii River Water Park



Fujii River Evening (held in June 2023)

## Nagano Plant

The Nagano Plant is located at 805,5m above sea level, in an area that is abundant in nature compared to other Yokohama Rubber plants. As there is almost no effluent other than rainwater drainage, we think the environmental impact of this plant is much lower than that of our other sites.

Since the Nagano Plant is located on a river terrace of the Tenryu River, we started biodiversity conservation activities in the plant's rainwater regulation pond in 2021 with the aim of restoring the back-marsh ecosystem of the Tenryu River within the plant premises. To this end, we have decided to exterminate invasive *Solidago altissima* (tall goldenrods) and *Solanum carolinense* (Carolina horsenettle) found in the monitoring activities, and each section is in charge of carrying out this activity every year from June to September.

We also conduct monitoring of living creatures, exterminate invasive alien species, and carry out cleanup activities at the irrigation canal on the south side of the plant where rainwater is discharged.



Uprooting activities for alien plants carried out by each section

We also changed a location for surveys of aquatic life from the junction with the Tenryu River, where we used to conduct surveys, to the drain channel on the south side of the plant, and restated surveys in 2023. In the surveys of the drain channel, domestic species such as *Opsariichthys platypus* (freshwater minnows), *Pseudogobio esocinus* (Japanese gudgeons), *Nipponocypris temminckii* (dark chubs), and *Paratya compressa* (freshwater shrimps), as well as alien species such as *Procambarus clarkii* (red swamp crayfish) were observed. We conduct surveys four times from April to October.



Aquatic life research activities where many native species were observed

We carried out lower branch pruning work for trees planted as part of our Yokohama Forever Forest Program at the Takamori Factory (current Takamori Warehouse) in 2010 and bamboo forest maintenance work in the adjacent land plot. As an effort to prevent the invasion of bamboos into the forest, we carried out bamboo shoot harvesting (Bamboo Shooting Festa), and share harvested bamboo shootings with employees, and they enjoyed delicious dishes featuring bamboo shootings at home.



Lower branch maintenance work carried out in the Forever Forest at Takamori Warehouse



Bamboo shoots and bamboo shoot dishes that coexist with the Forever Forest



In accordance with the "Forest Foster Parent Promotion Project" promoted by Nagano Prefecture, we have signed a "Forest Foster Parent Agreement" with Toyooka Village to cooperate in the maintenance of the village forest in Toyooka Village, and restarted satoyama maintenance work in June 2022. We cleared undergrowth and pruned lower branches for the conservation of the satoyama.



Members who carried out satoyama maintenance and the maintenance scene



## Ibaraki Plant

Since 2013, our Ibaraki Plant has conducted surveys on water quality, vegetation, aquatic life and birds at the Sonobe River to which the plant discharges effluent. Since water from the Sonobe River is used as agricultural water, we pay careful attention to its quality. Since the water coming out from drainage outlet for plant effluent has lower conductivity and higher transparency than those of the water in the Sonobe River, it is believed that plant effluent is adequately managed. A fish tank is also placed at the entrance of the plant, where we are keeping fish caught in the Sonobe River by using the plant effluent.

We started surveying birds within the plant premises in 2015, and have been continuing our survey activities. Starting in 2019, we have newly organized the project "Survey on the Living Environment of *Butastur indicus* (grey-faced buzzards)" to survey the vegetation and small animals (amphibians and reptiles) in the plant, focusing on grey-faced buzzards, which are registered as a near threatened species in Ibaraki Prefecture, as one of the indicators for environmental conservation. In 2020, we installed a perch for grey-faced buzzards in the plant, and confirmed it has been seen being used by those birds several times. We have also watched them flying over the plant.



Grey-faced Buzzard using a perch installed on the factory premises

These activities have been carried out under the guidance of the Wild Bird Society of Japan Ibaraki Branch and the Omitama Wildlife Association.



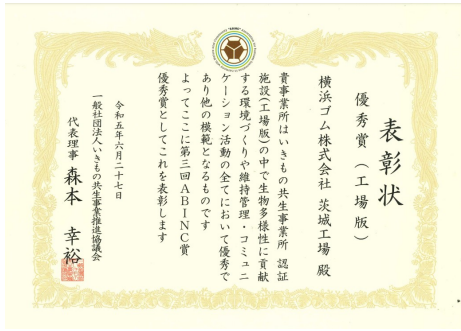
Wild bird observation within the factory premises



Small animal survey on the factory premises (survey on the growth environment of Grey-faced Buzzard)



In recognition of these activities, the Ibaraki Plant obtained the ABINC Excellence Award of the "Association for Business Innovation in Harmony with Nature and Community® (ABINC)" certification in April 2023.



ABINC Award for Excellence Award (Certificate)

We will continue in cooperation with people from many quarters.

## Yokohama Tire Retread Co., Ltd. Hokkaido Plant (YTRH)

YTRH is located adjacent to Lake Utonai, an internationally famous stopover for many migratory birds, which is located in the eastern part of Tomakomai City, in the central southern part of Hokkaido. YTRH is the only factory among the Yokohama Group that is built in such a nature-rich environment.

To preserve this precious place, we started with the "understanding of Lake Utonai." We started learning about the origins of Lake Utonai, how the first sanctuary of Japan was established, the actual status of conservation activities, and what protection activities are required toward the future, with a ranger of the Wild Birds Society of Japan as a lecturer. We have been continuing cleanup activities around Lake Utonai and the Nature Center since 2017.

In 2022, the once-a-decade biological research by the Wild Bird Society of Japan that started 60 years ago was conducted, and YTRH participated in this event. The data obtained in the research is used for the adjustment of the water level of Lake Utonai and the maintenance of the local ecosystem.

### <Events in Tomakomai City>

#### ◆Spring Cleanup Month "Zero Garbage Day" on Sunday, April 17, 2022

All the YTRH members (12 people) conducted an exhaustive cleaning of the area around Lake Utonai Sanctuary. Every year after the snow melts, they conduct this exhaustive cleaning, where a lot of trash and litters are collected. We were sad to find that this year again a lot of trash and litters including waste tires were collected. Although it was still cold, we were happy that the Lake Utonai Sanctuary was now cleaner afterward and ready for the summer. All employees will continue to work together on environmental activities and sanctuary support activities for Lake Utonai, and will also continue to engage in meaningful activities together with their families, people from affiliated companies, and the Wild Bird Society of Japan.

#### ◆Autumn Cleanup Month "Zero Garbage Day" on Sunday, October 16, 2022

All the YTRH members (12 people) conducted an exhaustive cleaning of the area around Lake Utonai Sanctuary. They collected a lot of trash and litters in the fresh autumn air as in the last spring.

#### ◆Removal of the invasive alien *Solidago gigantea* var. *leiophylla* (giant goldenrods) on Friday, July 15, 2021

When this activity started, the fixed-point observation site where we have conducted cleanup operations every year was occupied by *Solidago gigantea*, but after five years have passed, we found the number of local native *Artemisia indica* var. *maximowiczii* (felon herbs) and *Spiraea salicifolia* (brideworts) are growing. Therefore, we started conducting the cleanup operations in another place too. We hope to see more native plants in the new place as well.

◆Lake Utonai Vegetation Survey on Wednesday, August 24, and Thursday, August 25, 2022

Since 1962, the Wild Bird Society of Japan and researchers have taken a lead in conducting vegetation surveys at and around Lake Utonai. They have conducted the survey every 10 years, and this was the 7th survey with the year 2022 marking 60th anniversary. Responding to a request from the Wild Bird Society of Japan for support, two employees of YTRC joined the survey. Since the data obtained from the survey constitutes objective data indicating aridification (reduction in the area of the lake), it will serve as an important data for the long-term conservation of Lake Utonai. We have heard that our data is now being used by the authorities to adjust the water level of Lake Utonai. The survey was a really tough one, in which we bogged to our waists in marsh in an area where normally we are not allowed to enter and waded through bushes, but it still was a very valuable experience.

In Japan, there are 633 species of wild birds, 273 of which have been observed in Lake Utonai, and 30 species threatened with extinction are included in them. Endangered wild birds such as *Bubo blakistoni* (Blakiston's fish owls), *Haliaeetus pelagicus* (Steller's sea eagle) and *Haliaeetus albicilla* (white-tailed sea eagles) have been observed there, and recently, *Grus japonensis* (Japanese cranes) flourishing in the lake have been observed for the first time in 130 years. VTRH will continue, even in the humble ways they can, to work with Wild Bird Society of Japan to contribute to maintaining the ecosystem of Lake Utonai.



Pulling out giant goldenrod(*Solidago gigantea* var. *leiophylla*) around Lake Utonai



Cleanup work around Lake Utonai



## Yokohama Tire Retread Co., Ltd. Saitama Plant (YTRS)

YTRS has been participating in the activities of "Miyoshi Green Support Team" since November 2015. The Miyoshi Green Support Team is working under the slogan of "make our town a nice, pleasant place to live in through the conservation and maintenance of flatland forests and build heart-warming friendship". The activities are conducted on the third Sunday of every month participated by about 20 local residents and people from local companies every time. In the "Fujikubo Flatland Forest," the traditional circulation-based agricultural practice of making compost from fallen leaves that has continued since the Edo era hundreds of years ago still coexists with the natural biodiversity of the forest.

In April 2015, a part of the YTRS biodiversity activity area was designated as the Saitama Green Trust Conservation Area No. 14. The Saitama Green Trust is an initiative to preserve the outstanding natural and historical environment of Saitama Prefecture by converting an area with such environment into a public land through the cooperation with local residents, companies, and organizations in order to preserve the local environment for future generations.

In July 2023, the "Musashino fallen leaf-derived compost farming practice" was recognized as one of the Globally Important Agricultural Heritage Systems by the Food and Agriculture Organization of the United Nations (FAO). The Globally Important Agricultural Heritage System recognizes areas where traditional and globally important farming, forestry, and fishing are practiced. In each of the recognized areas, traditional farming, forestry, or fishing that has been passed down for generations is still being practiced while adapting to changes in society and environment. Local culture, landscapes and seascapes that have been nurtured are closely associated with such practices, along with a rich biodiversity formed by the agricultural organisms.



Making compost from fallen leaves... Many beetle larvae are living in the compost.



Pulling weeds and picking up litter in Satoyama



Picking up fallen leaves

## Yokohama Tire Retread Co., Ltd. Nagoya Plant (YTRN)

In FY2022, while many of our activities were limited or postponed due to the COVID-19 pandemic, we were able to conduct the 7th phase tree planting event of the Forever Forest Program in the area and continued some of the environmental and biodiversity conservation activities. As part of external activities, the Nagoya Plant belongs to the local NPO of Miyoshino City as a regular member, engaging in the restoration of fallow rice fields and continuing activities for the conservation of the precious local ecosystem.

This NPO supported by the environment division and the municipal board of education of Miyoshino City provides opportunities to provide environmental education to local elementary school students, where the public and private sectors can work together. With these activities having been featured in local public relations magazines, we are confident that they are being appreciated and established as a valuable nature experience program for the local people. In 2023, we are planning to hold a commemorative event to celebrate our 10th anniversary, in addition to the rice planting experience event. All employees of Nagoya Plant will actively take part in the event while doing all the preparatory and background work as part of their contribution to the local community.



Regeneration of fallow fields (rice planting)

## Yokohama Tire Manufacturing (Thailand) Co., Ltd. (YTMT)

Yokohama Tire Manufacturing (Thailand) Co., Ltd. (YTMT), a tire plant in Thailand, is located within an industrial park. Because water intake and discharge is centrally managed at industrial parks in Thailand, unlike the plants in Japan, it is not possible to confirm the impact of individual plants on water intake and discharge areas. For this reason, we monitor birds and insects in order to assess the green areas (Forever Forests and biotopes) on plant premises. In order to recreate a rich ecosystem within the plant premises, we are creating two types of biotope—marshes and ponds. We have been carrying out further planting in order to preserve the connection between aquatic and land wildlife. We also secure habitats for local species and conduct environmental education for employees through these activities.

In FY2022, these activities were canceled due to the COVID-19 pandemic. On July 25, 2023, YTMT sent environment officer cooperated with CSR officer of Amata City IEAT for give biodiversity education to student primary 5 of Nikhom9 primary school total 31 persons at school. The student enjoyed our activity and get more knowledge about biodiversity and environmental mind.



On-dispatch classes at Nikhom 9th elementary school





## Y.T. Rubber Co. Ltd. (YTRC)

YTRC is Yokohama Rubber's only natural rubber processing plant, located in Surat Thani Province in southern Thailand. It is built on a flat land nestled between the Tapi River running from about 70km upstream and its branch streams, surrounded by rich nature and a number of natural rubber and palm tree farms.

Although a lot of water is required for washing and transportation in the natural rubber manufacturing process, YTRC has a 100% water recycling system which has been active ever since the plant started operating, thus being a model of effective water use. Sediments from water used in the factory are applied to the ground to make nutrient-rich soil, which works well to create a planting mound or to grow tree saplings. We maintain the quality of factory water at the same level of the water in a nearby river through efficient use of a cleansing basin and also careful water quality checks and improvement.

YTRC has a flood-control basin on its premises where an undisturbed natural environment is maintained. We have been monitoring the fish habitat and water quality in the pond on a monthly basis since November 2014. When the water level rises during the rainy season, the water in the nearby Tapi River often flows into the flood-control basin, where more than 20 species of fish were found to be flourishing in a recent survey. In the forest surrounding this flood-control basin and the area where the trees planted as part of the Forever Forest program are growing, more than 20 species of birds have been observed in the past, and in the evenings, the sound of lively birdsong can be heard from trees. In the forest, there are a lot of palm trees that we carefully maintain by working with people in the community since the plant started operating. These people enjoy collecting the palm fruits and taking them home every month.

In addition to actively taking part in regional events and making donations, we will continue to carry out our activities with a consciousness of ourselves as a "community-minded company." YTRC will continue to maintain the environment surrounding flood-control basin and trees in cooperation with people in the community, and carry out our activities as a "community-contributing company" appreciated by the local people,



Biodiversity survey activities at buffer ponds



Fish catching research activities using cast nets



Bird habitat survey activities



Release of 30,000 fry provided by the Thai Department of Fisheries into the reservoir

## Hangzhou Yokohama Tire Co., Ltd. (CHZY)

CHZY is located in an industrial park near the Qiantang River running through the Qiantang district in Hangzhou, China. Although the industrial park has green belt areas, they consist of a limited number of tree species and are not very rich in biodiversity. CHZY has been engaged in our Yokohama Forever Forest Program since 2008. To date, about 24,000 trees have been planted in an area of about 5,000m<sup>2</sup> on and around the plant premises. With a view to making CHZY's Forever Forest a home to woodland plants and animals, our employees have been conducting assessment of the Forever Forest and surveys on living creatures there with teachers and students from the local Hangzhou Normal University. In order to create a superior ecological environment, we conduct activities for the removal of non-native invasive species in the marshy area along the river in the Qiantang district every year in collaboration with the local government and the environment conservation society, protecting the local biodiversity.

As part of the government's environmental protection program, CHZY has been entrusted with the management of a plot of land (area: approximately 2,000m<sup>2</sup>) in the vicinity of the CHZY site as a "Yokohama Preservation Forest." Since 2013, we have conducted tree-planting activities on Arbor Day in March every year. Even though we were not able to carry out tree planting due to the COVID-19 pandemic in FY2021, we have planted a total of 150 trees to date.



Exterminating goldenrod and picking up trash along the river near the factory



## Yokohama Tire Philippines, Inc. (YTPI)

YTPI, located within the Clark Special Economic Zone in Pampanga, Republic of the Philippines, has been actively fostering the conservation of biodiversity and the environmental through a series of initiatives engaging its employees and

neighboring communities. These efforts comprise ongoing activities like wildlife surveys, tree planting and provision of saplings and support for various undertakings such as the Green Space Program.

During the celebration of the Environment Month, YTPI held a tree planting activity on its grounds with the participation of the Top Officers headed by president Atsushi Funayama and the YTPI employees volunteers. A total of 26 Ilang-ilang seedlings were planted during the activity.



Tree planting activities at YTPI

Additionally, 100 pieces of various seedlings were donated to the Municipal Environment and Natural Resources Office (MENRO) in Bacolor City, Pampanga, in June 14th, 2023, to support their activity. This act of donation aims to support local environmental initiatives and promote greening efforts within the community.



Donation of saplings to Bacolor City Department of Environment and Natural Resources

In 2021, YTPI launched its "Green Space" Program. Through the Green spaces initiatives employees are encouraged to cultivate vegetables in designated open areas within the company premises, aiming to enhance food sustainability, raise awareness about nutritious eating habits, boost biodiversity by increasing plant species, and promote an environmentally friendly lifestyle to achieve carbon neutrality.

As to this date, several departments have embraced this initiative, successfully cultivating, and distributing their harvests. They also expanded from vegetable and fruit crops to flower-bearing plants like sunflowers. Moreover, the program has evolved into "Gulay ay Buhay sa YTPI," extending its reach by adopting school vegetable gardens, providing necessary supplies, and organizing the harvest for cafeteria concessions as a source of fresh vegetables.

To date, YTPI has partnered to four schools namely around the community – San Joaquin Elementary School (SJES), Mauaque Resettlement High school (MRHS), Mauaque Resettlement Elementary School (MRES), and San Vincent and Elementary School (SVES). The program intends to include more schools in the future to further enhance community partnership.



Harvesting from green space



Through expanding the green spaces initiatives and sustaining YTPi's forever forest, diverse species of insects, arachnids, reptiles, and birds were seen during monitoring thereby concluding a sustainable complex and healthy ecosystem despite YTPi's forest size. For the first half of 2023, YTPi was observed to be home for a total of 22 species of wildlife.



Observed *Heliconius sara* (Sara Longwing, left) and *Crioceris duodecimpunctata* (Asparagus beetle, right)



By engaging in these initiatives, YTPi aims to decrease its carbon footprint, thus contributing to the mitigation of global warming and climate change. Simultaneously, the company seeks to assist neighboring communities with their environmental challenges and needs. The hope is that these activities will create awareness about the significance of affected ecosystems and encourage the community to actively participate in conservation efforts.

## Yokohama Tire Manufacturing Virginia (YTMV)

YTMV is located at the foot of the Appalachian Mountains of Virginia in the eastern United States. The area offers a vibrant natural environment where people can enjoy four distinct seasons like in Japan. The growth of trees in the Forever Forest planted on the YTMV premise has provided a natural habitat for a large variety of wildlife and wild fowl. YTMV is carrying out activities to balance the conservation of this natural environment and the company's production activities.

Since 2015, YTMV has set up nest boxes to protect breeding *Sialia sialis* (Eastern bluebirds), and since then, all employees watch over the baby birds as they grow.



Nest for Eastern bluebird



Bluebird chick in the nest box



Eastern bluebird

Also, within the premises of YTMV, a small group of *Odocoileus virginianus* (white-tailed deers) lives. These mammals play a significant role within our gates through vegetation management as well as seed dispersal and plant diversity. These animals also serve as a viewing enjoyment to our employees.



White-tailed deer grazing on the factory grounds



## Suzhou Yokohama Tire Co., Ltd (CSZY)

CSZY is located in Yangtze Delta of Suzhou City, Jiangsu Province, China. Yangtze Delta is abundant in water resources with many lakes and rivers including Lake Tai, covering 36% of Suzhou's area. This area is also characterized by mild climate, ample rainfall and plenty of sunshine. CSZY launched Forever Forest activities in 2012, and biodiversity activities in 2016, and has observed changes of birds, insects and plants within the plant premises.

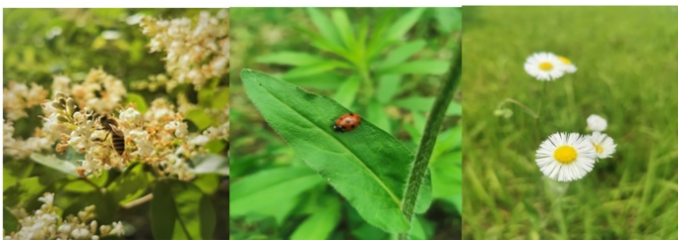
On May 27 2022, 23 new employees conducted a survey on biodiversity within the factory. On May 27 2023, CSZY also held its 15th biodiversity survey activity event jointly with the New District Ecological Environment Bureau and the New District Environmental Protection Council. Children and students from neighboring kindergartens, elementary schools and junior high schools and their parents and teachers joined the events with CSZY employees and helped with the survey activities. In the survey, participants counted the number of insects, plants and birds within the premises to understand how they live, and measures the growing conditions of trees in the CSZY's Forever Forest. The survey also revealed that the number of egrets has increased. The event helped the local residents to understand what CSZY is doing to protect indigenous creatures

and conserve the local environment. Biodiversity survey activities enable us to understand the status of the biological environment within the plant premises, and also help to preserve the local ecosystem and harmonize with the local community while conducting business activities at the plant.

In the CSZY activities, they have observed birds such as sparrows and egrets, plants such as *Triadica sebiferum* (Chinese tallow trees), *Malus halliana* (hall's crabapples), *Ligustrum obtusifolium* (border privets), *Taraxacum* (dandelions), *Ipomoea nil* (morning glories), and *Bellis perennis* (common daisies), insects such as Apis (honey bees) and butterflies, and earthworms. At the same time with observing these creatures, they also collect tree seed nuts to grow saplings for our Forever Forest Program. At the survey event, in addition to observing the living creatures, the CSZY teams confirmed the healthy growth of their Forever Forest, which gave them a valuable opportunity to deepen their understanding of how its growth is positively impacting the local ecosystem.



Participants in biodiversity activities



Students from Yangshan Center Elementary School, Jinyu Xincheng Experimental Elementary School, and Huqiu Practice Center Elementary School observing living creatures

## Yokohama Tyre Vietnam Inc. (YTVI)

YTVI started an internal tree-planting project in 2018 jointly with the Southern Institute of Ecology (SIE) at Lo Go-Xa Mat (LGXM) National Park, leveraging the knowledge and skills they have obtained through the Forever Forest activities within the plant premises. YTVI has planted 500 trees of seven different indigenous species on about one hectare of land. It has been confirmed that the planted trees have formed a canopy over the three years and that the number of animal species living in the forest has increased every year (from 2018 to 2021). Over the past four years, a total of 68 employees, from YTVI's executives to new hires, have worked to protect and survey the trees planted on the premises. In June 2022, a closing ceremony of the biodiversity conservation activities in LGXM National Park was held with jointly with our key partner

## Yokohama Tyre Vietnam Inc. (YTVI)

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Closing remarks by YTVI President Yasuhiro Kurokawa



Group photo of project members in the forest



Organisms captured during the nighttime survey (gecko: scientific name *Dixonius siamensis*, spider: scientific name unconfirmed)



## Future challenges

Currently, the loss of Biodiversity is recognized as serious an environmental risk as that of climate changes. In particular, we recognize that it is important to take initiatives and disclose information in accordance with the targets goals and approaches that are being getting identified in the process of adopting formulating the Kunming-Montreal Global Biodiversity Framework (GBF) and the Taskforce on Nature-related Financial Disclosures (TNFD).

In order to make meaningful efforts in line with the discussions within these frameworks and the wider penetration of their concept across the world, we will define our priority biodiversity commitments as part of the overall business activities of the Yokohama Rubber Group, and promote activities to pursue these commitments and actively share information to deepen the understanding of our employees and stakeholders.

# Effluent and waste

## KPI

Item	FY 2021 results	FY 2022 results
Waste Disposal	51,884 ton	48,865 ton
Achievement of total zero-emissions	Landfill rate 1.63% Percentage of bases achieving target 84.40%	Landfill rate 1.93% Percentage of bases achieving target 82.93%
Water quality and total wastewater emissions by type of discharge	Surface water 4,838,000 m <sup>3</sup> Groundwater 0.0 m <sup>3</sup> Sewerage 1,226,000 m <sup>3</sup> Others 398,000 m <sup>3</sup>	Surface water 4,763,000 m <sup>3</sup> Groundwater 0.0 m <sup>3</sup> Sewerage 1,170,000 m <sup>3</sup> Others 364,000 m <sup>3</sup>
Total number of serious leaks and amount of wastewater leaked	None	None
Number of incidents of non-compliance with water quality/quantity permits, standards and regulations	None	None
Total quantity of hazardous waste transported, imported or processed, and percentage of waste that was transported internationally	NA	NA
Waterways and connected habitats affected by wastewater discharge — locations, size, conservation status, and value of biodiversity	NA	NA

## Responsible Departments

Each business location

## Our position and Targets

### Why is “Effluents and Waste” a critical issue to be addressed?

#### Explanation of the reason and background

We believe that minimizing the impact of our business activities in Japan and overseas on the environment will lead to sustainable operations. Accordingly, we believe that it is important for effluents and waste to be minimized as much as possible in a form with a low environmental impact.



## Vision (attainment goal) / target

Mid-term targets are set for water use in Japan and overseas.

Based on these targets, and after confirming water risks and the status of wastewater, we will improve recycled water use and ultimately aim for a closed system.

We will work to achieve a reduction of 1% in waste materials per unit of waste, and aim for the attainment and maintenance of 100% recycling\*<sup>1</sup>. We will then aim to achieve total zero-emissions\*<sup>2</sup> at all our production bases.

Specially managed industrial wastes such as PCB, asbestos, chlorofluorocarbons, and mercury, etc., will be appropriately processed in accordance with relevant laws and regulations.

※1 100% recycling: Achieve zero final disposal (= direct landfilled amount + incineration disposal amount resulting in ineffective use)

※2 Total zero-emissions: Make the direct landfilled amount zero.

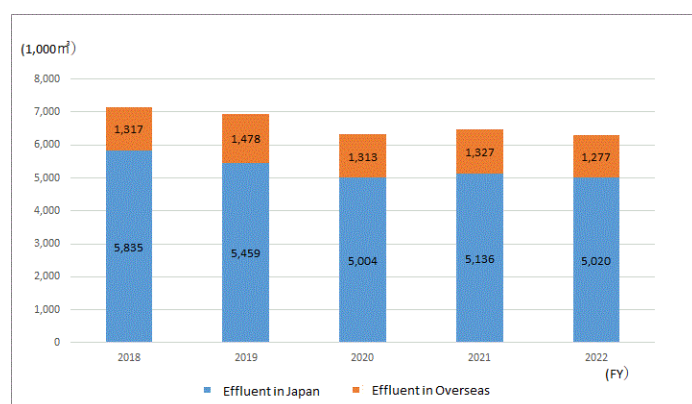
## Measures for vision achievement

- We will introduce water recycling facilities, increase recycled water use, and reduce the volume of water discharge.
- Even in the case of business locations that are legally entitled to have waste disposed of in landfill sites, we will look for and select industrial waste disposal contractors that do not conduct landfilling, and contract with them to undertake recycling processing.
- The processing of PCB-containing devices will be conducted within the deadline specified by law.

## Review of FY 2022 Activities

At overseas production bases in areas with high water risks (Thailand and India), closed systems have been introduced at the time of plant construction, and there is minimal water uptake and no water discharge.

The table below shows the volume of water discharged.



Overseas production increased, but the effluent discharge amounted to 6,298 thousand m<sup>3</sup> (down 2.63% from the previous year). Effluent in Japan decreased 2.3% from the previous year, as leakage countermeasures also continued.

## Non-compliance with water quality/quantity permits, standards, and regulations

	FY 2021	FY 2022
Number of non-compliance incidents	0	0
Penalties (financials and/or operational)	None	None
Fines	None	None
Guidance/Enforcement orders	None	None

## Waste volume of domestic and overseas groups

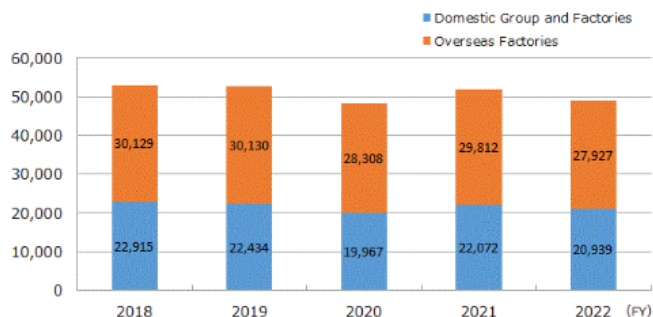
Despite the increase in production volume, the total waste volume (amount processed) for the entire domestic and overseas group in FY2022 was 48,865 tons, a 5.8% reduction from the previous year, as a result of efforts to improve production efficiency and quality.

We have been working to achieve complete zero emissions at all production sites in Japan and overseas through recycling.

In 2020, 677 tons (1.40%) and 857 tons (1.63%) were landfilled in FY2021.

In FY2022, there was an increase in production, which resulted in an increase to 927 tons (1.93%).

We will continue our efforts to achieve complete zero emissions and recycling treatment.

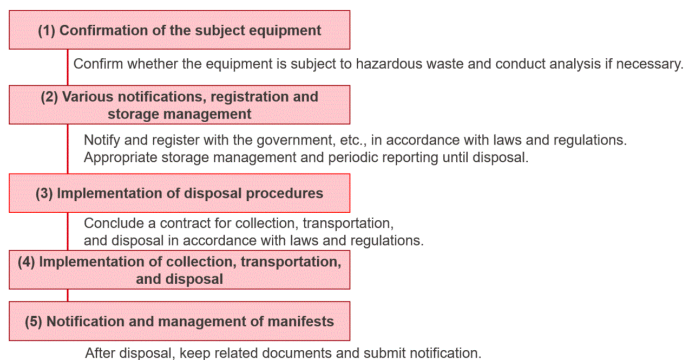


## PCB Waste Storage and Management

We properly store and dispose of used PCB-containing equipment in accordance with laws and regulations. 10.5 tons of PCB-containing equipment was disposed of in FY2022.

In 2023, we will continue to properly dispose of PCB-containing equipment in use.

### Hazardous Waste Disposal Flow



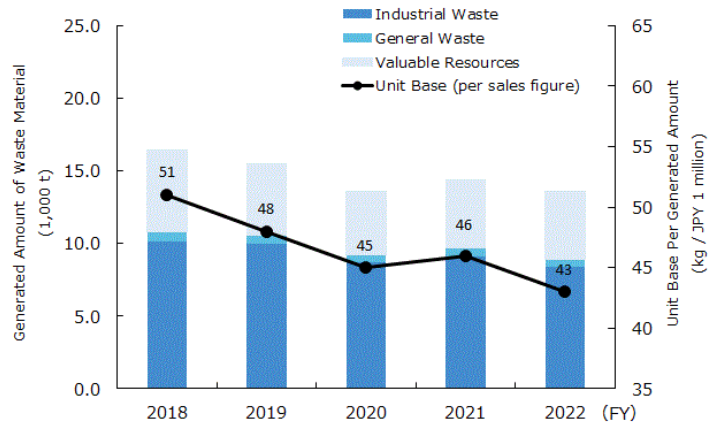
## Introduction of Initiatives

At the Onomichi Plant, we have improved and strengthened water filtration capabilities, worked to stabilize water quality, and succeeded in significantly improving the period of possible repeated use.

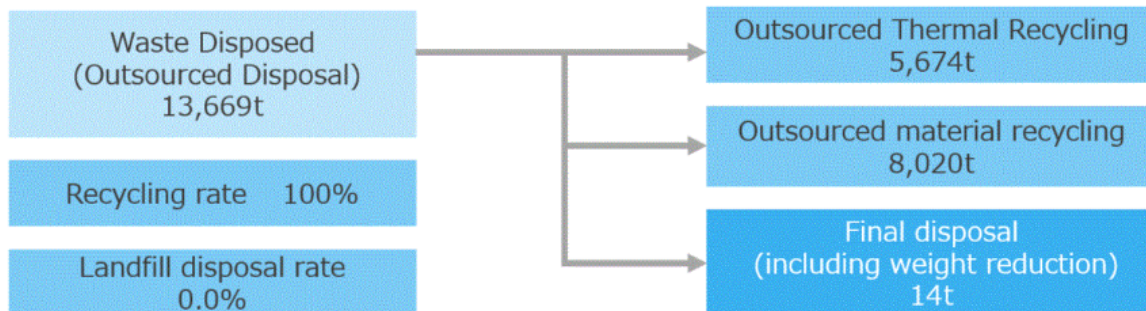
### Amount of waste material generated at production bases in Japan

The amount of waste generated in FY2022 was 13,569 tons, down 5.7% from the previous year, and the basic unit of waste generated (per net sales) also improved by 2.8% from the previous year.

This was due to improved yield amid increased production volume. On the other hand, the lower basic unit is due to disposal costs remaining high.



The processing flow for waste materials at production bases in Japan during fiscal year 2022 was as follows.



1) Excluding general industrial waste

2) Consumer paper manufacturing waste, tree planting material, various consumer waste

In order to prevent improper disposal such as illegal dumping, local audits of all our processing contractors are conducted every year. In fiscal 2022, although under COVID-19, we conducted 100 audits in Japan, including Group companies, and 100 audits at overseas factories to confirm that waste was properly disposed of.

## Future challenges

- Selection of overseas production bases of industrial waste disposal contractors that don't conduct landfilling
- Development of low-water-use facilities, and review of and investment in closed systems
- Formulation of disposal plans for devices that are currently in use which contain low concentrations of PCB
- Consider increasing the effective recycling value by increasing the ratio of valuables from industrial waste

# Emissions

## KPI

Item	FY 2021 results	FY 2022 results
<b>Emissions of greenhouse gases</b>	(Consolidated) Scope1 613 thousand tons Scope2 486 thousand tons Scope3 25,701 thousand tons	(Consolidated) Scope1 569 thousand tons Scope2 483 thousand tons Scope3 26,661 thousand tons
<b>Ozone-depleting substances</b>	Emissions of CFCs (Non-consolidated) 678 tons (Domestic) 956 tons	Emissions of CFCs (Non-consolidated) 1,263 tons (Domestic) 1,356 tons
<b>HAPs (Hazardous Air Pollutants)</b>	(Domestic) 17.3 tons	(Domestic) 12.3 tons

## Responsible Departments

Each business location

※Activities are conducted by each location, and the direction of policies and activity measures are decided on by bodies that include the Global Warming Countermeasures Committee and the Chemical Substance Management Committee.

※In 2022, the Global Warming Countermeasures Committee has been reorganized into the Carbon Neutral Committee.

## Our position and Targets

### Why is “Emissions” a critical issue to be addressed?

#### Explanation of the reason and background

We use resources to manufacture and sell various rubber products such as tires, hoses, and belts. In particular, we recognize that reducing the amount of emission in the manufacturing process and the use-phase is a particularly important initiative that will lead to the prevention of global warming and environmental pollution, as well as continuous business operation at each site.

### Our policies and position relating to emission

The Yokohama Rubber Group will work to minimize the burden on the environment by providing products and services in accordance with the "[Yokohama Rubber Environmental Policy](#)" and the "[Yokohama Rubber Group Action Guidelines](#)". To this end, we will develop and introduce environmental technologies while working together with various people involved in the provision of products and services to promote the reduction of emissions into the atmosphere throughout the entire value chain.

We are determined to control the emissions not only by complying with international agreements on emission, and the regulations of each country, such as the Energy Conservation Act, the Act on Promotion of Global Warming Countermeasures in Japan, and regulation-responding policies from related organizations such as the Japan Rubber Manufacturers Association, but also by voluntarily setting even stricter standards.

# Risks and opportunities of the Yokohama Rubber Group associated with greenhouse gas emissions

## <Risks>

Risks include an increase in facility investment costs for emissions reduction, an increase in energy costs related to the use of renewable energy, and an increase in investment costs necessary to deal with the deterioration in working environments due to global warming as well as to take countermeasures.

## <Opportunities>

By the reduction of emissions the atmosphere, we contribute to society through promoting the efficient use of energy necessary for operation, conserving the environment of the areas we operate our business, and externally providing heat-insulating materials, etc. Controlling not only the emissions of greenhouse gas but also those of volatile organic compounds (VOCs) and air pollutants makes it possible to reduce the cost of environment-related investment, which will lead to a reduction in product manufacturing costs.

## Use of offsets

Offsets are not used.

## Vision (attainment goal) / target

As international regulations related to emissions become increasingly stringent, as a general rule we aim to achieve control standards equivalent to those of the developed economies.

The Yokohama Group is working to reduce total greenhouse gas (GHG) emissions as an energy use reduction target.

- Long-term target:
  - Achieve net zero CO<sub>2</sub> emissions (carbon neutrality) in our activities by 2050
- Mid-term target:
  - Reduce CO<sub>2</sub> emissions from company activities by 38% by 2030 compared to fiscal 2013  
\*This activity is on the same level as our goal of a 28% reduction by 2030 (compared to 2019).
  - Encourage suppliers to collaborate with us in meeting our targets.

## Measures for vision achievement

Our Group conducts the following measures to monitor and reduce the environmental burdens generated throughout our activities including production activities, R&D, and office work.

1. We set voluntary control criteria that are stricter than those required by laws and regulations and constantly conduct monitoring.
2. We regularly report legally-required measurement results to government authorities and local residents.
3. We enhance activities toward the reduction of environmental burdens, such as one for the improvement of our production process.  
We promote the switch of energy source to be used, the introduction of renewable energy, the control of exhaust heat with heat retention and insulation materials, and the introduction of the latest environmental technologies and systems.
4. Prevention of environmental pollution  
We identify environmental pollution risks and take remedial measures accordingly, and regularly implement monitoring and measurements, etc.
5. Chemical substance management  
We ascertain the suitability of chemical substances contained in materials to be used in our products at the time of adoption or when laws and regulations are changed.  
We minimize the use of environmentally hazardous substances in our business activities and products, and control the emissions of VOCs and hazardous substances.

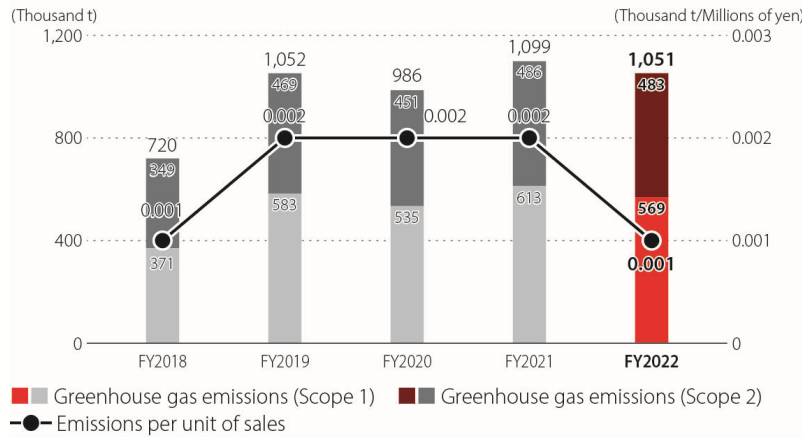
# Review of FY 2022 Activities

## Greenhouse Gas (GHG) Emissions

Response to climate change (Disclose information on TCFD)

### Greenhouse Gas Emissions (Scope 1-2) (Consolidated)

#### Greenhouse Gas Emissions (Scope 1-2) (Consolidated)

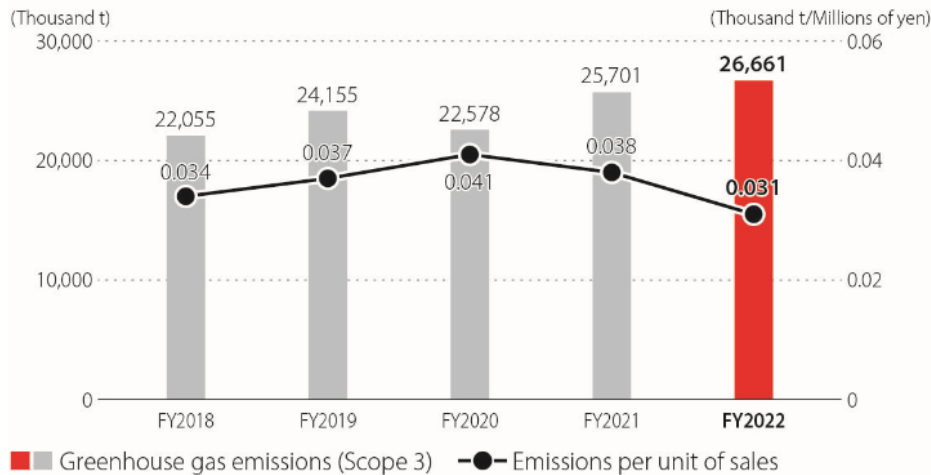


Greenhouse gas emissions (Scope 1 and Scope 2) decreased year on year, with Scope 1 emissions decreasing 7% and Scope 2 emissions decreasing 1% due to Group-wide reduction efforts despite 4% increase in tire production. Emissions per unit of sales improved 25% year on year for Scope 1 + Scope 2.

## Scope 3 estimation

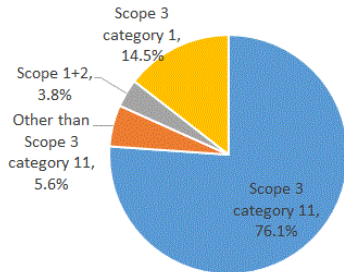
### Greenhouse Gas Emissions (Scope 3) (Consolidated)

#### Greenhouse Gas Emissions (Scope 3) (Consolidated)



Greenhouse gas emissions (Scope 3) increased 4% year on year along with the increase in tire production volume. Emissions per unit of sales improved 19% year on year.

Scope 3 covers the calculation of 13 categories. Scope 3 accounts for 96.2% of all categories from Scope 1 to 3 combined, in which "Use of products" accounts for 76.1%. Our Company will endeavor to spread environmentally friendly products and fuel efficient tires while making concerted efforts with our suppliers to promote the reduction of GHG emissions in our value chain.



(Emissions Unit: thousand t-CO2)

Cat	Scope 3 category	FY2020	FY2021	FY2022
1	Purchased products and services	2,924	4,031	4,022
2	Capital goods	52	152	175
3	Fuel and energy	135	147	129
4	Transportation and distribution (upstream)	167	154	125
5	Waste	16	50	27
6	Business travel	3	5	5
7	Commuting employees	20	21	19
8	Upstream lease assets	NA	NA	NA
9	Downstream transportation and distribution	59	72	59
10	Processing of sold products	11	10	14
11	Use of products	18,259	19,940	21,087
12	Disposal of products	822	875	906
13	Downstream lease assets	NA	NA	NA
14	Franchise	NA	NA	NA
15	Investment	111	246	92
<b>SUM</b>		<b>22,578</b>	<b>25,701</b>	<b>26,661</b>

※1 Scope 1: Direct emissions of greenhouse gases by the Company (examples: fossil fuel, natural gas, etc.)

※2 Scope 2: Indirect emissions of greenhouse gases by the Company (electric power use, etc.)

※3 Scope 3: Greenhouse gases emitted indirectly by the Company through its supply chain activities (manufacturing, transportation, business travel, commuting, etc.)

※4 Calculation was conducted in accordance with the criteria of Scope 3 issued by the "GHG Protocol."

## Verification of greenhouse gas (GHG) emissions

We had the calculation results verified by a third-party institution in order to ensure the accuracy and reliability of our GHG emission calculation.

- Third-party greenhouse gas verification report
  - Japanese version (4,147KB)
  - English version (5,520KB)

## Emissions of NOx, SOx, etc.

There was no occurrence of events leading to air pollution.

The emission concentrations of NOx and SOx are controlled to comply with legal regulations on concentration values.

(Domestic) (Unit: tons)

Cat	NOx	SOx
FY 2021	111.8	3.3
FY 2022	98.4	3.7

Regarding the use and emission of ozone-depleting substances, we use class I specified products, such as air-conditioning facilities, which includes the use of chlorofluorocarbon. In FY2022, since following the updating of equipment, a lot of waste was disposed, we registered our leak level. There were no cases of dioxin emission.

Even though the amount of VOC emission increased overseas due to increase in production, the total amount decreased by 1.7% compared with the previous year.

## Introduction of Initiatives

### Switch of energy source to natural gas

We have been promoting the switch of the fuel used in domestic plants to gas that is supplied via environment-friendly gas pipelines. Effort has been made even in some countries where a gas pipeline system has not been fully developed. For example, the Vietnam Plant has switched from heavy fuel oil to gas by using tank lorries to transport it, and the India Plant has also switched from heavy fuel oil to gas by using gas cylinder, both of which has contributed to the reduction of CO<sub>2</sub> emissions.



Switch to gas cylinders in the India Plant



## Installation of solar lights

Street lights combining a high efficiency solar panel and LEDs have been installed.

Since using an independent power supply, the street lights will be effective even in the event of a disaster or power outage.



Installation of solar street lights



Installation of solar and wind powered street lights

## Employing heat recovery technology to utilize factories' waste heat for air-conditioning (absorption chilling equipment)

Employing the absorption chilling equipment with a heat recovery system to use waste heat, etc. has contributed to the reduction of CO<sub>2</sub> emissions as well as to the reduction of power consumption during peak time during summer months.



Absorption chilling equipment

## Steam driven compressor

The plant gets air supply by operating the air compressor powered by the energy generated from the pressure difference resulting from steam decompression, which has never been used before.

Showing results in cutting down power consumption and CO<sub>2</sub> emission.



Steam driven compressor

## Energy saving improvements through heat insulation materials

We manufacture and install heat insulation materials fitting the size of equipment and piping.

We are implementing energy-saving activities that control heat release by installing heat insulation materials on and near steam pipework in our business locations both in Japan and overseas.



Pipe insulation

## Energy-Saving Technology Committee

We have held Energy-Saving Technology Committee meetings to promote the adoption of energy management methods conforming to the Energy Conservation Act and the introduction of energy-saving equipment, which has led to the effective reduction of energy consumption.



Energy-Saving Technology Committee



We are also promoting energy-saving activities from a management perspective.

1. Promote in-house black illumination, encouraging employees to leave work on time.
2. Promote a cool biz campaign in summer and a warm biz campaign in winter in-house for energy saving.
3. Make sure to turn off office automation equipment when they are not being used to reduce standby power consumption.
4. Enhance energy saving awareness by visualizing electricity usage.
5. Drive company-wide efforts for energy-saving improvement by sharing information on improvement cases (creating a database)

## Future challenges

Our challenges to be addressed include accurately managing the data on air emission volumes at overseas sales bases, etc. in a global scale, and working to reduce the amount of "emission into the atmosphere" in collaboration with the supply chain.

# Materials

## KPI

Item	FY 2021 results	FY 2022 results
Total volume of raw materials used	(Consolidated) 1,068,000 tons	(Consolidated) 1,088,000 tons
Ratio of renewable/recycled raw material	(Consolidated) 25.5%	(Consolidated) 26.2%

## Responsible Departments

Technology and design departments

※Supervised by the 4Rs Committee

## Our position and Targets

### Why are “Materials” a critical issue for us to address?

#### Explanation of the reason and background

The Yokohama Rubber Group sells products using both natural and chemically composed materials including natural rubber and water. All of these materials are made from resources available on our planet, which are by no means infinite. Therefore, we believe that it is important that we should address the challenges of delivering products that will please customers and society, while minimizing material usage, promoting the sales of recycled products (such as retread tires), and using renewable or recycled materials whenever possible.

### Our policy and position relating to raw materials

The Yokohama Rubber Group has presented its environmental philosophy in the "[Yokohama Rubber Basic Environmental Policy](#)" and "[Yokohama Rubber Environmental Policy](#)", will work to develop and procure raw materials in a manner that reduces environmental impacts and minimizes material usage in accordance with the "[Yokohama Rubber Group Action Guidelines](#)".

### Vision and targets

Long-term target: 100% sustainable raw materials usage by 2050

Mid-term target: At least 30% renewable/recycled raw material usage by 2030

### Measures to pursue our vision

We promote the development and use of raw materials that have least impact on the environment and society through the following initiatives in order to continue our business.

We also have a system to procure sustainably-available raw materials that will have the lowest environmental and social impacts throughout their life cycles.

1. We review factors such as structural design and material rigidity to fulfill the required performance while achieving weight reductions.
2. We promote the sales of retread tires.
3. We explore and utilize innovative recycled and renewable materials, while further increasing the use of existing recycled and renewable materials.

## Review of FY 2022 Activities

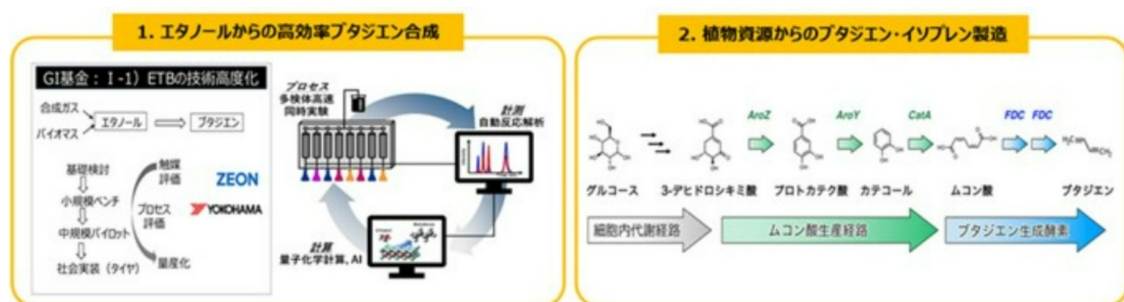
### Expanding the use of renewable raw materials toward a recycling-oriented society

We have long been promoting the use of renewable and recycled raw materials as part of our efforts to realize a recycling-oriented circular economy. In addition to the use of recycled rubber, which we have been actively working on, we are now expanding the use of a wider variety of recycled and renewable raw materials, including wires made by melting and reusing scrap iron, silica made from plant-derived and inedible rice husks, and resins derived from natural materials.

In 2022, we used 273,000 tons of renewable raw materials worldwide, which accounts for 26.2% of our total raw material usage.

Toward realizing a renewable raw materials use rate of 30% in 2030, we explore and utilize innovative recycled and renewable raw materials, while further increasing the use rate of existing recycled and renewable raw materials, with the aim of solving environmental challenges our planet is facing.

The joint initiative by ZEON Corporation and us titled "Development of Manufacturing Technology for Synthetic Rubber Core Chemicals with Carbon Resource Recycling" has been adopted by NEDO as a "Green Innovation Fund Project / Development of Manufacturing Technology for Plastic Raw Materials Using CO<sub>2</sub>, etc." The Green Innovation Fund Project is a program established by the Ministry of Economy, Trade and Industry (METI) to accelerate innovation through structural transformation of energy and industrial sectors and bold investment toward achieving the national goal of "reducing overall greenhouse gas emissions to zero by 2050." The program provides a continuous ten-year support to companies and organizations that pursue this goal as a business commitment in the areas from research and development, demonstration to commercial implementation. Our demonstration project aims to establish two advanced technologies to produce butadiene and isoprene, which are key synthetic rubber chemicals based on carbon resource recycling, from renewable carbon resources such as used tires and biomass at high yield rates, with a view to commercially implementing them in the 2030s. This will contribute to the improvement of resource recycling and carbon neutrality in the tire and rubber industries.



Outline of the Project for Development and Demonstration of Carbon-Resource-Recirculating Synthetic Rubber Core Chemicals Manufacturing Technology

### Yokohama Rubber to join a tough hill climb race in the U.S. with tires made from sustainable materials for the first time

Yokohama Tire Corporation, our tire sales arm in the United States, supported 23 cars in the "100th Pikes Peak International Hill Climb" held in Colorado, U.S. on June 26, 2022, supplying "ADVAN A052" street sport tires made from sustainable materials for the first time. This is a traditional hill climb competition that has been held since 1916, also known

as the "Race to the Clouds," which starts at an elevation of 2,862m and covers 20km before finishing at an altitude of 4,300m.

Among the cars supported by Yokohama Rubber, the "ADVAN A052" tires made from sustainable materials were used on the "Electric Performance/NRS 2022 Tesla Model S Plaid" piloted by Blake Fuller, competing in the Exhibition Class. These ADVAN A052 tires have a more recyclable material composition than their previous version, where the sidewall rubber material, which is subject to most severe deformation during vehicle travel, has been changed from the conventional petroleum-derived butadiene rubber to a biomass-derived butadiene rubber. Blake Fuller finished the competition in the sixth place in the class he competed in.

Actually, competing in this harsh hill climb event has provided us with new knowledge and will further accelerate our development of technologies that will reduce tires' burden on the environment. We will continue to work on the development of tires featuring sustainable materials.

## Recycling activities in the MB business

Similarly, to the previous year, recycled rubber was mainly used for ballast belts with its use rate being 2.6% by weight in FY2022. We are also working to promote the adoption of recycled carbon and rubber raw materials recycled from waste tires and other rubber waste.

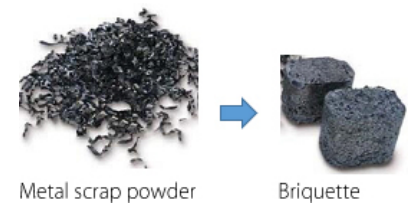
The plastic mold material used in the hose manufacturing process, which are thermoplastic resins, are crushed and re-melted for reuse. However, the powder generated in the crushing process used to be discarded as waste. To address this issue, we now have a highly controlled two-stage crushing process, of which first stage yields crushed particles with much larger diameters than fine powder that quickly scatters.

The finer powder generated in the second crushing stage is collected and reused, carrying the traceability information as that of the main crushed resin.

## Yokohama Rubber Nagano Plant receives the "Japan Environmental Management Association for Industry (JEMAI) Chairman's Award" for its metal scrap briquetting

We received the "JEMAI Chairman's Award" for our metal scrap briquetting technique at the "Resource Recycling Technologies and Systems Awards" in 2018.

The Nagano Plant produces joint fittings for hoses and assembles hoses and fittings. The plant has developed an effective system to contribute to better resource recycling, in which the metal scraps generated during the production of metal fittings, that used to be sold to external metal scrap suppliers, are shaped into briquettes that can be used for steel production by applying massive pressure that allows forming the scraps in any designed shape so that they can be directly sold to steel manufacturers.



## Future challenges

While using raw materials in business activities is unavoidable, our final goal is to be in a state which minimizes the use of the resources available on our planet.

A key issue is correctly assessing whether the use of reusable products and recycled materials actually results in a reduction in the use of the planet's resources and the environmental impact, and deploying the technique on a global level if found effective.

# Products and Services

## KPI

Item	FY 2021 results	FY 2022 results
Ratio of environmentally friendly products to all products handled	(Consolidated) 100.0%	(Consolidated) 100.0%
Reuse and recycling ratios for used products and packaging materials	(Consolidated) Used products Tires 67% MB 85% Packaging materials 84%	(Consolidated) Used products Tires 65% MB 95% Packaging materials 84%

## Responsible Departments

Product development and planning division

## Our position and Targets

### Why is “Environmentally Friendly Products” a critical issue to be addressed? Explanation of the reason and background

The LCA (life cycle assessment) method enables us to understand environmental burdens (CO2 emissions) generated at each stage of product life cycle from their production to disposal. We employed this method to conduct measurements on tires, the Yokohama Rubber Group's flagship products, and found that the CO2 emissions at the use-stage accounted for 80 to 90% of the total CO2 generation in the entire life cycle. Therefore, Yokohama Rubber Group has directed efforts particularly toward "producing environment-friendly products to achieve fuel efficiency."

### Our policies and position relating to products and services

In accordance with our basic position set forth in the Yokohama Rubber Basic Environmental Policy, the [Yokohama Rubber Basic Environmental Policy](#), [Yokohama Rubber Environmental Policy](#), and the [Yokohama Rubber Group Action Guidelines](#), the Yokohama Rubber Group will work to prevent global warming, effectively use resources, and consider and improve chemical substance management with the aim of minimizing the burden of products and services provided by the Yokohama Rubber Group on the global environment. In addition, we will provide environment-friendly products with improved safety and quality (performance) to customers.

### Vision

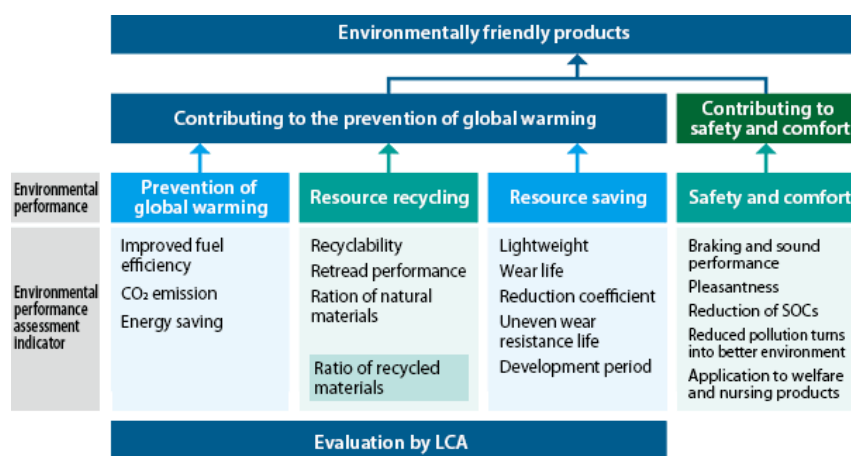
We will maintain a 100% ratio of "products that contribute to the environment," and improve product environmental performance responding to social demands.

## Measures to pursue our vision

To be a "top-level environment friendly company," we will maintain "100% environmentally friendly product portfolio." In the production of environmentally friendly products, we not only simply work on the reduction of green house gas emissions through our products, but also work to ensure safety and comfort through means such as resource recycling, resource conservation, and the reduction of chemical substances contained in our products. Before the development of new products, candidate products are subject to the system in which they undergo an environment impact assessment at the early stage of the development process and need to meet our Environment-Friendly Products Regulations\* at the design review stage; therefore, it is right to say that all the products released from our Group are environmentally friendly products.

※Environment-Friendly Products Regulations: Newly developed products are required to exceed conventional products by 5% or more in terms of the average scores of the four items of "prevention of global warming," "recycling and circulation of resources," "resource conservation," and "safety and comfort" with no decrease found in any of the items.

## <Four pillars of environmental performances and environmental performance evaluation index>



## Review of FY 2022 Activities

### Results for the environmental contribution ratio (overall)

The ratio of environmentally friendly products in the Yokohama Rubber Group has remained at 100.0% since 2017. The ratio of fuel-efficient tires sold in FY2022 (consolidated) was 35.9%.

It has been calculated that the use of fuel-efficient tires led to the reduction of approximately 1,748 thousand t-CO<sub>2</sub> emissions in terms of "GHG emissions at the product use stage" (Scope 3), which are indirect emissions in the supply chain. In the development of environmentally friendly products, the results of the degree of their environmental contribution and environmental impact were not evaluated.

## Introduction of Initiatives

### High-pressure hydrogen gas hoses (ibar HG82)

For a hydrogen infrastructure to be successfully spread in society, it is vital to develop pressure-tight, durable, lightweight, and flexible hoses.

Yokohama Rubber has newly developed reinforced hybrid structure utilizing PBO fiber and steel wire, and launched products that meet these requirements.



## "BluEarth-GT AE51" fuel-efficient tires

Fuel efficiency has been further improved while ensuring the excellent wet grip performance well-established by our previous product (BluEarth-A). In the domestic labeling system, their wet grip performance has received the highest grade of "a" for all sizes. In terms of rolling resistance performance, BluEarth-GT AE51 has acquired "AA" for size 31 and "A" for size 26.



## "ice GUARD SUV G075" studless tires for SUVs

While realizing the "iceGUARD" series basic concepts of "being effective on icy surfaces," "being long-lasting" and "improving fuel consumption," they adopt "low-heat-generating tread rubber" using the technology developed for the fuel efficient tire brand "BluEarth" in terms of "improving fuel consumption" to reduce energy loss due to heat generation and reduce rolling resistance by 5%. Furthermore, by optimizing the tread arrangement using Yokohama Rubber's original simulation technology, pattern noise has been reduced by 28% (compared in noise energy reduction rate) to improve quietness.



## "BluEarth 711L" fuel efficient performance-oriented all-season truck tires

"BluEarth 711L" has achieved the highest fuel economy performance in the history of YOKOHAMA's truck tires. This performance improvement will greatly reduce transportation costs beard by our customers who often drive long distances on motorways. This product was created with new compound composition and YOKOHAMA's unique blending technique, in addition to the newly developed tread pattern with increased rigidity, the product of advanced technology, achieving 42% reduction in rolling resistance compared with "710R," our company's all-season tires. "BluEarth 711L" is the first product bearing the name of "BluEarth," the fuel-efficient tire bland, as domestic tires for heavy trucks.





## "ECOTEX" energy-saving conveyor belt

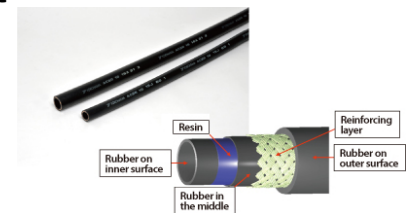
We delivered an energy-saving conveyor belt called "ECOTEX," the longest conveyor line in Japan (about 14km), to the KLT line of Chichibu Taiheiyo Cement Corporation. In addition to having its excellent durability, ECOTEX contributes to reducing the energy consumption of conveyors by optimizing the viscoelasticity of the bottom cover rubber in contact with the roller, and reducing the running-over resistance of the roller. The KLT line has achieved a significant reduction in energy consumption of more than 50% (according to our research) after the delivery compared with our conventional products. After this replacement, Chichibu Taiheiyo Cement Corporation was also awarded the "Limestone Association of Japan's Best Achievement Award" at the 77th Limestone Mining Convention, by which "ECOTEX" won the admiration for its energy-saving performance.



## Car air-conditioner hoses compatible with next-generation coolant

We have developed car air-conditioner hoses compatible with HFO-1234yf, which has come to be widely used by car manufacturers in North America as a next-generation coolant for car air-conditioners. The high-pressure and low-pressure hoses newly developed this time have already been adopted.

HFC-134a, now widely used as a coolant for car air-conditioners, has a high-degree of impact on global warming with its global warming potential (GWP) being 1,430; however, the GWP of HFO-1234yf is controlled to be at four, and there is a movement to promote switching from a viewpoint of the prevention of global warming. However, HFO-1234yf has the property of decomposing gradually with long-term use and generating acid, which posed the problem of causing resin corrosion when a hose having a resin layer on its innermost surface was used. It was possible to solve this problem either by improving the resin material, or preventing contact between the resin and coolant. However, to meet the demands of car manufacturers in North America, we decided to adopt a hose structure with a rubber layer on the inner surface of the resin layer, and developed an internal rubber with improved adhesion, which led to the development of a car air-conditioner hose that prevents direct contact between coolant and the resin, as well as resin corrosion and coolant leakage.

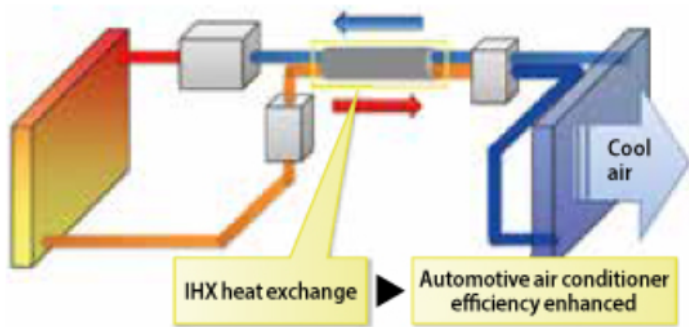


## Internal heat exchanger (IHX) that improves cooling efficiency of car air conditioners

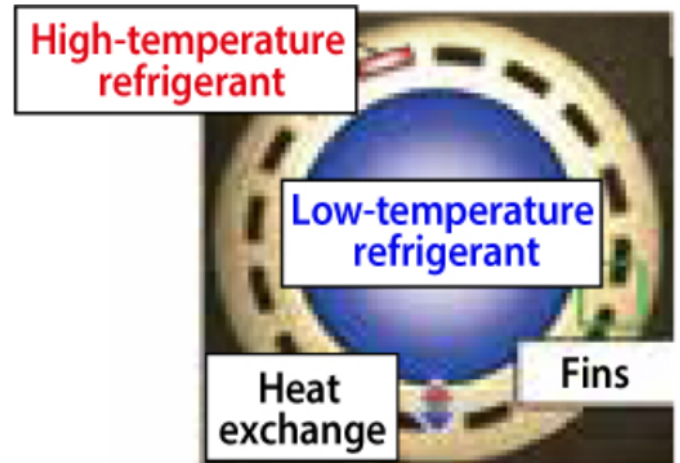
We have developed a double-tube IHX\*<sup>1</sup> that improves the cooling efficiency of car air conditioning systems. Currently, HFC-134a, which is widely used as a coolant in car air conditioners, has a high GWP\*<sup>2</sup> of 1,430, so the switch to HFO-1234yf (GWP = 4) with a low coefficient is progressing to prevent global warming. On the other hand, while the cooling efficiency of HFO-1234yf is lower than for HFC-134a, the developed double-tube internal heat exchanger can cover this drop in cooling efficiency. With a double-tube structure that integrates a part of two coolant tubes that were conventionally configured separately and using the temperature difference between the high-temperature and low-temperature coolants to exchange internal heat, it improves the cooling efficiency of the entire air conditioning system (Fig. 1). In addition, it was necessary to design the pipes according to the layout of the engine room since the car air conditioning system is piped in a narrow space there, but the piping could be designed freely as with conventional air conditioning by arranging the fins inside (Fig. 2) since the coolant flow path is not crushed even if it is bent. The newly developed double-tube internal heat exchanger has already been adopted.

※1 : IHX = Internal Heat Exchanger

※2 : GWP = Global Warming Potential



(Fig. 1) Car air conditioning system using double-tube internal heat exchanger



(Fig. 2) Cross section of pipe with finned double-tube structure

## "BluEarth-air EF21" light weight fuel-efficient tires

We have developed "BluEarth-air EF21," advanced technology concept tires that aim to contribute to the environment with its latest lightweight design.

"BluEarth-air EF21" adopts Yokohama's latest lightweight design technology with the aim of contributing to the reduction of total vehicle weight for the improvement of fuel efficiency and contributing to the environment through the reduction of necessary materials. By this, we achieved a lightweight, thin and highly rigid structure with a weight reduction of about 25% in mass. It also adopts a newly developed exclusive compound and "A.R.T. Mixing," the latest rubber mixing technology. BluEarth-air EF21 has received the highest grade of "AAA" for its rolling resistance performance, and its wet grip performance also has received the highest grade of "a" exhibiting excellent fuel efficiency and wet performance.

"BluEarth-air EF21" was developed in commemoration of the Yokohama Rubber's 100th anniversary, and was sold with a production limit of 100 in December 2017. Its performance has been inherited by "BluEarth-1 EF20."



## Future challenges

One of the challenges we are facing is the handling of old products that are difficult to be replaced with new products due to promises made to customers.

For other products, at the end of FY2017, we achieved 100% ratio of products that contribute to the environment sold in Japan and overseas. We are determined to continue to maintain a 100% ratio of products that contribute to the environment and enhance activities to further improve the environment.