

Briefing on Sustainability

The Yaskawa Group's Environmental Management and Vision for Decarbonization

Notes:

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YASKAWA Electric Corporation

Yoshikatsu Minami

Director, Managing Executive Officer,

General Manager, Production Management & Operations Div.;

General Manager, Export & Import Administration Div.

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1. Environmental Management of the Yaskawa Group

**Climate Change Measures as a Management Issue, “CCE 100” a Unique Environmental Indicator,
Definition of Emission Reduction Contribution by Green Products
Contribution of Green Products to CO₂ Emission Reduction**

2. Contributing to Energy Conservation and Low Carbon Society through Business

**The Risks and Opportunities Identified in the TCFD Scenario Analysis, Changes and Needs in the
Relevant Markets Brought by the Transition to Energy Conservation and Decarbonization,
Environmental Impact of Motors and Business Opportunities by Adoption of AC drives,
Examples of In-house Energy Conservation through Adoption of AC drive,
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3. Yaskawa's Decarbonization Initiatives

**2050 CARBON NEUTRAL CHALLENGE and Prospects for Achievement
Status of Introduction of Solar Power Generation at Domestic Sites, Initiatives at Yahatanishi Site,
Current Status of CO₂ Emissions in the Entire Supply Chain, Scope 3 Emission Reduction Targets
and Directions for Achievement**

1. Environmental Management of the Yaskawa Group

Climate Change Measures as a Management Issue

“CCE 100” a Unique Environmental Indicator

Definition of Emission Reduction Contribution by Green Products

Contribution of Green Products to CO2 Emission Reduction

Climate Change Measures as a Management Issue

Domestic and international initiatives for climate change measures

Paris Agreement reached at the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 21)



SDGs

2050 Carbon Neutral Declaration by former prime minister, Suga in October 2020

Contribution through the supply of products



Promotion of energy conservation and energy creation in business activities

- The use of renewable energy
- Energy conservation through the use of Yaskawa products



- Switching to CO₂ free power

YASKAWA ECO VISION



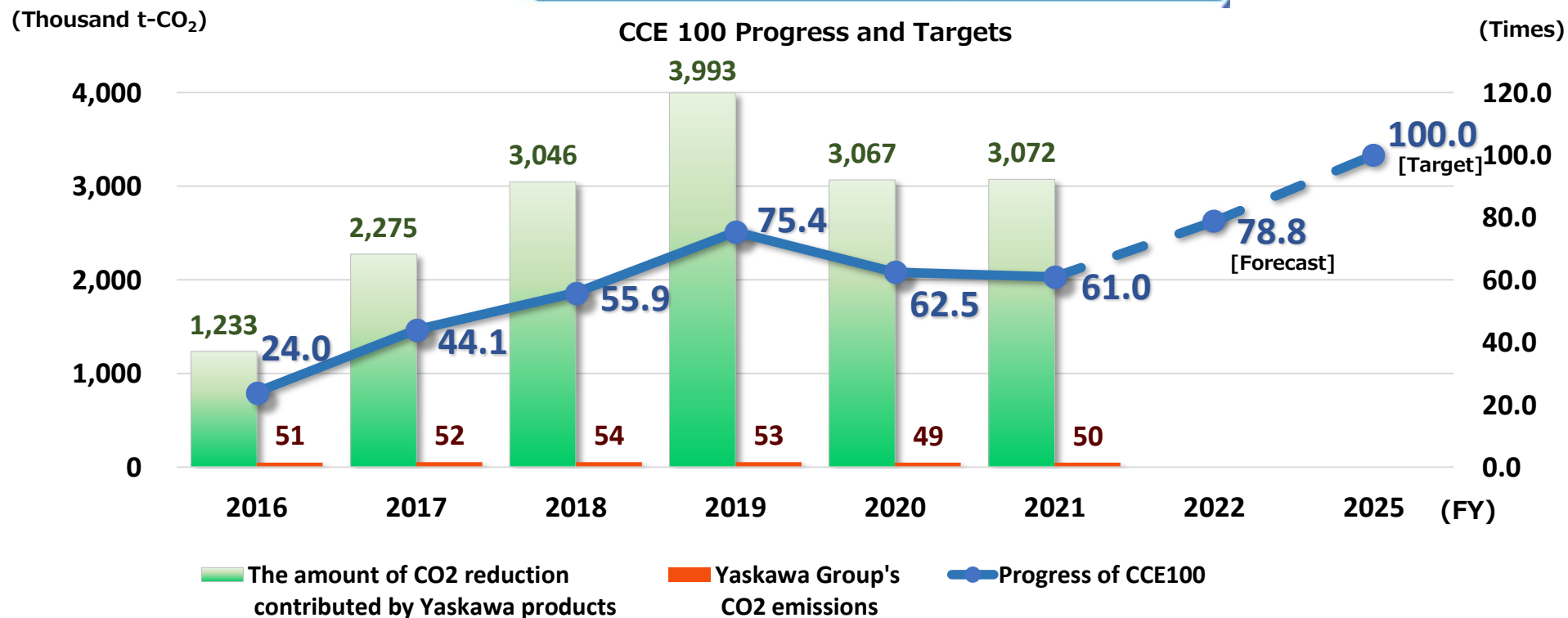
"CCE100" a Unique Environmental Indicator

- Reducing the environmental impact of production activities (Green Processes) and contributing to reducing the environmental impact of customers around the world through Yaskawa products (Green Products)
- Promoting CCE100*, a target to increase the amount of CO₂ reduction contributed by Yaskawa products to 100 times or more of Yaskawa Group's CO₂ emissions by 2025

* Abbreviation of Contribution to Cool Earth 100

$$\frac{\text{CO}_2 \text{ reduced through products}}{\text{CO}_2 \text{ emitted by the Group}} \geq 100 : \text{CCE100}$$

Contributions of more than 100 times in 2025



Definition of Emission Reduction Contribution by Green Products

Examples of applicable products

Overview of calculation logic

AC drive equipment



Reducing CO₂ by saving energy when an induction motor is driven by an AC drive

Ex.) For a fan/pump: Energy saving rate at the time of AC drive operation is used.

PM motor



Reducing CO₂ by energy saving by switching an induction motor to a PM motor

Ex.) Energy saving rate by switching to PM motor is used.

Renewable energy equipment



Reducing CO₂ by creating energy when general electricity is switched to CO₂ zero renewable energy generation

Ex.) Utilization rate of typical offshore wind power generation equipment is used.
Utilization rate of typical solar power generation equipment is used.

Robot

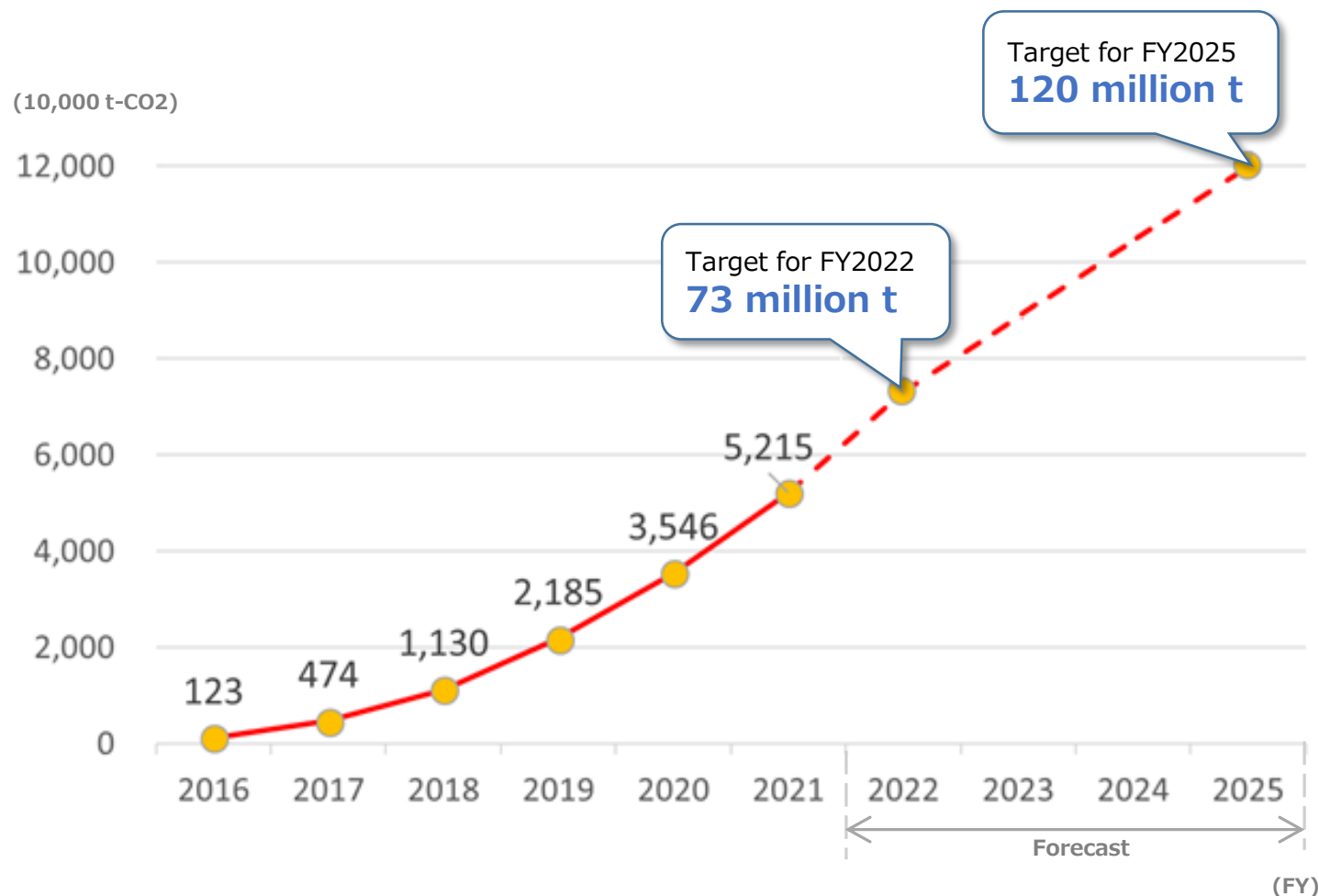


Reducing CO₂ by saving energy by switching to the latest model of robots

Ex.) Energy saving rate by switching to slim and light weight robots and regenerative power collection function is used.

Contribution of Green Products to CO₂ Emission Reduction

Contribution of Green Products to CO₂ Emission Reduction (Cumulative total since FY2016)



Green Products applicable for calculating CO₂ reduction contribution

AC drive



Matrix converter



Medium voltage AC drive



PV inverter for solar power generation



PM motor



Generator for wind turbine



Robot



2. Contributing to Energy Conservation and Low Carbon Society through Business

The Risks and Opportunities Identified in the TCFD Scenario Analysis

Changes and Needs in the Relevant Markets Brought by the Transition to Energy Conservation and Decarbonization

Environmental Impact of Motors and Business Opportunities by Adoption of AC Drives

Examples of In-house Energy Conservation through Adoption of AC drive

Improvement of Energy Efficiency by i³-Mechatronics

The Risks and Opportunities Identified in the TCFD Scenario Analysis
















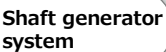
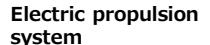
- The impact of climate change on business was examined.
- In terms of financial impact, opportunities of revenue increase will be greater than risks of revenue decrease.

Business impact on risk and opportunity factors

Risk/ Opportunity	Transition/ Physical	Factor	Impact	Evaluation
Risk	Transition	Carbon price	<ul style="list-style-type: none"> Increased fuel and material procurement costs due to the introduction of carbon taxes by national governments. 	Serious
		Government policies on carbon emissions	<ul style="list-style-type: none"> Increased costs (e.g., purchasing clean energy) that accompany the introduction of emissions trading and the strengthening of emissions regulations. 	Serious
		Transformation to energy savings and carbon reductions	<ul style="list-style-type: none"> Production impacts due to price increases and procurement difficulties for reasons such as insufficient related materials from electrification and the transition to electric vehicles. 	Serious
		Recycling regulations	<ul style="list-style-type: none"> Increased costs from using substitute materials, etc., due to regulations such as those on plastics. 	Minor
		Growth of low-carbon technologies	<ul style="list-style-type: none"> Increased investment costs, such as R & D costs, due to increased competition in the energy saving performance of products against a background of increasing demands for energy savings. 	Moderate
		Changing behavior of investors and customers	<ul style="list-style-type: none"> Increased support costs due to investors and customers preferring companies that are more environmentally responsive. Decreased company valuation and loss of business opportunities due to delayed responsiveness to environmental responsibility related to information disclosure and procurement. 	Minor
	Physical	Increasing average temperatures	<ul style="list-style-type: none"> Increased energy costs due increased air conditioning energy in our factories. Need to move production sites where the risk of flooding exceeds tolerances due to sea rise. 	Moderate
		Intensification of unusual weather	<ul style="list-style-type: none"> Operation stoppages, reductions in production, and additional investment to restore equipment from typhoons, tornadoes, and flooding. 	Serious
Opportunity	Transition	Transformation to energy savings and carbon reductions	<ul style="list-style-type: none"> Increased demands for factory automation devices and industrial AC drives due to increased energy saving needs. Expanded business opportunities for solutions that increase the productivity and energy saving performance of factories and equipment. Expanded demand for solar power generators and wind power/geothermal power/biomass power generation equipment due to feed-in tariff incentives and so on. Expanded business opportunities for electronics in electric vehicles as the electrification of automobiles progresses. Expanded business opportunities for marine electronics due to increased demands for electric and hybrid ships. 	Serious
		Changing behavior of investors and customers	<ul style="list-style-type: none"> Increased investor valuation, increased ESG investment, and increased corporate value due to expansion of businesses that contribute to the environment. 	Minor

Changes and Needs in the Relevant Markets Brought by the Transition to Energy Conservation and Decarbonization

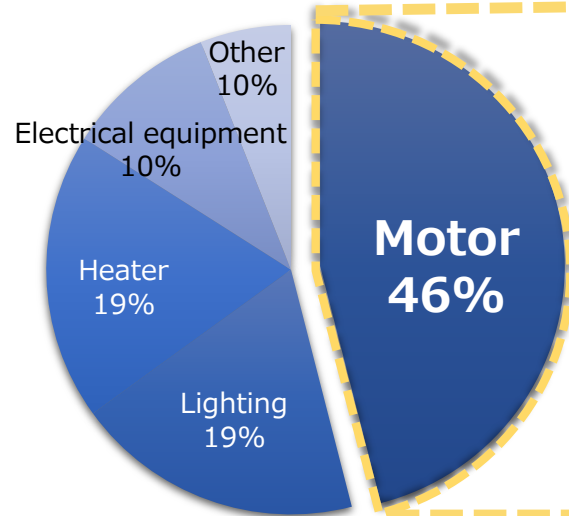
• Providing a wide range of products and solutions that are essential for the transition to energy conservation and decarbonization

Changes in the relevant market	Market needs	Yaskawa products and solutions
① Energy saving of motors	<ul style="list-style-type: none"> Expanding the use of AC drive to drive motors 	 AC drive  PM motor
② Productivity improvement of plants and equipment	<ul style="list-style-type: none"> Expanding automation of production lines Realization of non-stop production Yield improvement 	 AC servo drive  AC drive  Robot  Controller
③ Expanding the use of renewable energy	<ul style="list-style-type: none"> Establishment and renewal of solar panel production lines Establishment and renewal of solar and wind power generation facilities 	 AC servo drive  Robot  PV inverter  Electric appliances for large wind turbines
④ Adoption of electric vehicles	<ul style="list-style-type: none"> Establishment and renewal of EV and EV parts production lines Establishment and renewal of battery charging replacement stations Reduction of the CO₂ emission factor for electricity 	 AC servo drive  AC drive  Robot  PV inverter  Electric appliances for large wind turbines
⑤ Improvement of fuel efficiency of ships	<ul style="list-style-type: none"> Electric and hybrid vessels 	 Shaft generator system  Electric propulsion system

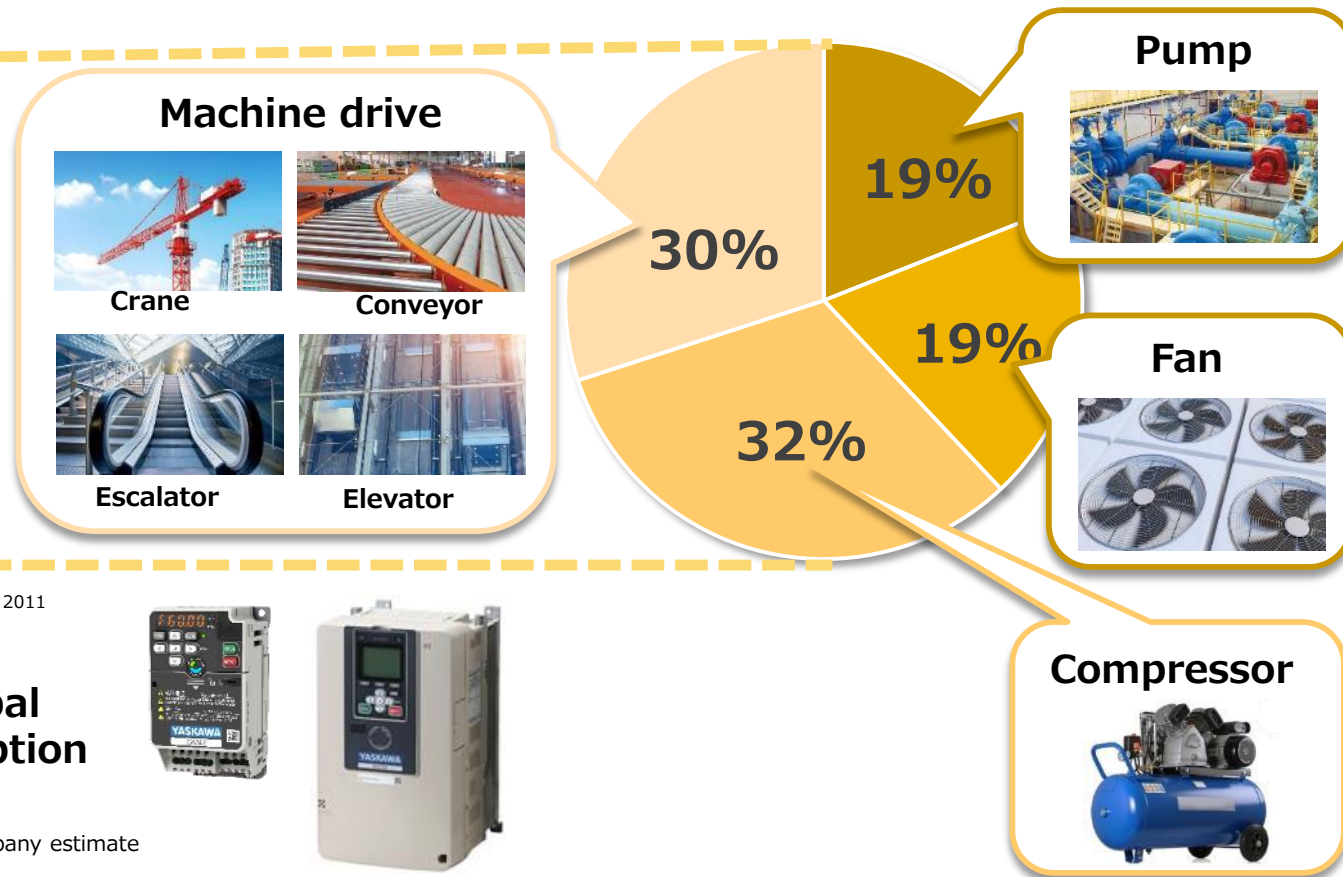
Environmental Impact of Motors and Business Opportunities by Adoption of AC Drives

- Slightly less than 50% of the world's electricity is consumed by motors
- AC drive offers energy-saving solutions for various motor applications

World's power consumption by application (Presumption)



Main applications of global motor power demand (Presumption)



Source: MOTOR SUMMIT 2012
IEA Energy Efficiency Series, Paul Waide and Conrad U. Brunner, et al. . 2011

Yaskawa AC drive reduces global annual electric power consumption

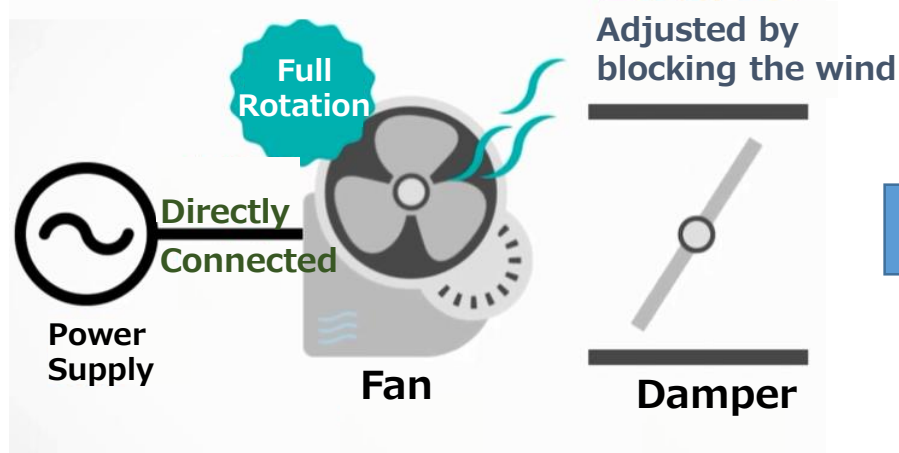
by approximately **4%*** *Company estimate



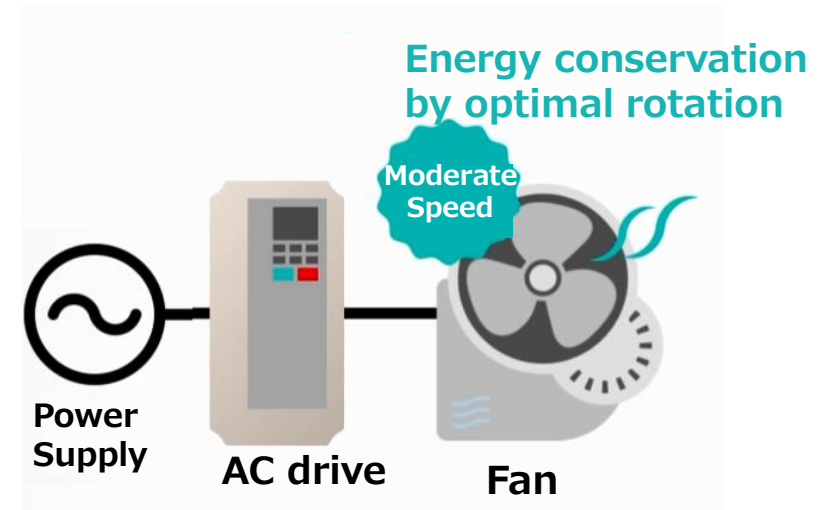
Examples of In-house Energy Conservation through Adoption of AC drive

Example of energy saving by adoption of AC drives in paint line exhaust fan at robot factory

Conventionally,
full power operation using commercial power



Driving at an optimal strength by AC drive

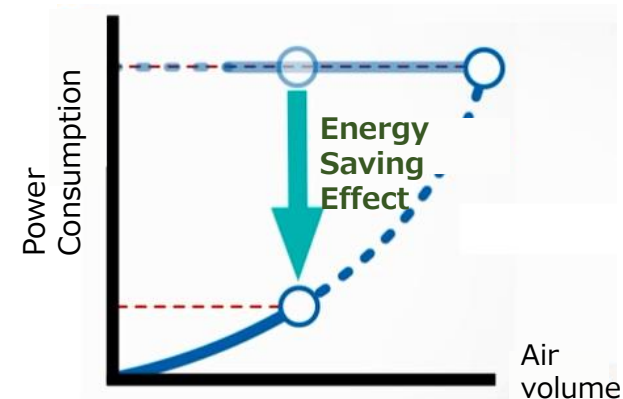


Energy reduction (Crude oil equivalent)

5.3 kl/year Reduction rate : **32%**
(compared to equipment)

Peak power reduction

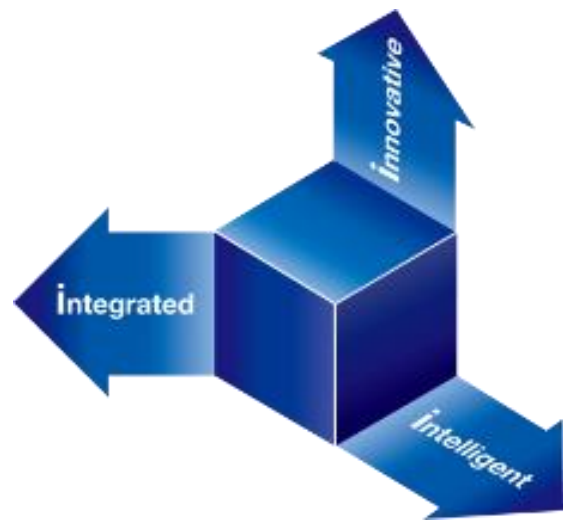
9 kW Reduction rate: **32%**
(compared to equipment)



Improvement of Energy Efficiency by i³-Mechatronics

- Under the concept of i³-Mechatronics, we provide solutions that improve productivity by utilizing IoT, AI, big data, etc.
- Realizing reduction of production lead time, improvement of nonadjusted ratio (reduction of defects), improvement of utilization rate, etc. as well as contributing to **reduction of energy consumption per unit of production**

Achieve the highest efficiency, quality and non-stop production



i³-Mechatronics



3. Yaskawa's Decarbonization Initiatives

2050 CARBON NEUTRAL CHALLENGE and Prospects for Achievement

Status of Introduction of Solar Power Generation at Domestic Sites

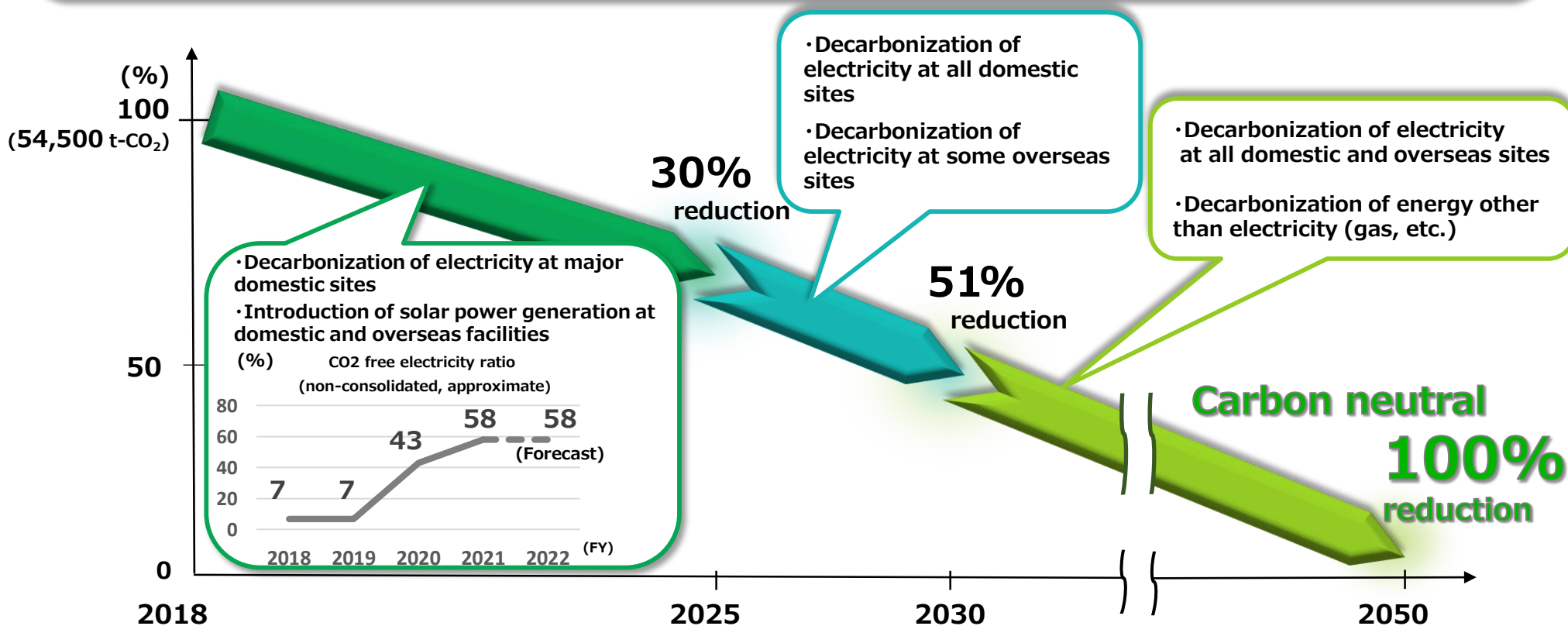
Initiatives at Yahatanishi Site

Current Status of CO₂ Emissions in the Entire Supply Chain

Scope 3 Emission Reduction Targets and Directions for Achievement

2050 CARBON NEUTRAL CHALLENGE*¹ and Prospects for Achievement

- We will achieve net zero CO₂*² emissions from global business activities (Scope 1 + Scope 2*³) in 2050, and reduce the same CO₂ emissions by 51% from 2018 levels by 2030.
(Announced in March 2021, revised in May 2022)
- We will actively invest in the environment to achieve this goal.



*1 Yaskawa Group's goal of achieving net-zero CO₂ emissions from its global business activities by 2050.

*2 Including carbon dioxide and other greenhouse gases (CFCs, etc.)

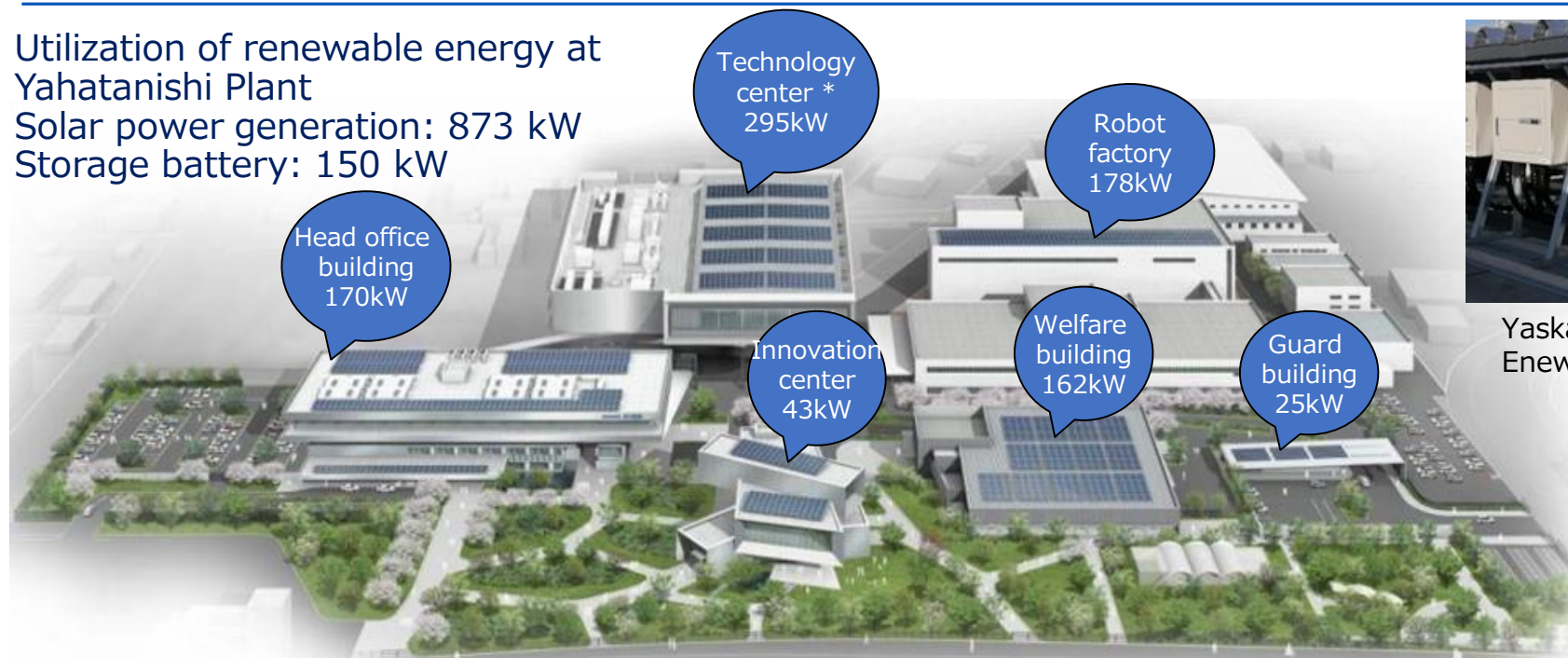
*3 Scope 1 is mainly emissions associated with fuel use (direct emissions). Scope 2 refers to emissions associated with the use of purchased electricity and heat (indirect emissions by electric power companies, etc.).

Status of Introduction of Solar Power Generation at Domestic Sites

Utilization of renewable energy at
Yahatanishi Plant

Solar power generation: 873 kW

Storage battery: 150 kW



Yaskawa's PV inverter
Enewell-SOL P2



Solar Power Generation
at YASKAWA Technology Center



Storage battery
at YASKAWA Technology Center

Solar power generation
introduced at each domestic site

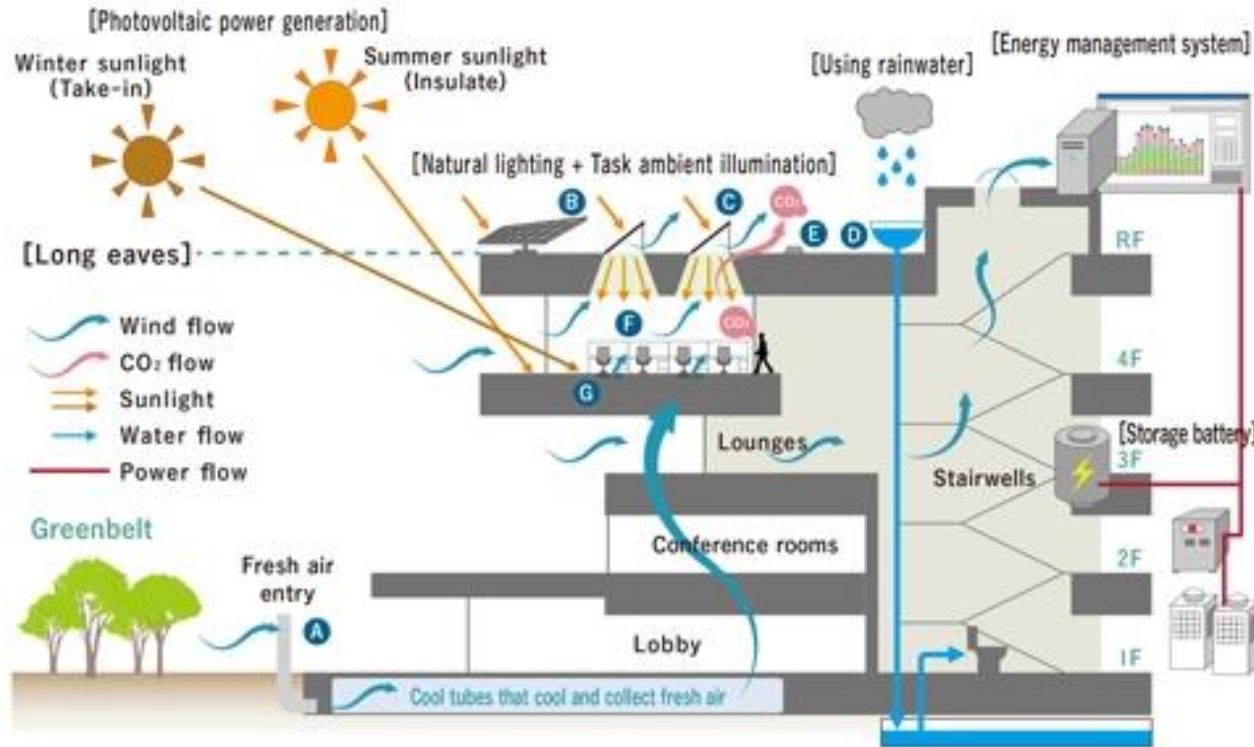


Solar Power Generation Capacity
2.5 MW in Japan in 2021

*Green bonds were issued in May 2021 for use in the construction of YASKAWA Technology Center

Initiatives at Yahatanishi Site

Energy-saving headquarters building using nature



- Completed in April 2015
- 4 floors above ground, total floor area 11,246 m²
- CASBEE "S" for building environmental performance evaluation



▲ CO₂ Sensor



▲ Monitor

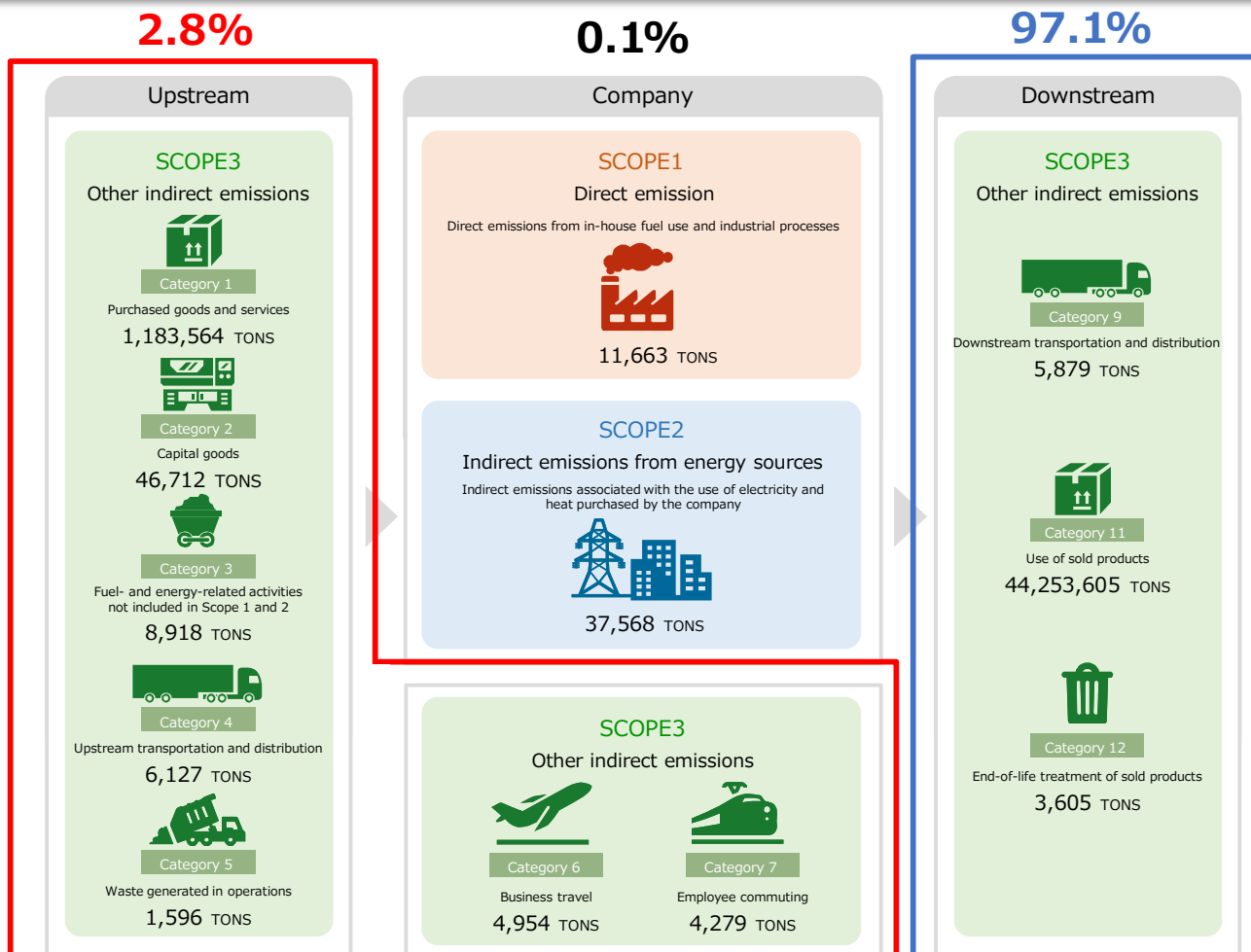


Office bright enough with only natural light

- Reduced air conditioning load by 0.43 kl/year with a long visor to control solar radiation
- Natural lighting reduces power consumption by 6.9 kl/year
- Reduced air conditioning load by 0.01 kl/year by cooling tube (0.5°C relaxation)
- Use of rainwater in toilets saves water (345 kl: approx.12 days' storage)

Current Status of CO₂ Emissions in the Entire Supply Chain

- CO₂ emissions from our business activities are kept low.
- Emissions from the use of sold products are linked to the expansion of revenue.
We will pursue higher efficiency and reduce impact



*Categories 8, 10, 13, 14, and 15 are not counted.

Scope 3 Emission Reduction Targets and Directions for Achievement

2030

Scope 3 emissions reduction target: **-15.0%**
(compared to 2020)

[Assumptions]

- Revenue is expected to expand in 2030 compared to 2020
- We need to reduce Category 11 emissions (emissions from the use of Yaskawa products purchased by customers), which account for 97% of Scope 3 emissions

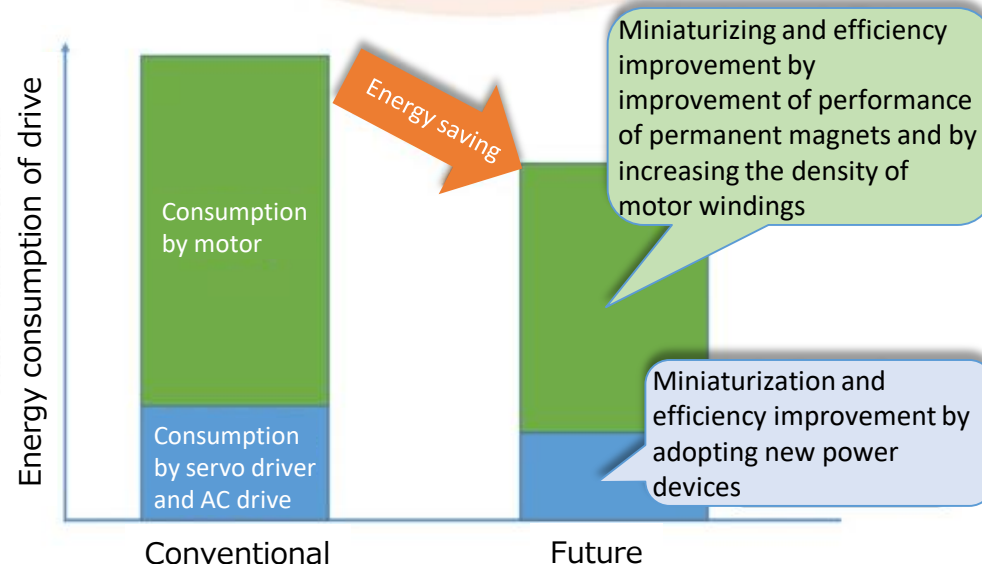
[Issues]

Reducing emissions from motor drive power consumption

[Reduction measures]

1. Innovations in motor drive efficiency
 - *Smart factory technology registered with the Keidanren "Challenge Zero" (right figure)
2. Understanding the status of decarbonization of electricity used by customers

Motor drives are widely used at production sites



Source: Keidanren Challenge Zero Yaskawa Electric Innovation Case Study (Japanese)
<https://www.challenge-zero.jp/jp/casestudy/307>

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