

## Establishing a Low-carbon Society

While the worldwide movement of decarbonization has shown signs of acceleration amid growing concern about global warming, the Tokai Rika Group has been enhancing activities we consider to be the responsibility of a global company, and has been promoting CO<sub>2</sub> reduction activities in the whole group. These activities include downsizing and reducing the weight of products, which contribute to the improvement of fuel efficiency of vehicles, and improving the efficiency of the use of energy in production and transportation.

### Reduction of CO<sub>2</sub> emissions

By performing activities such as the thorough elimination of wasteful energy consumption in production processes, horizontal deployment of energy saving improvements on a global scale, and the introduction and expansion of renewable energy, we have achieved both Tokai Rika's and the Tokai Rika Group's basic-unit targets for CO<sub>2</sub> emissions for FY 2018.

### Expanding the use of renewable energy

The Tokai Rika Group aims to achieve renewable energy to account for more than 20% of power consumption by 2040, and are introducing solar power generation systematically. In FY 2018, we introduced 1.5 MW at TRT (Thailand), and mega solar panels for 1 MW at TRCW (China). Starting from FY 2019, we are planning to introduce them to Japan and overseas. We are expanding their introduction as a target to improve the average 1% per annum.



Mega solar panels installed at TRT (Thailand)

Renewable energy use rate

An improvement of **0.9%**

### Topics

#### Activities that promote energy saving by TRT (Thailand)

At TRT (Thailand), the organization, made up of members elected from each division, was created to promote improvement on energy saving and has promoted such activities. Countermeasures were considered among the members for the issues that were extracted. In FY 2018, improvements on 150 cases were performed out of 173 cases that fell under improvement themes. The details of the activity were to categorize the equipment into three types: A, B, and C. A is the equipment that can be stopped during break, B is the equipment that can be stopped during days off, and C is the equipment that cannot be stopped. We improved B and C so that they could be converted to A as much as possible. In addition, they are corresponding to this by clarifying the persons assigned to stopping the equipment. This activity has been assessed, and was awarded the EAPA (Environment Activity Performance Achievement) Level "A" prize by the TOYOTA Co-operation Club.



EAPA commendation

### Voice

At TRT (Thailand), we have been performing energy saving through an activity called ERI (Energy Reduction Innovation). The cases that I handled dealt with the improvement of compressors. Because the compressors consume the largest input of energy inside the factory, we have performed this activity, thinking it will be a great success if we can improve that situation. As we discussed countermeasures between members, we learned that some of the compressors can be stopped during break time when the equipment is not operating. Six out of 11 compressors were stopped, and we were able to reduce an electricity amount of 17,000 kWh / year.

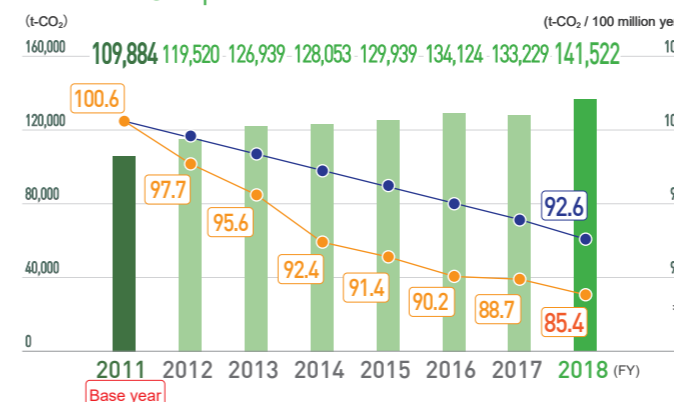
We believe that there are more instances of energy being wasted beside this, so we will continue to work on waste energy improvements.



TRT (Thailand)  
Monchai Mongkonkaew

### Trends in CO<sub>2</sub> emissions per processing expenses

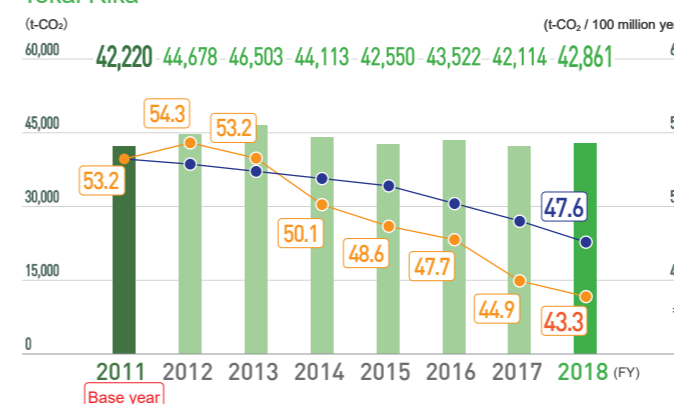
#### Tokai Rika Group



Target value for FY 2018: 92.6 t-CO<sub>2</sub> / 100 million yen

Actual result for FY 2018: **85.4** t-CO<sub>2</sub> / 100 million yen

#### Tokai Rika



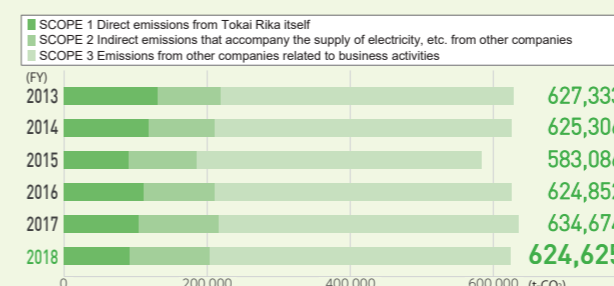
Target value for FY 2018: 47.6 t-CO<sub>2</sub> / 100 million yen

Actual result for FY 2018: **43.3** t-CO<sub>2</sub> / 100 million yen

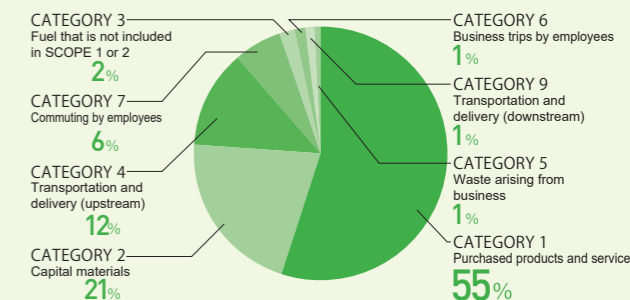
### CO<sub>2</sub> emissions in the supply chain

The Tokai Rika Group recognizes that in order to control global warming, it is necessary to reduce not only CO<sub>2</sub> emitted through activities conducted by the company, but also emissions throughout the life cycle. We have been monitoring the amount of CO<sub>2</sub> emissions throughout the supply chain, including upstream and downstream, and are deploying activities for reduction.

#### Trends in emissions in the supply chain

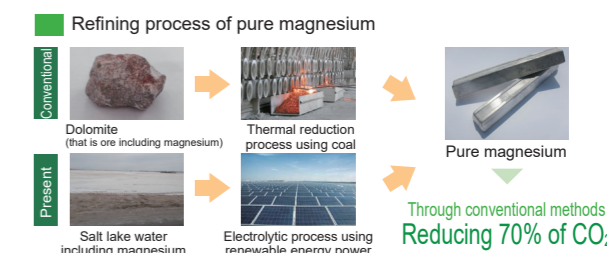


#### Breakdown for SCOPE 3 in FY 2018



### CO<sub>2</sub> reduction in the upstream

We are using magnesium that is light weight and has strong intensity on the steering wheels and paddle switches produced in Tokai Rika. In order to reduce the consumption of CO<sub>2</sub> in the entire life cycle of pure magnesium, the material for those products, we are adopting materials that are prepared with renewable energy as the power during the refining process.



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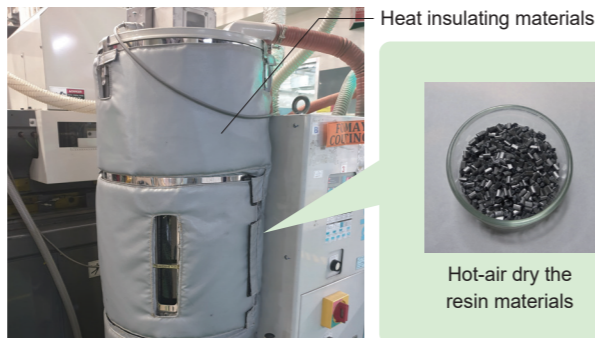
Measures against radiation heat loss of drying machine for resin materials

In the process of injection molding in resin products, resin materials are being dried before molding in order to prevent quality defects caused by hydrolysis. We aimed to improve energy efficiency at TRP (Philippines). For 71 hot air dryers on shop floors, we installed insulating covers to prevent energy loss due to heat radiation and energy efficiency increased.

Reduction in amount of CO<sub>2</sub>

10 t-CO<sub>2</sub> / year

Drying machine that has heat insulating materials installed



Energy saving control of heat source in semiconductor plants

At semi-conductor plants, the entire plant is made into a clean room where we maintain air cleanliness, aiming to prevent dust dispersion, and more. The boiler used as a heat source inside the clean room used to be operated under two steps: "high combustion - low combustion." With the equipment renewal, we changed it to a three-step operation: "high combustion - mid combustion - low combustion." By assembling a controlled set operation, we were able to operate more efficiently, corresponding to load. We aim to reduce gas consumption by taking the exhaust heat from the boiler and using it to preheat feed water.

Reduction in amount of CO<sub>2</sub>

218 t-CO<sub>2</sub> / year

Boiler for heat source of air conditioning



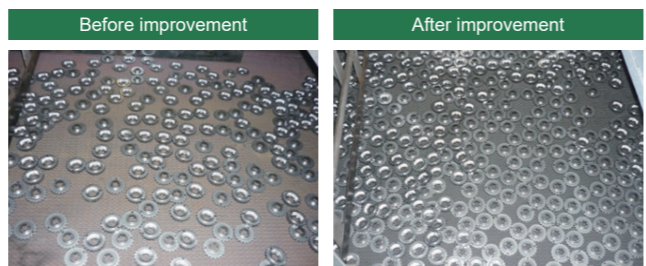
Productivity improvement of heat treatment process

The heat-treatment process of a gear lock, a component part of a seat belt, is placed on the conveyor and continuously receives heat-treatment. By adding vibration we were able to prevent the products on the conveyor from overlapping and minimize the gaps, and we were able to increase efficiency of heat-treatment to 13%, so we were able to contribute significantly by reducing energy consumption.

Reduction in amount of CO<sub>2</sub>

96 t-CO<sub>2</sub> / year

The products on the conveyor that are put into the heat-treatment furnace



There are many gaps and the production efficiency is low

Minimize the gaps by means of vibration

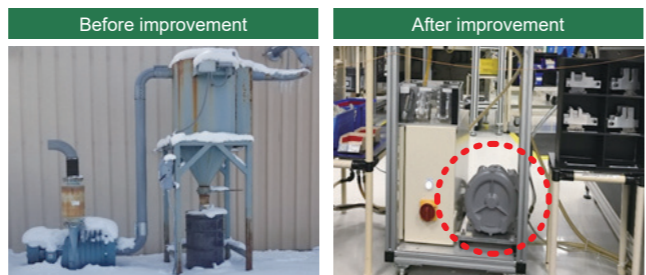
Distribution placement of the dust collector

In the assembly process at TRIN (America), the dust collector was used to collect the minor fragments of the material being produced during injection in order to prevent spreading. Until then, we had been using the larger dust collector to collect dust on the entire floor. However, we removed the larger dust collector and placed small dust collectors in each line. As a result, the collection efficiency improved and energy consumption was reduced at the same time.

Reduction in amount of CO<sub>2</sub>

50 t-CO<sub>2</sub> / year

Placement of dust collector

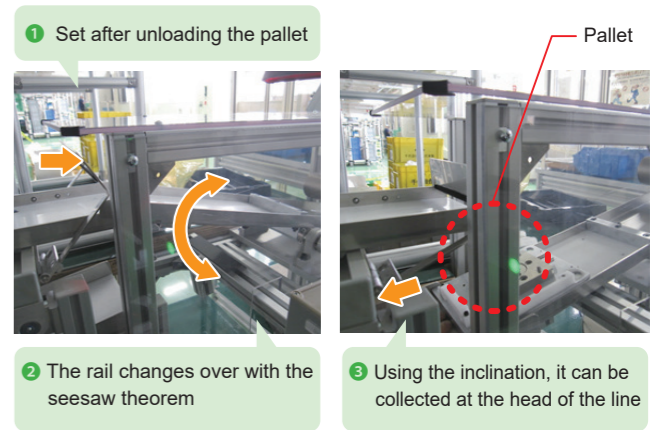


By means of the large dust collector, fragments of the material on the entire floor have been collected

Small dust collectors were distributed by line

Pallet returner that uses Karakuri mechanisms

The Tokai Rika Group is promoting the use of Karakuri mechanisms, as an initiative toward "Monozukuri that makes the best use of originality and ingenuity." At the parts assembly line, assembly work is performed above the jig set on a rail called the "pallet." The pallet returner which utilizes the seesaw theorem, can collect the unloaded pallets at the head of the line by means of the inclination and the pallet's own weight. Minimizing the motion of workers and improving productivity has also helped contribute to energy saving.



Green power certificate

At the office building at the Head Office, green power is being used, by making use of the Green Power Certificate\* system with an annual biomass generation of 100,000 kWh.

\* The Green Power Certificate is issued by a third-party agency and certifies the amount of environmental added-values of power generated by means of natural energy.



Energy Saving Exhibition

Tokai Rika is seeking to be a company that encourages energy saving and for the purpose of expanding our horizons on energy efficiency, we organize an Energy Saving Exhibition every year. In the exhibition, workers who participated were able to deepen their understanding towards energy saving by featuring not only exhibitions of company's outstanding examples, but also other exhibitions to learn about energy saving perspectives, experiencing actual equipment, and more related to energy saving mechanisms and properties.



Energy Saving Exhibition

Interactive learning corner

Outstanding Example Award for CO<sub>2</sub> Reduction

In order to boost employees' activities for reducing CO<sub>2</sub>, Tokai Rika has established an award system for outstanding examples, and presents in-house awards. In FY 2018, an example conducted by Security Production Division No. 2, in which they worked on high-cycle metal processing, was chosen for the Gold Award.

Voice

We made improvements thinking we could reduce the cycle time by changing the process of opening a hole from the drill machining to press processing. The process did not go well at first, but we tried many times until the hole was successfully opened, and it resulted in improvement. We are very glad that our efforts are recognized.



SEC Prod. Div. No. 2  
Satoshi Inagaki

FY 2018 Outstanding Examples

Gold Award	High-cycle processing by stamping	SEC Production Division No. 2
Silver Award	Non-operational stopping of mold temperature controllers	SEC Production Engineering Division
	Control energy saving for air conditioning heat source boilers	Oguchi Plant Administration Division

Bronze Award	Reducing inspection time for wafer inspection machine	EL Device Division
	Non-operational stop for agitating fans of heat treating batch furnace	SAF Production Engineering Division
	Electrification of pump for circulating the plating solutions	SAF Production Engineering Division

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Promotion of more compact and lightweight designs for products

We are contributing to the improvement of fuel efficiency by promoting more compact and lightweight products. Furthermore, in anticipation of the need to respond to next-generation eco-friendly cars, we are moving forward with technological developments to improve environmental performance, taking into consideration not only the shapes and materials of products, but also their internal structure and properties in relation to mounting in vehicles.

● Digital outer mirror that contributes to weight saving

The installed cameras on the door mirror position display the camera view inside the vehicle's monitor, and the digital outer mirrors can check rear views from those visual images. It has fewer blind spots than conventional door mirrors, and visibility increases during the night, rainy weather, and more so it significantly enhances safety, and it contributes by being more compact and lighter in weight.

Digital outer mirror

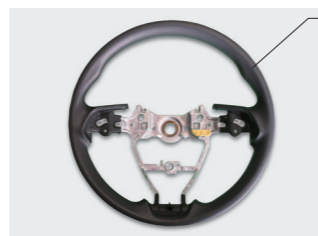


Product weight  
**45% reduction**

● Lightweight steering wheel

We are adopting polyurethane for the steering wheel's outside material. We are able to conduct lightweight without losing its performance, such as operation feeling and wear resistance, by lowering the density of steering wheel with raising expansion rate of polyurethane.

Steering wheel



Polyurethane material

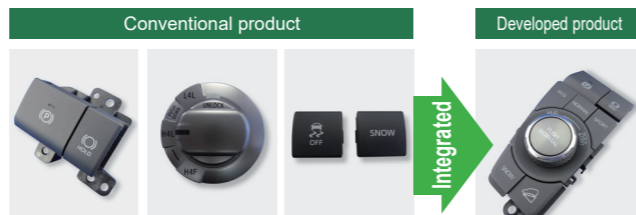
Expansion rate increased  
↓  
**Lightweight**

Product weight  
**10% reduction**

● Driving switch made lightweight by means of integration

The drive-related, changing switches such as 4WD mode and drive mode used to be placed in different locations by function. However, modularizing the switches and integrating them into the console has improved handling, creates more space, and reduces weight at the same time.

Driving switch integration



EPB\* switch 4WD switch Driving mode switch Driving modular switch  
\* Electric Parking Brake

Product weight  
**25% reduction**

Voice

The demands for redesigning the control switches to create more space on the automotive console are getting higher every year. We had some difficulties in completing a mold while maintaining the robust design in the process of modularizing the switches with different operating modes. We were able to resolve this problem by reviewing the design with other divisions countless times.



Personnel at Switch Engineering Division from the left: Misato Uchida, Masaya Tamiya, Ryosuke Okuda, Yuki Kubo, and Seiji Ishigaki

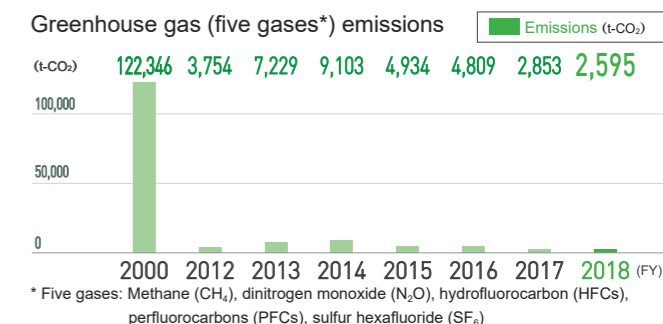
Reduction in greenhouse gases

We have been promoting reduction of not only CO<sub>2</sub> emissions that accompany energy use, but also of emissions that occur when using greenhouse gases (five gases), by taking measures for emission control such as replacing and detoxifying the target gases.

● Initiatives for reducing SF<sub>6</sub> emissions

Shielding gas is necessary to shut off air from the liquid surface in the magnesium casting process to prevent melted materials from burning when exposed to air. We had been using SF<sub>6</sub> for the shielding gas, but we promoted a changeover to FK (fluorinated ketone) gas, which has a smaller greenhouse gas effect, and changeover in all casting processes in Japan was completed.

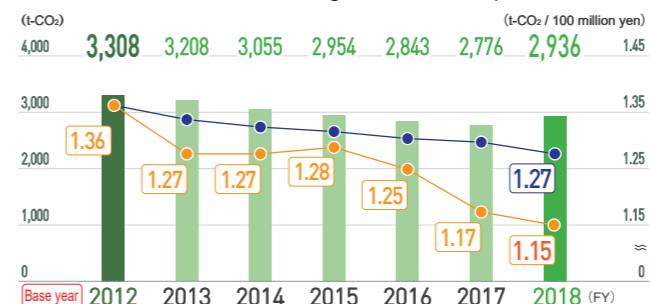
\* SF<sub>6</sub> has a high global warming potential, 23,900 times greater than that of CO<sub>2</sub>, our standard (IPCC guideline No. 2), and has a long life span, so it has been specified as one of the targets of emission control.



Pursuit of transportation efficiency and reduction of CO<sub>2</sub> emissions in logistics activities

We have been working on the reduction of CO<sub>2</sub> emissions, for example by reviewing the transportation routes to make them more efficient and improving packaging so that more items can be packed together. As a result, we successfully achieved our basic-unit target for CO<sub>2</sub> emissions in FY 2018.

Trends in CO<sub>2</sub> emissions for logistics activities per sales



Emissions (t-CO<sub>2</sub>) Emissions per sales (t-CO<sub>2</sub> / 100 million yen) Base-unit target (t-CO<sub>2</sub> / 100 million yen)

Target value for FY 2018: 1.27 t-CO<sub>2</sub> / 100 million yen  
Actual result for FY 2018: 1.15 t-CO<sub>2</sub> / 100 million yen

● Shortening transportation distance of packaging containers

Folded containers and packing trays returned by overseas bases will be transported by truck from Nagoya Port to the packagers who temporarily store them and return them to each plant. Until now, we had been storing them temporarily at two packaging companies, but we are now able to reduce CO<sub>2</sub> regarding transportation by integrating to one company which has a shorter transportation distance.

Reduction in amount of CO<sub>2</sub>  
**22.2 t-CO<sub>2</sub> / year**

Shortening transportation distance

