

Supplements to Mid-term Business Plan "Challenge 25"

June 6th, 2019

YASKAWA ELECTRIC CORPORATION

Motion Control Segment AC Servo & Controller Business

Overview of AC Servo & Controller Business

Business overview

- Development, production and sales of main components (AC servo motors, linear motors, machine controllers, etc.) incorporated in manufacturing equipment requiring high precision

Strengths

- World's first servo motor called "Minertia motor" developed in 1958.
 - World's best performance and quality
 - Brand strength of global No.1 share
- Built strong relationship with top companies of various manufacturing equipment
 - Contributing to the sophistication and enhanced performance of machinery with pursuit of cutting-edge technologies

Business opportunity

- Sophistication of industrial machinery and labor saving
- Sophistication of industries such as 5G, IoT, and autonomous drive

Market size (Assumption)

[FY2021]
AC servo market
Approx. 850 B.JPY
*Estimated by Yaskawa

Targets for “Vision 2025” and “Challenge 25”

Vision 2025

Create new value in target markets, establish position as global top player, and become customers' first choice

Dash 25 (Achievements)

<Development capability>

- Expand robotics components*
- Expand product lineup of components for production automation

*Products for robot applications
(robot control modules, etc.)

<Production capability>

- Improve efficiency by Yaskawa Solution Factory production method
- Increase global production capacity

<Sales capability>

- Boost sales by capturing smartphone-related demand

Challenge 25 (Target)

<Initiatives>

1. Expand sales in growing markets by implementation of i³-Mechatronics
2. Expand sales in growing markets including China and Asia
3. Enhance production efficiency

<Financial targets>

*Motion Control Segment

Net sales	:240.0 B.JPY
Op. Income	:43.4 B.JPY
Op. Income ratio	:18.1%

Realize 25 (Target)

Consolidate No.1 global market share by maximizing the components' added value through i³-Mechatronics

Initiatives 1. Expand Sales in Growing Markets by Implementation of i³-Mechatronics

Increase sales by launching strategic products and implementing measures targeted at six growth markets

Measures

With robots

- Strengthen engineering capabilities
- Propose solutions for automation

Application optimization

- Differentiating customer equipment with application optimization which meets customer needs

Higher added value

- Pursuing the highest performance in the industry and leveraging our strengths in cutting-edge areas
- Enhance digital solution by IoT function

Strategic Products

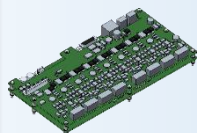


YRC1000micro

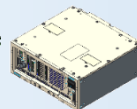


Robot Module
RM100

**YRM Controller
(Tentative name)**



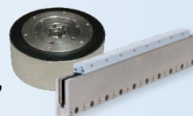
Multi-axes Servo



**Next-generation
servo drive**



MP3000/Σ-7
IoT function
enhancement



DD/Linear

**Data solution through
i³-Mechatronics**

6 Growing Markets

Robotics

Semiconductor

Machine Tool

Electronic Parts

Metal Processing

Packaging

FY2018

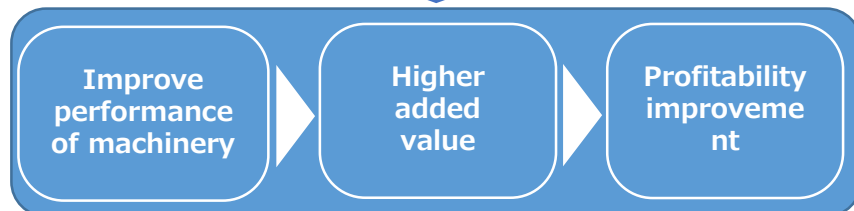
FY2021

Initiatives 2. Expand Sales in Growing Markets including China and Asia

Capture demand in growing markets by optimizing for applications and strengthening product functions adapting to market environments

Bolstering customization

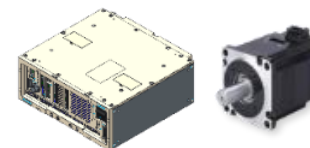
- Development and launch of next-generation servo drives with enhanced customer response capabilities
- Rapid development of use-optimized products by strengthening local development in China



Increase in-store share in existing markets which are expected to grow steadily

Fortifying product

- Deliver new servo drives and more advanced products to local robot manufacturers and EMS



- Enhance quality of product in response to specific environments in local markets



Examples of servo drive quality required in the Chinese and Asian Markets

Capture 3C market along with the growth of robot manufacturer

Initiatives 3. Enhance Production Efficiency

Maximize profits by enhancing efficiency through expanding the latest production method of Yaskawa Solution Factory to global production

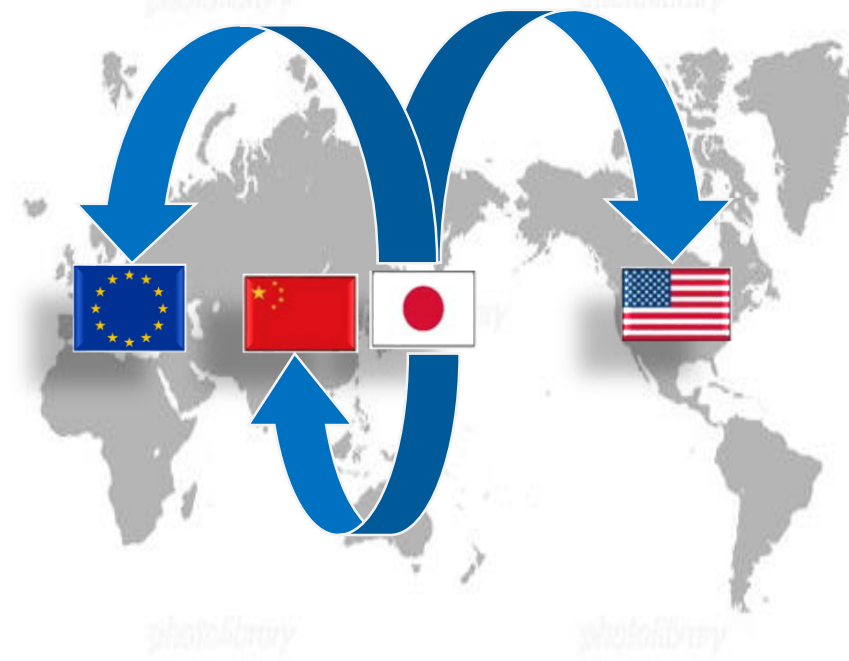
Create benefits of Yaskawa Solution Factory

- ① Global expansion of the latest production methods
- ② Improvement of productivity by promoting automation and preventive maintenance
- ③ Improve profits by promoting in-house production of parts

Optimal production through visualization of global production

Maximize profits with timely product supply based on supply chain optimized for regional demand

Implement the latest production methods from Japan into global bases



Motion Control Segment Drives Business

Overview of AC Drive Business

Business Overview

- Development, production, and sales of AC drives, matrix converters, high-efficiency motors and other components to improve performance and efficiency of machineries

Strengths

- Leading power electronics and high-efficiency motor technologies in the energy-saving field
- Control and sensing technologies accumulated over multiple years of experience in the motor drive fields
- Knowledge of machinery and equipment stemming from system engineering
- Global sales and service sites, development centers and production plants

Business Opportunity

- Expansion of infrastructure investment
- Continuous energy-saving needs
- Expansion of factory automation
- Growing markets in emerging countries

Market size (Assumption)

【FY2021】
AC drive market:
Approx. 1,350 BJPY

*Estimated by Yaskawa

Targets for “Vision 2025” and “Challenge 25”

Vision 2025

Become a drives specialist chosen by the customers through creating value in key markets

Dash 25

〈Achievements〉

<Development Capability>

- Accumulated application specific technology and skills
- Released new AC drive series

<Production Capability>

- Initiated production of new AC drive series at 5 global factories
- Validated the viability of ASEAN supply chain

<Sales Capability>

- Actively developed connection with customers
- Initiated sales of new AC drive series

Challenge 25

〈Targets〉

<Initiatives>

- 1.Capture target markets through global enforcement of customer response capabilities
- 2.Capture automation market by introducing predictive management technology
- 3.Capture energy-saving application through new value proposals

<Financial target>

***Motion Control segment**

Net Sales : 240.0 BJPY
Op. Income : 43.4 BJPY
Op. Income ratio : 18.1%

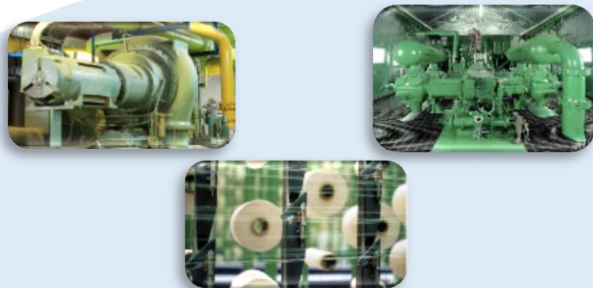
Realize 25

〈Targets〉

Aim to achieve global share of 10% by increasing share in energy saving application

Initiative 1: Capture Target Markets through Global Enforcement of Customer Response Capabilities

**Improve machine performance by expanding AC drive product lineup
optimized for each application and provide quick service in each region**



General-machinery



Elevator



Crane



Air conditioner fan



Pump



General purpose AC drive

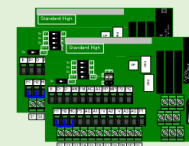


Application-specific
AC drive



**Program Capacity
Expanded!**
Number of
connections: **200**
Function Blocks: 419

Programming

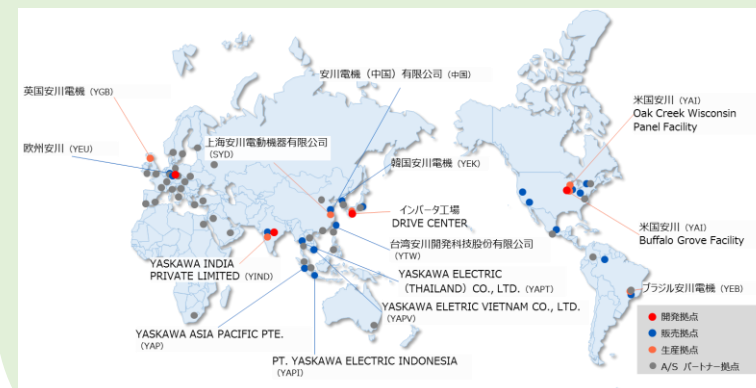


I/O* extension



Built-in
environmental
function

+ Quick "Plus one" service

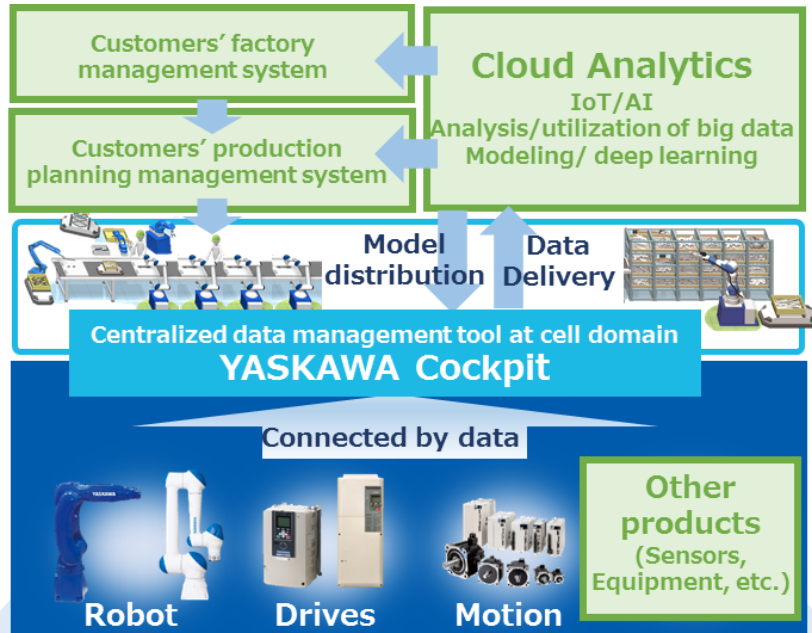


Development (4 sites), production (5 sites),
and After-sales Service (150 sites)

*I/O: Input/Output

Initiative 2: Capture Automation Market by Introducing Predictive Management Technology

Propose new value through i³-Mechatronics and predictive management



Food machinery



Material handling machines

Self-diagnosis function of AC Drives

Predictive function for AC Drive and machinery

Internal parts of AC Drive



Deterioration of machinery and equipment



Belt deterioration



Belt/Pully deterioration

Operation life extension of machinery and equipment

Prevent machine and motor failures and shorten downtime

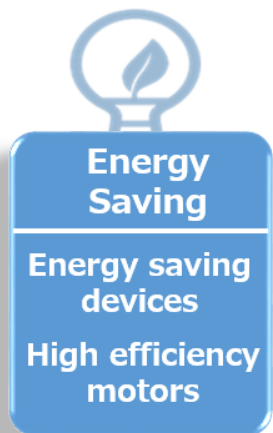
Prevention of demagnetization of synchronous motor Suppression of compressor vibration



*Software under development

Initiative 3: Capture Energy-saving Application through New Value Proposals

**Propose new added value through combining high-performance
AC Drives and high-efficiency motors**



**Expand
Application
Field**



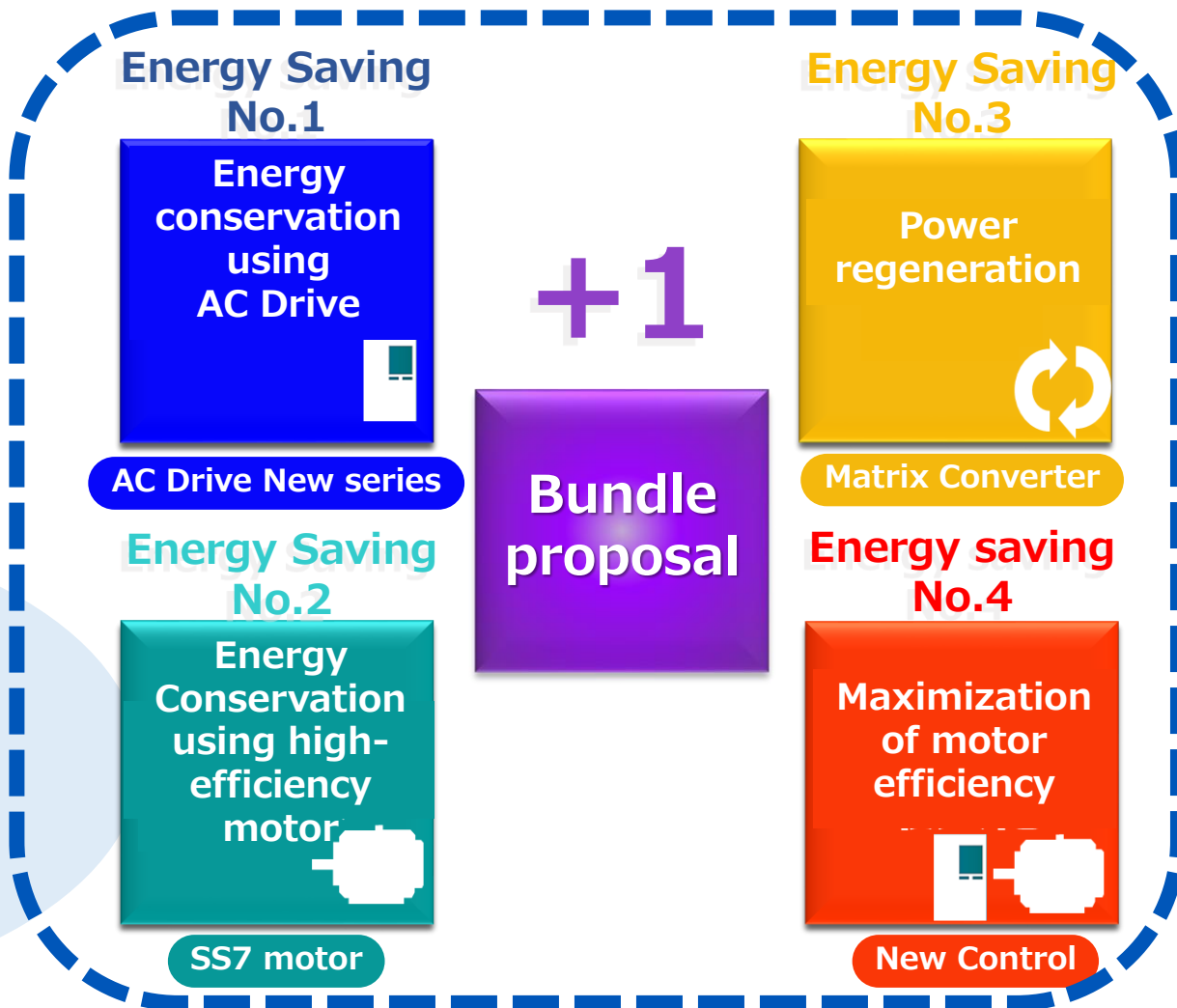
Compressor



Air conditioner fan



Pump



Robotics Segment

Overview of Robotics Business

Business Overview

Development, production and sales of industrial robots suitable for various applications, including automotive, semiconductor, and general industries

Strengths

- Developed the first Japanese all-electric multi-joint robot in 1977
 - Met growing needs for labor saving and automation at production sites
 - Achieved top-class global market share
- In-house production of servo motors; the most important element for performance of robots
 - Secured competitive advantage through improvement of robot performance and reduction of production costs

Business Opportunity

- Increasing automation needs of manual tasks against backdrop of labor shortages
- Sophistication of production through the use of IoT
- Reformation of manufacturing in the automotive industry

Market Size (Assumption)

【FY2021】
Industrial robot market :
Approx. 1,600 B.JPY

*Estimated by Yaskawa

Targets for “Vision 2025” and “Challenge 25”

Vision 2025

Become global No.1 robotics company through robotics solution that can realize “Revolutionary Industrial Automation”

Dash 25 (Achievements)

<Development capability>

- Expanded new product lineup (53 models)
→ Improved product competitiveness
→ Cost reduction through switch over
- Released lineup of collaborative robot
- Commercialized YASKAWA Cockpit

<Production capability>

- Enhanced global production capacity and improved profitability
(Expansion of Changzhou factory, and establishment of new Slovenia factory)

<Sales capability>

- Improved relationships with customers by top management sales activities
- Focused sales and development of new technologies in automotive, general and semiconductor markets

Challenge 25 (Target)

<Initiatives>

1. Expand orders in key markets
(Automotive/General industries)
2. Expand product lineup and technological domain by strengthening development capabilities
2. Enhance production capacity and efficiency in response to volume increase

<Financial target>

Sales : 210.0 B.JPY
Op. income : 27.3 B.JPY
Op. income ratio : 13.0%

Realize 25 (Target)

Aim to achieve global No.1 share through pursuing the development of solution based on “i³-Mechatronics” concept and contributing to expansion of manufacturing automation (as a result, expansion of Yaskawa’s business)

Initiatives 1-1 Enhance Engagements in Automotive Industry

Expand business in the automotive market by strengthening solution capabilities cope with changes in production processes triggered by environmental concerns and electrification of vehicles, as well as expansion of manufacturing process automation

Engagements in Japan, EU, and the Americas

Horizontal expansion of engagements with key automotive car manufacturers and component suppliers on a global scale



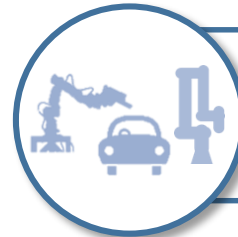
Capture Chinese automotive market

Enhance solution proposal to key automotive manufacturers and component suppliers

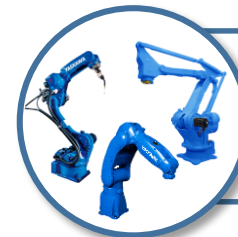
Reinforce proposal capabilities by promoting new solution development



Respond to transformation of production process such as electrification of vehicles



Strengthen system solution capabilities using robots

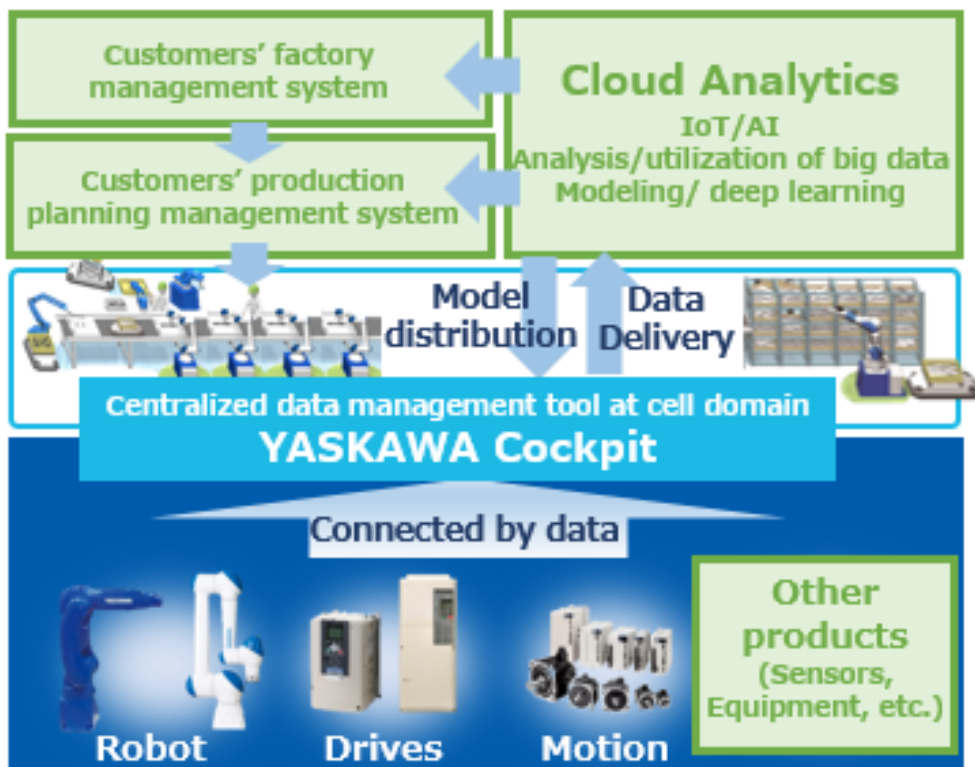


Accelerate local development of optimized robots

Initiatives 1-2 Enhance Engagements in the General Industries

- Expand market share in general industries through i³-Mechatronics concept
- Realize solution business through digital data solutions

Implement concept of i³-Mechatronics in collaboration with key customers by area / industry



Capture growing markets in China and Asia

Respond to rise of local competitors with differentiation strategies

Enter 3C markets in China and Asian countries



Expand sales of collaborative robots



Create automation solution that is optimal for installation of collaborative robots

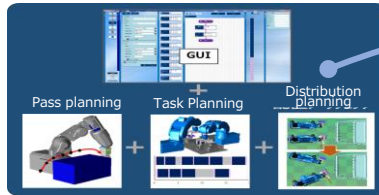
Initiative 2: Expand Product/Technology Fields by

Strengthening Development Capabilities

Feedback analysis based on various data and simulation results through digitalization of operating condition of components and equipment etc.

Realization of "Digital Twin"

YASKAWA Planning



Digital Environments

AI technology



Data Collection/Analysis/Feedback

Production Site



Generate Movement

Data Collection

YASKAWA Cockpit



Feed-back

Data Collection

YRM Controller (Tentative name)

Digital Environment

Real Environment

AI technology



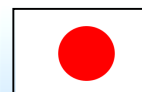
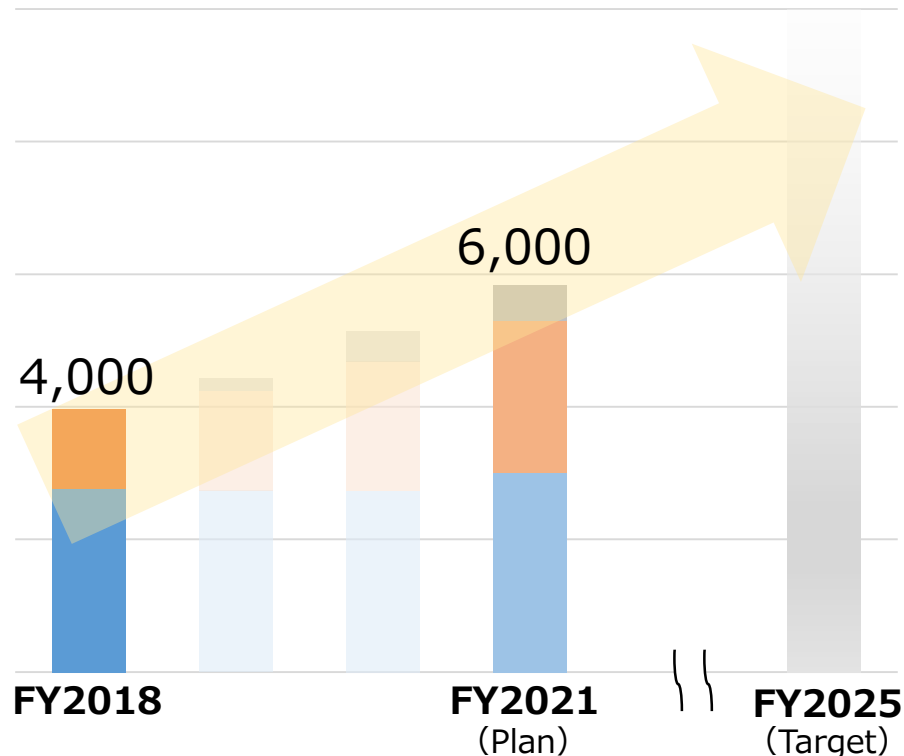
Total control of cell layer

Initiatives 3: Increase Productivity in Response to Volume Increases and Improve Profitability by Enhancing Productivity

**Further improvement of production efficiency by
strategic increase of production capacity at three global bases,
and global implementation of Japan's production system**

Global Production Capacity (Unit/Month)

■ Europe ■ China ■ Japan



Establish highly efficient production system as the mother factory

1. Restructure each site in Japan and increase production efficiency
2. Promote Smart Factory concept

Global implementation



Increase production capacity in response to increased demand

1. Efficiency improvement through restructuring of Yaskawa China Robotics Plant No.1 and No.2
2. Expand capacity of Plant No.3

Global implementation

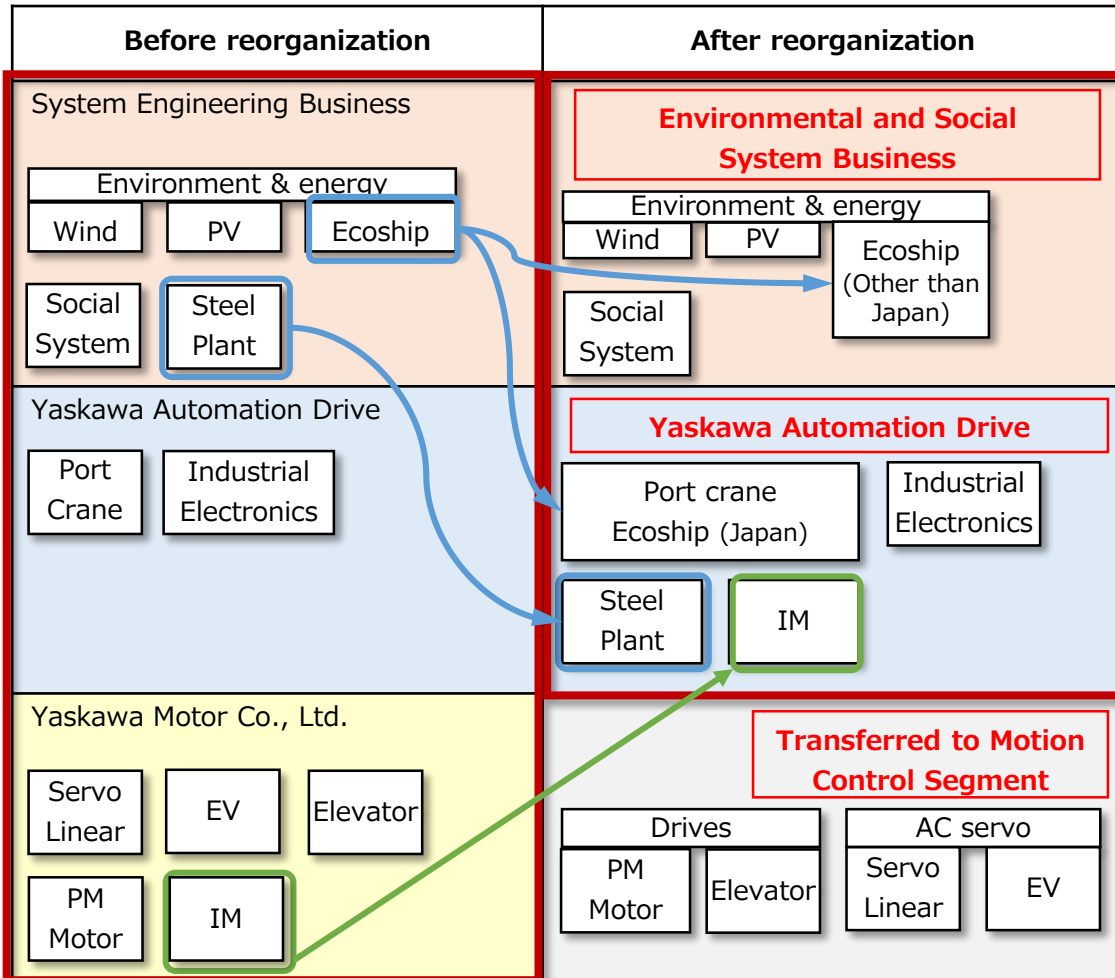


Full-scale production of new production site

1. Gain market share through optimal local production
2. Build new supply chain in the European market

Systems Engineering Environment and Social System Business

Restructuring of System Engineering Segment



Notes 1: Scope of System Engineering Segment is indicated by the red frames

Notes 2: PV: Photovoltaic inverter, EV: Electric drive system for electric vehicles, PM Motor: Permanent magnet type synchronous motor, IM: Induction motor

New System Engineering Segment

Environment and Social System Business

- Specialized in environmental energy and social infrastructure business

Yaskawa Automation & Drives Corp.

- Specialized in industrial automation/drive business

System Engineering Segment was reorganized for the purpose of improving productivity and efficiency through optimizing functions within the Yaskawa group, effectively utilizing resources, and reducing indirect costs

Overview of Environment and Social System Business

Business Overview

- Development, production and sales of generators and converters for large-scale wind turbines, PV inverter for solar and electrical equipment for Ecoships
- Development, design and production of electrical systems for water treatment plants

Strengths

- Power-conversion technologies (energy-saving and high-efficiency) of Yaskawa and strong technological capabilities of acquired Solectria^{*1} and the Switch^{*2}, which were acquired
- Global sales network of Yaskawa, and strong customer base of the two companies acquired
- Achievements and system technology development capabilities gained in the public and industry sector

Business Opportunity

- Renewable energy market, which will be the mainstay in the mid to long-term perspective
 - European offshore wind power
 - PV market in the U.S.

Market Size (Assumption)

[FY2021]
Offshore Wind Power Market:
Approx. 80 B.JPY
(Generator + Converter)

PV Inverter market:
Approx. 400 B.JPY
(3phase distributed PV inverter)
*Estimated by Yaskawa

*1: U.S. subsidiary that manufactures and sells PV inverters

*2: Finnish subsidiary that manufactures and sells generators and converters for large-scale wind turbines

Target for “Vision 2025” and “Challenge 25”

Vision 2025

Capture the expanding needs of global renewable energy market, particularly in Europe and the U.S., and grow business in areas where Yaskawa’s energy conversion technology can be leveraged

Dash 25 (Achievements)

<Development capability>

- Introduced wind power generators for larger capacities
- Started in-house production of wind power converters
- Launched XGI1000, new product for PV inverter, developed jointly by Japan and the U.S.

<Production capability>

- Completed preparation for mass production of wind power generators
- Integration of U.S. production sites

<Sales capability>

- Large-scale orders obtained for wind power generators
- Discontinued sales of unprofitable PV inverter products

Challenge 25 (Target)

<Initiatives>

1. Expand large-scale wind power generation business, focusing on offshore projects in Europe
2. Expand sales of new products and restructure PV inverter business

<Financial target>

***System Engineering segment**

Sales : 60.0 B.JPY
OP income : 1.8 B.JPY
OP income ratio : 3.0%

Realize 25 (Target)

Expand business area of renewable energy market into new regions (Asia, etc.) and fields (energy storage applications, etc.), based on business built up in “Challenge 25”

Initiative 1: Expand Business of Electrical Appliances for Large-scale Wind Turbine

- **Expand business to key wind turbine manufacturers, especially in Europe**
- **Create new global business opportunities**

Expand sales to key European wind turbine manufacturers

- Expand orders by strengthening top management sales strategy
- Secure profitability by deploying cost-cutting initiatives
- Establish mass production framework of next-generation large-scale generators

Create new global business opportunities

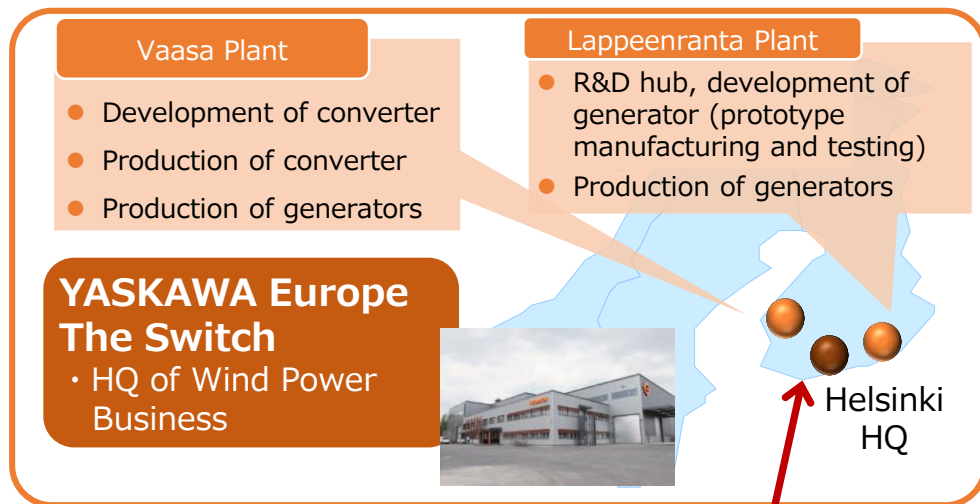
- Determine commercialization of large-capacity converters
- Acquire offshore wind power projects in Japan (Promote activities to be assigned as designated supplier from power distributor)
- Develop converters for energy storage applications



Permanent magnet type synchronous generator



Full-power converter (FPC)



Environment and Social System

- Global development, production and quality control HQ of Asian operations



Development function

- Development and production of drive module for wind power

Sales function

- Sales/Engineering in Japan
- Support of Asian sales
- After-sales service

Initiative 2: Stable Profitability by Reorganization of PV Inverter Business

- **Expand sales by introduction of new products (XGI1000)**
- **Improve profitability through business restructuring**

Expand orders and improve profitability of the U.S. business

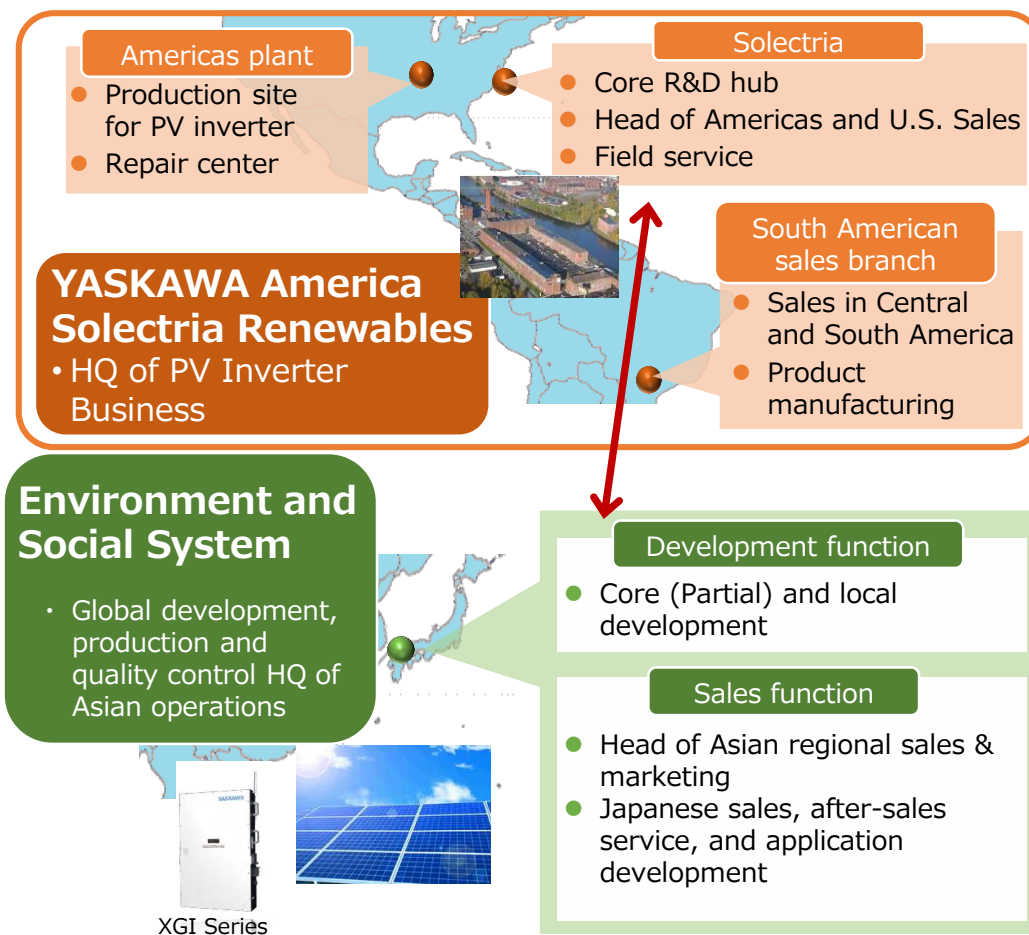
- Expand orders through release of new PV inverter (XGI series)
- Improve profitability by strengthening sales strategies of XGI1000
- Develop new products that support energy storage applications

Restructure business in Japan

- Expand orders in the private energy consumption market through solution proposal
- Expand orders for high-voltage projects through XGI series

Reform Business Structure in the Americas

- Increase efficiency by continuous reorganization of Solectria



Disclaimer

- The Company changed its accounting period in fiscal 2017 from March 20 to the last day of February. The results of fiscal 2017 are shown as <reference>. The <reference> figures are based on an assumption that the accounting period remained unchanged (from March 21, 2017 to March 20, 2018).
- The information within this document is made as of the date of writing. Any forward-looking statements are made according to the assumptions of management and are subject to change as a result of risks and uncertainties.

YASKAWA Electric Corporation undertakes no obligation to update or revise these forward-looking statements, whether as a result of new information, future events, or otherwise.

YASKAWA