Briefing on Sustainability
The Yaskawa Group’s Environmental Management and Vision for Decarbonization

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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
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)

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

SDGs

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

1. Preventing global warming
2. Pursuing the recycling and the saving of resources
3. Social contribution: Coexistence with nature,
   Improvement in corporate value
4. Proper management of chemical substances
5. Biodiversity conservation
6. Activities by all employees
7. Green products
8. Green processes
“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

CCE 100 Progress and Targets

(Times)

(Times)

CCE100 Contributions of more than 100 times in 2025

CO₂ reduced through products

CO₂ emitted by the Group

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## Definition of Emission Reduction Contribution by Green Products

<table>
<thead>
<tr>
<th>Examples of applicable products</th>
<th>Overview of calculation logic</th>
</tr>
</thead>
</table>
| 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 CO\textsubscript{2} Emission Reduction

Contribution of Green Products to CO\textsubscript{2} Emission Reduction (Cumulative total since FY2016)

Target for FY2022 73 million t
Target for FY2025 120 million t

Green Products applicable for calculating CO\textsubscript{2} 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

<table>
<thead>
<tr>
<th>Risk/Opportunity</th>
<th>Transition/Physical</th>
<th>Factor</th>
<th>Impact</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>Transition</td>
<td>Carbon price</td>
<td>Increased fuel and material procurement costs due to the introduction of carbon taxes by national governments.</td>
<td>Serious</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Government policies on carbon emissions</td>
<td>Increased costs (e.g., purchasing clean energy) that accompany the introduction of emissions trading and the strengthening of emissions regulations.</td>
<td>Serious</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transformation to energy savings and carbon reductions</td>
<td>Production impacts due to price increases and procurement difficulties for reasons such as insufficient related materials from electrification and the transition to electric vehicles.</td>
<td>Serious</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recycling regulations</td>
<td>Increased costs from using substitute materials, etc., due to regulations such as those on plastics.</td>
<td>Minor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Growth of low-carbon technologies</td>
<td>Increased investment costs, such as R &amp; D costs, due to increased competition in the energy saving performance of products against a background of increasing demands for energy savings.</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Changing behavior of investors and customers</td>
<td>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.</td>
<td>Minor</td>
</tr>
<tr>
<td>Physical</td>
<td></td>
<td>Increasing average temperatures</td>
<td>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.</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intensification of unusual weather</td>
<td>Operation stoppages, reductions in production, and additional investment to restore equipment from typhoons, tornadoes, and flooding.</td>
<td>Serious</td>
</tr>
<tr>
<td>Opportunity</td>
<td>Transition</td>
<td>Transformation to energy savings and carbon reductions</td>
<td>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.</td>
<td>Serious</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Changing behavior of investors and customers</td>
<td>Increased investor valuation, increased ESG investment, and increased corporate value due to expansion of businesses that contribute to the environment.</td>
<td>Minor</td>
</tr>
</tbody>
</table>
# 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

<table>
<thead>
<tr>
<th>Changes in the relevant market</th>
<th>Market needs</th>
<th>Yaskawa products and solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>① Energy saving of motors</td>
<td>- Expanding the use of AC drive to drive motors</td>
<td>AC drive, PM motor</td>
</tr>
</tbody>
</table>
| ② Productivity improvement of plants and equipment | - 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 | - 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 | - 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 | - 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)

- Motor 46%
- Electrical equipment 10%
- Heater 19%
- Lighting 19%
- Other 10%

Main applications of global motor power demand (Presumption)

- Machine drive 32%
  - Crane 19%
  - Conveyor 19%
  - Escalator 30%
  - Elevator 32%
- Fan 32%
- Pump 19%
- Compressor 19%
- Crane
- Conveyor
- Escalator
- Elevator

Source: MOTOR SUMMIT 2012

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
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

*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

- Head office building 170kW
- Technology center * 295kW
- Robot factory 178kW
- Innovation center 43kW
- Welfare building 162kW
- Guard building 25kW
- Solar power generation introduced at each domestic site

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

Solar Power Generation at YASKAWA Technology Center
Storage battery at YASKAWA Technology Center

Solar Power Generation Capacity 2.5 MW in Japan in 2021

Yaskawa’s PV inverter Enewell-SOL P2
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

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)

Office bright enough with only natural light
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.

### Upstream
- Category 1: Purchased goods and services
  - 1,183,564 TONS
- Category 2: Capital goods
  - 46,712 TONS
- Category 3: Fuel- and energy-related activities not included in Scope 1 and 2
  - 8,918 TONS
- Category 4: Upstream transportation and distribution
  - 6,127 TONS
- Category 5: Waste generated in operations
  - 1,596 TONS

### Company
- Category 1: Direct emission
  - 11,663 TONS
- Category 2: Indirect emissions from energy sources
  - 37,568 TONS

### Downstream
- Category 9: Use of sold products
  - 44,253,605 TONS
- Category 11: Downstream transportation and distribution
  - 5,879 TONS
- Category 12: End-of-life treatment of sold products
  - 3,605 TONS

*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