Energy & Environment Business Plan

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Energy & Environment

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June 10, 2016

MITSUBISHI HEAVY INDUSTRIES, LTD.

Table of Contents

Table of Contents

Philosophy of Domain Statement

Built from elements of Group Statement announced on May 9, 2016
relevant to Energy & Environment domain,
as part of MHI Group Brand Story

Concept behind Energy & Environment Domain Statement

As a leading force in the energy plant industry, MHI
contributes to social and industrial development and
better lives for people everywhere through
the provision of products and services
that enable a stable supply of sustainable energy.

MOVE THE WORLD FORWARD

Energy makes the world go round. As one of the global leaders in the energy plant industry, we're helping produce the stable and efficient power supply needed to keep it moving. Driven by engineering expertise and technologies in both electricity generation and chemical process plants, we are securing clean, safe and sustainable power sources to communities across the world. Enriching people's everyday lives in order to "Move the world forward."

While needs may vary, our wide range of products, engineering capacity and continuous R&D provide the flexibility required to meet any and all customer demands. Allowing us to drive growth and prosperity for each society, along with the people who live there. It's a story of success that continues to be written. One that will fuel hope and well being for generations to come.

1-2. Business Overview

Thermal power plant

- GTCC Gas Turbine Combined Cycle
- Coal fired power plant
  IGCC MITSUBISHI HITACHI POWER SYSTEMS
- Gas turbines converted from aircraft engines PW Power Systems

Environmental plant

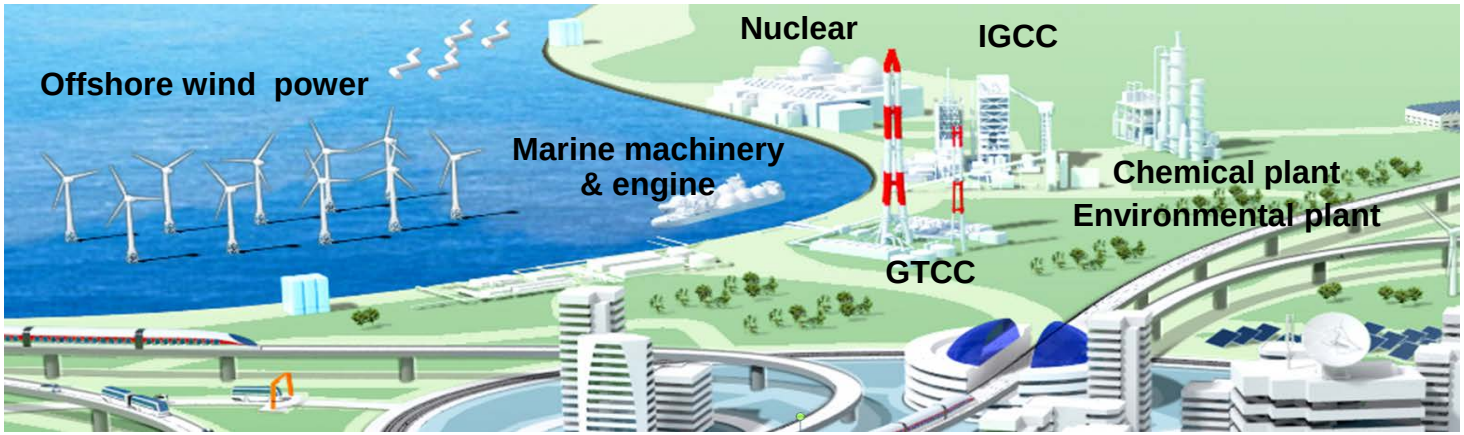
MITSUBISHI HITACHI POWER SYSTEMS

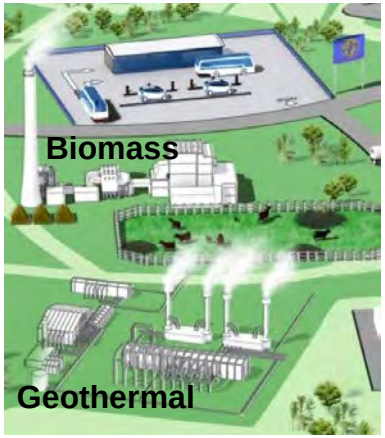
Chemical plant

- Fertilizer / Methanol etc.

Marine machinery & engine

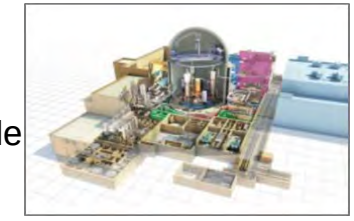
MITSUBISHI HEAVY INDUSTRIES MARINE MACHINERY & ENGINE CO., LTD.





Nuclear

- Pressurized Water Reactor (PWR)
- ATMEA1
- Nuclear fuel cycle



Renewable Energy

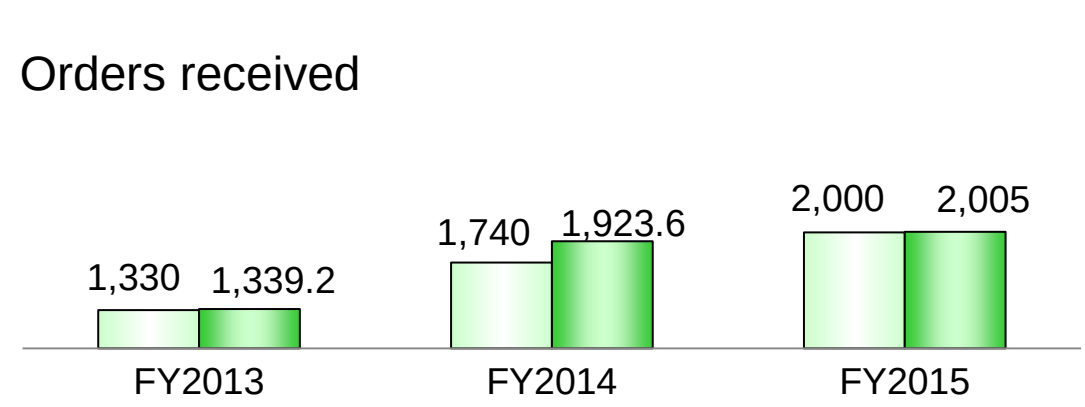
- Offshore Wind Power

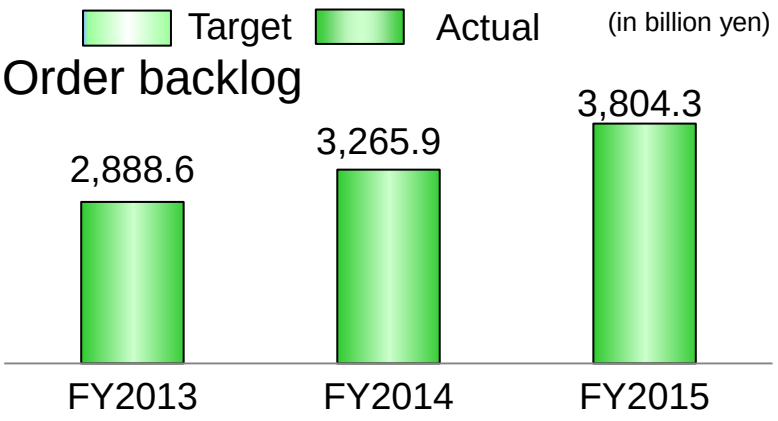
- Geothermal

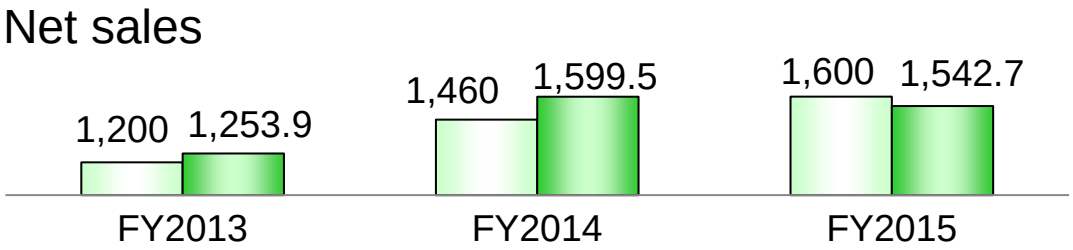
- Organic Rankine Cycle

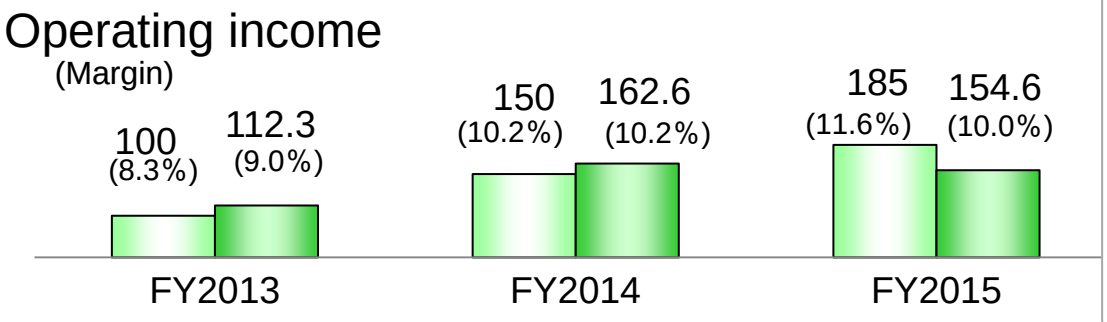
1-3. Review of FY2015

In FY2015, through implementation of various reforms, including M&A synergies, business scale expanded generally on target and an order backlog was secured for the next two years.









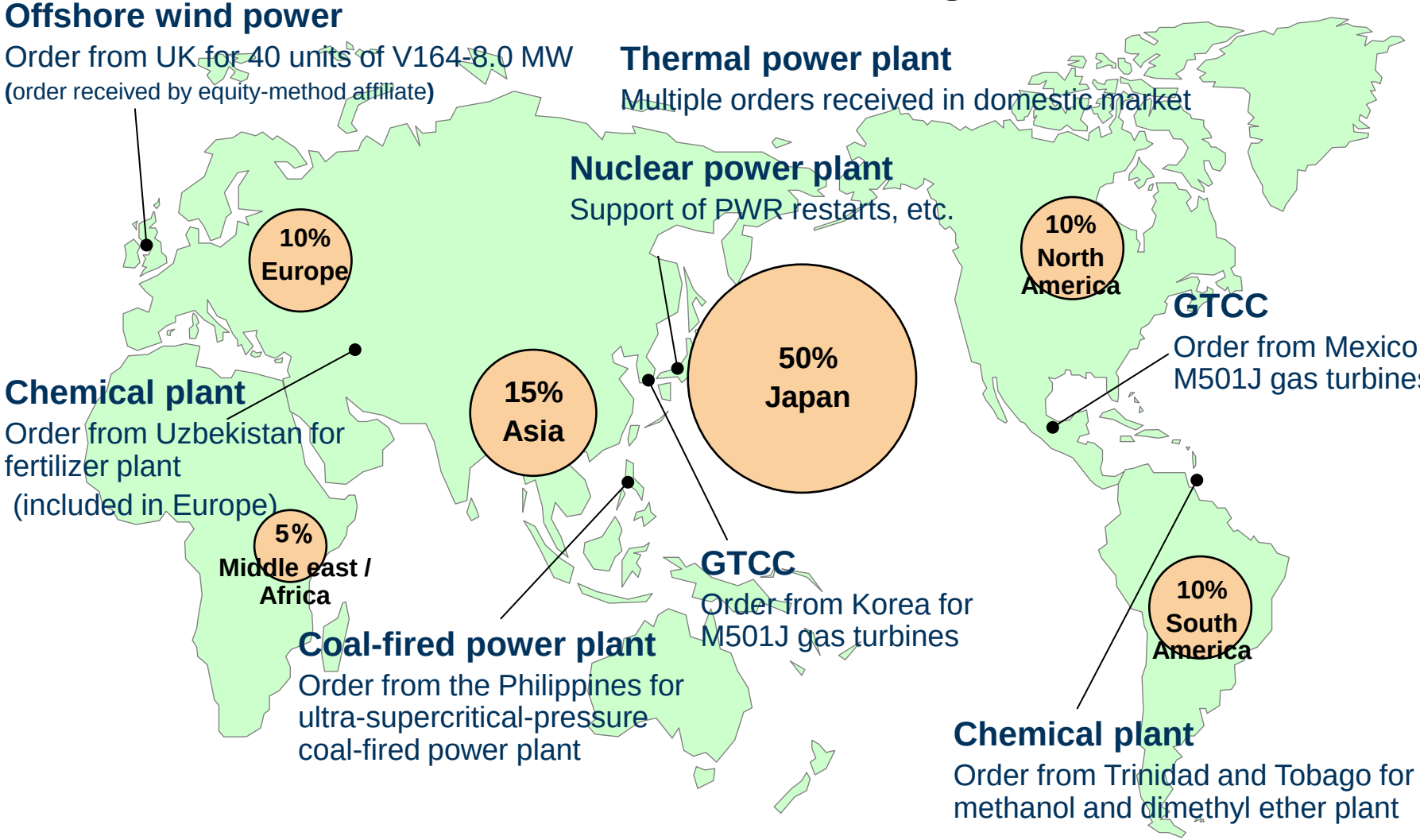
▼ Oct. 2013 Launch of Energy & Environment domain

- **Orders received**
  Large-scale orders received for thermal and chemical plants, etc.
- **Net sales down**
  Down due to period shift projects for thermal plants
- **Operating income down**
  Booking of costs for Himeji No.2 Power Plant, etc.

1-4. Major Projects and Orders in FY2015

Breakdown of orders received in FY2015 (2,005 billion yen)

Scale of orders received in FY2015, by region



Review of FY2016 targets

- Orders received :
  Revised slightly downward due to opacity of global economy, etc.
- Net sales :
  Reduced in reflection of period shift in project execution and numerous servicing orders with long delivery periods
- Operating income :
  Operating income outlook lowered in reflection of lower sales.
  Operating margin, we will take various measures to secure the target.

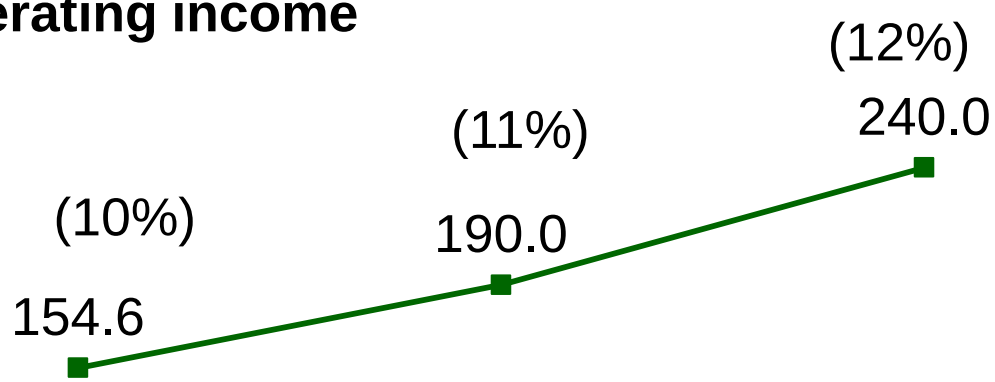
(in billion yen)

	FY2015		FY2016		FY2017
	Target	Actual	Original target	Revised target	Target
Orders received	2,000.0	2,005.0	2.200.0	2,100.0	2.300.0
Net sales	1,600.0	1,542.7	1,900.0	1,700.0	2,000.0
Operating income	185.0	154.6	210.0	190.0	240.0
Operating income margin	11.6%	10.0%	11.1%	11.2%	12.0%

Table of Contents

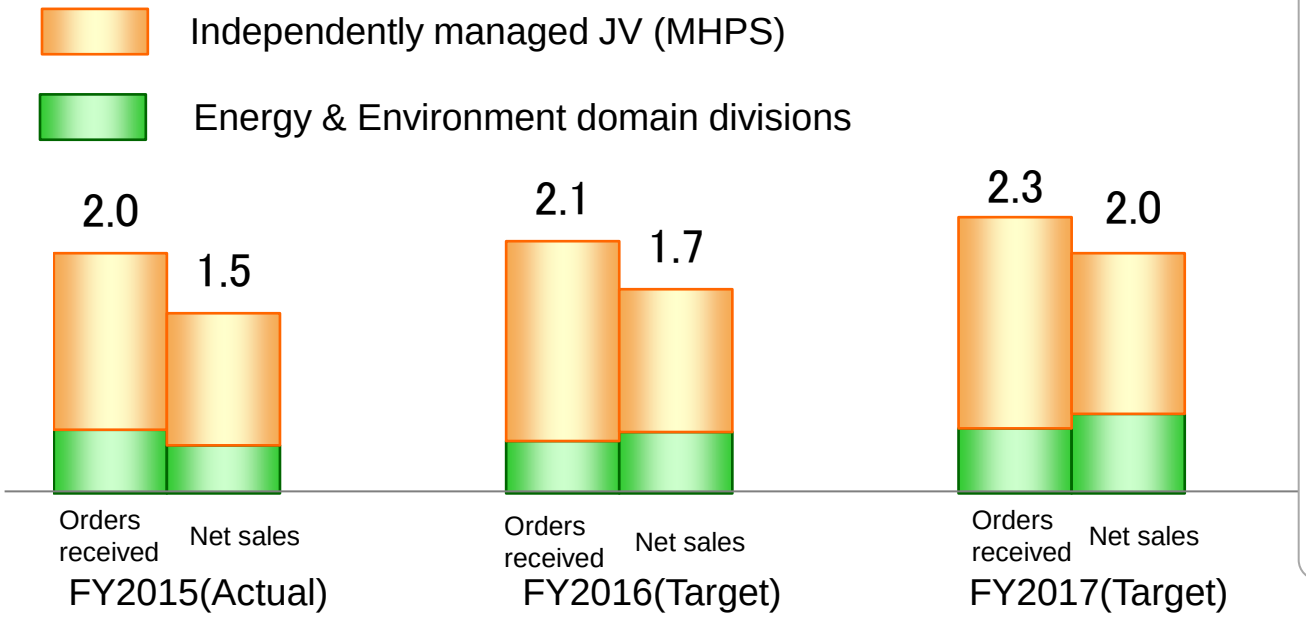
Operating income

(in billion yen)



Orders received, Net sales

(in trillion yen)



- **Orders received**
  100 billion yen increase over FY2015, from stronger order-receiving structures in overseas, etc.
- **Net sales**
  200 billion yen increase over FY2015, dependent on construction progress of thermal power and chemical plant orders received in FY2014 and FY2015
- **Operating income**
  190 billion yen, up 35 billion yen from FY2015, to come from reduced G&A expenses (from PMI progress) and expansion of servicing operations

2-2. FY2016 Business Policies & Strategies

2015 Business Plan measures	Status/Challenges	Future measures
Measure 1 Increase earning capacity Expand scale	Expanding overseas market share GE・Alstom integration	Measure 1 Strengthen earning capacity ・Accelerate PMI at MHPS ・Strengthen servicing operations
Measure 2 Carve out, downscale/withdraw SBUs	Accelerate	Measure 2 Concentration into core competencies
		Measure 3 Improve operating capital Reduce total assets
Measure 3 Strengthen technologies Reform governance structure	Technological prolems/Emergence of business risks	Measure 4 Strengthen technological and business risk resilience
Measure 4 Utilize IoT/AI	Global advances in IoT (Industry 4.0 GE Predix)	Measure 5 Reform business models Strengthen servicing operations using IoT
Measure 5 Reform business models		

Form firm financial foundation

Details on following pages

IoT : Internet of Things AI : Artificial Intelligence

2-2. Measure1 Strengthen earning capacity ①Acceleration of MHPS PMI

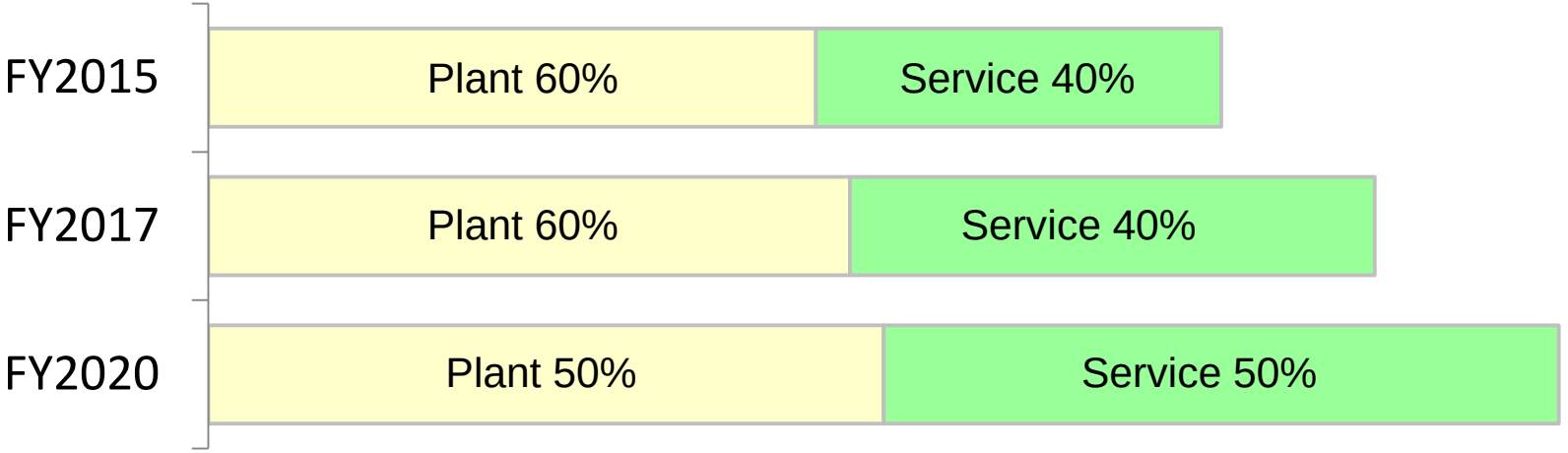
Pursue total global optimization and accelerate speed of business scale expansion

	FY2014	FY2015	FY2016	FY2017
Feb. 2014 MHPS established▼	PMI 1st step		**PMI 2nd step**	
Sales	Strengthen response to domestic power plant bidding		Strengthen overseas order-receiving structures (Strengthen small/medium scale gas turbine and geothermal power generation plant businesses)	
Manufacturing	Adjust work load through construction flexibility Shift operations of Yokohama works Kanazawa Area		**Pursue total global optimization ”One Works”**	
G&A	Integrate personnel and core systems Form overseas regional management structures		**Pursue total global optimization ”One Company”**	
Service	Enhance servicing program menus		Shift personnel to servicing business Develop new businesses (using ICT, etc.)	
Development / Engineering	Apply large-scale gas turbine technologies to small/medium scale models		Develop and verify next-generation gas turbines	
Procurement	Reduce costs through bulk order placement		Expand global procurement	

G&A : General & Administration expenses

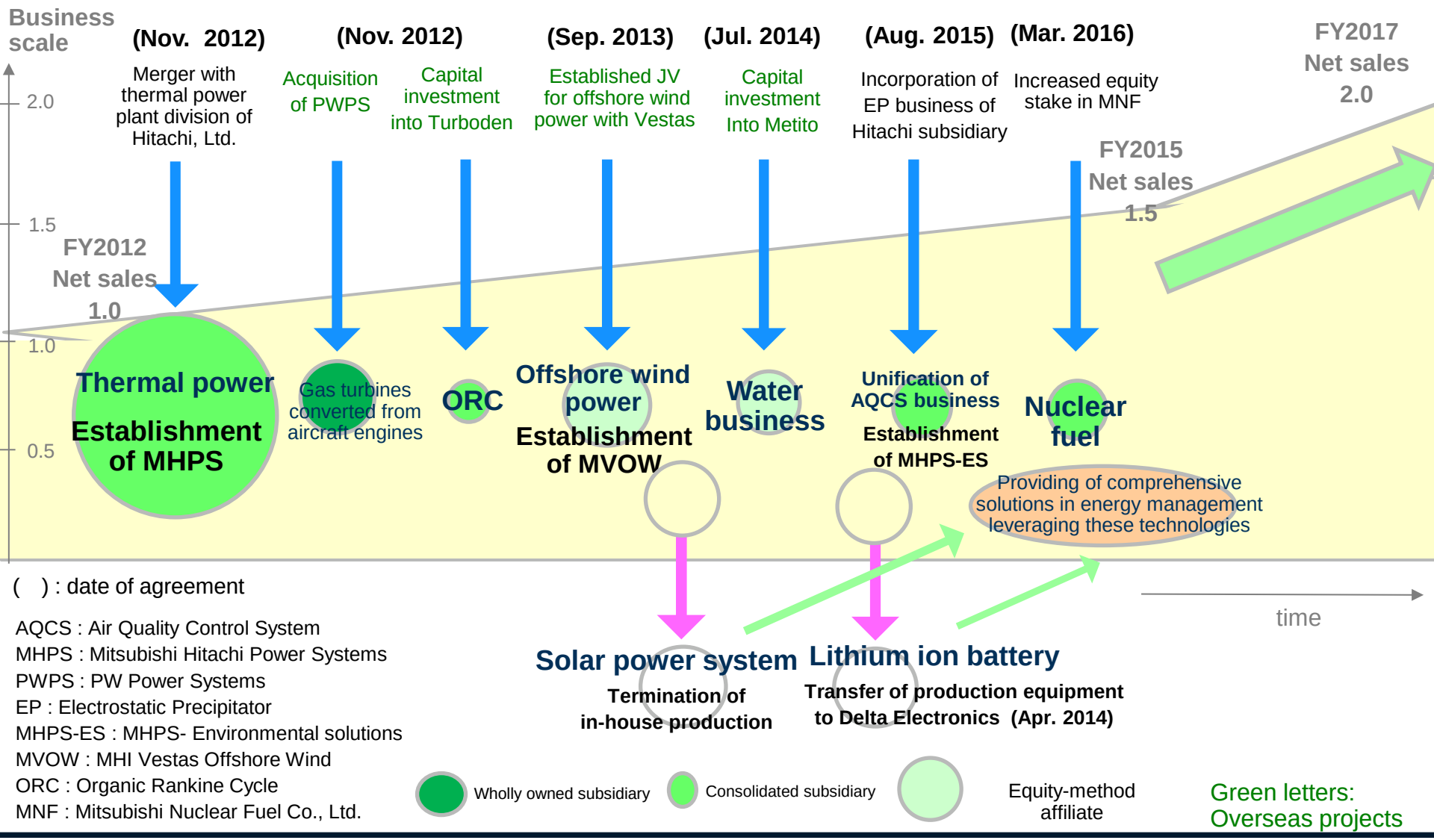
- Shift personnel to servicing business
- Expand existing business through enhancing service program menus
- Develop new businesses
  - New performance enhancement program
  - Entry into O&M business through use of ITC
  - Expand servicing of power generation equipment, control devices and environmental plants
  - Develop relocation business
  - Promote localization at all bases

Expand after-sales servicing business



Developments in concentration into core competencies since FY2012

(in trillion yen)



( ) : date of agreement

AQCS : Air Quality Control System
MHPS : Mitsubishi Hitachi Power Systems
PWPS : PW Power Systems
EP : Electrostatic Precipitator
MHPS-ES : MHPS- Environmental solutions
MVOW : MHI Vestas Offshore Wind
ORC : Organic Rankine Cycle
MNF : Mitsubishi Nuclear Fuel Co., Ltd.

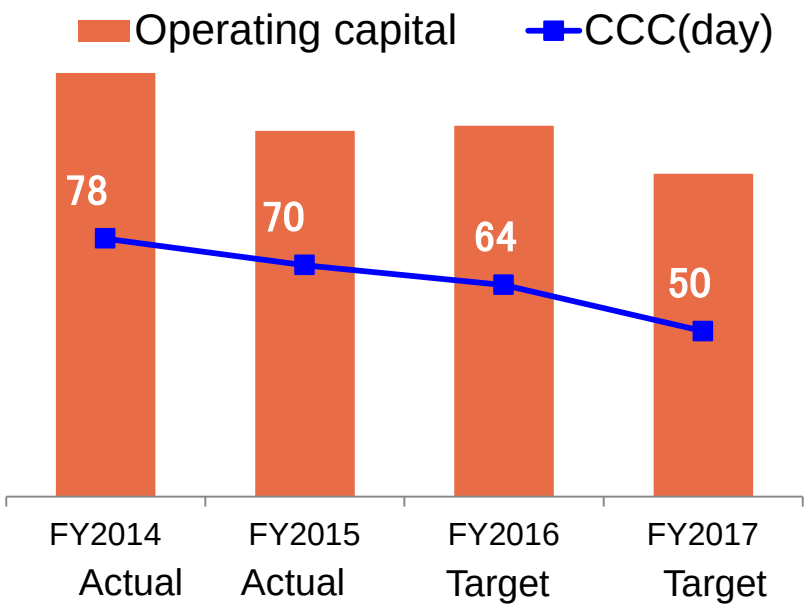
Wholly owned subsidiary
Consolidated subsidiary
Equity-method affiliate

Green letters: Overseas projects

2-2. Measure3 Operating capital reduction and CCC's shortening

- Shorten production lead time
- Reduce inventories by expanding interchangeability of hot parts
- Forge unified inventory management system for all bases worldwide
- Swiftly recover long-overdue accounts receivable

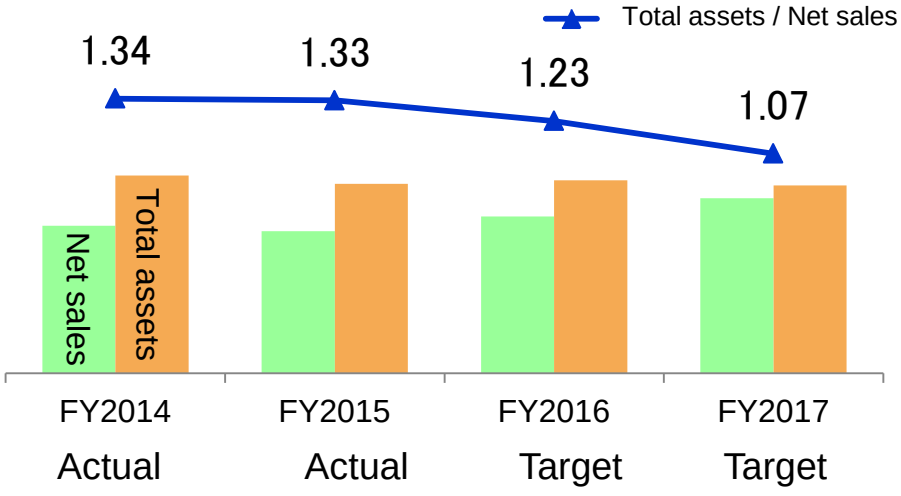
Operating capital reduction and CCC shortening



Initiatives to achieve "net sales ≧ total assets" through various measures

1. Improve operating capital (Measures listed above) 2. Restructure bases (P12:Acclerate MHPS PMI)

3. Select investments and financing with optimal discretion (P14:Concentration into core competencies)



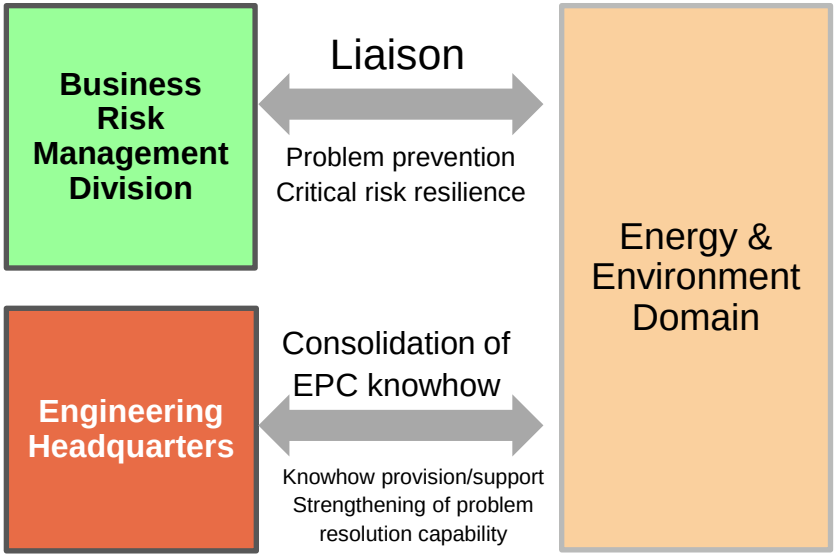
CCC : Cash Conversion Cycle

1. Strengthen technological risk resilience

- Improve technological capabilities (expand expertise) by strengthening development and design structures; reduce risk by strengthening progress management and gate control
- Strengthen procurement processes (selection, evaluation, quality control) through multifaceted technological reviews (design, manufacturing, inspection) by experts; prevent problems arising from procured items

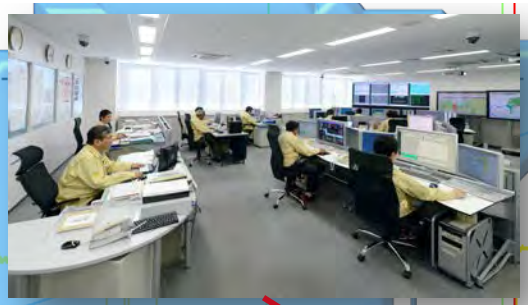
2. Strengthen business risk resilience

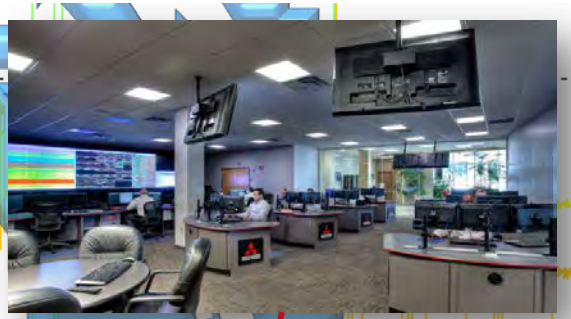
- Prevent problems through liaison with Business Risk Management Division; respond to realized critical risks
- Consolidate EPC knowhow at Engineering Headquarters; strengthen problem resolution capability
- Strengthen accuracy of risk projection and awareness through establishment of company pooling companywide experts



2-2. Measure5 Strengthen servicing operations using IoT(1/2)

- Takasago and Orlando RMCs monitor 115 gas turbines worldwide, contributing to the world's highest operation rate.
- Strengthen monitoring in Asia and the Middle East through establishment of a new monitoring center in the Philippines.





Remote monitoring
Symptom monitoring
Performance enhancement
Remote support
Operating advice

Takasago

Orlando

Philippines

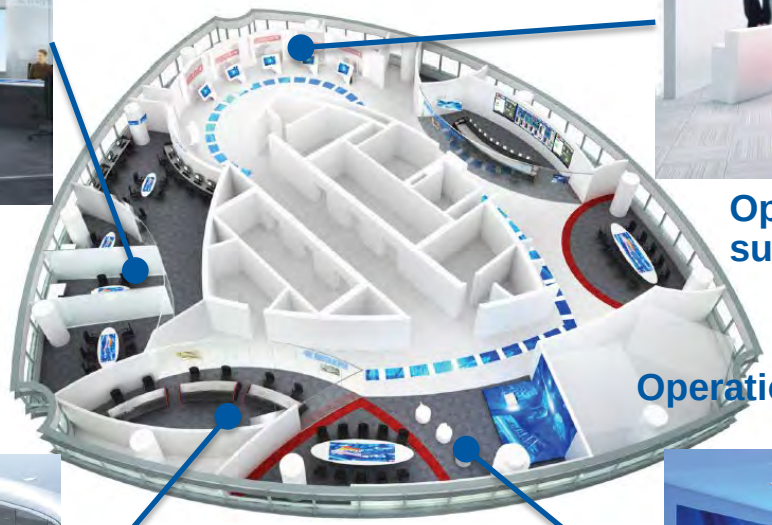
RMC :Remote Monitoring Center

2-2. Measure5 Strengthen servicing operations using IoT(2/2)

The remote monitoring center to be established in the Philippines will monitor all coal-fired and GTCC thermal plants in Asia and the Middle East, and provide increasingly advanced support and services to customers based on big data analysis;
it will also have a role as global service center working closely with boiler works in the Philippines (MHPS-PHL), integrating training function and customer support office.

Customer support

Operation & Maintenance support



Performance enhancement proposals

Operation and maintenance support through training

Symptom detection
Operation rate improvement

Table of Contents

Further strengthening of gas turbine business

1.Development of world's most efficient gas turbine

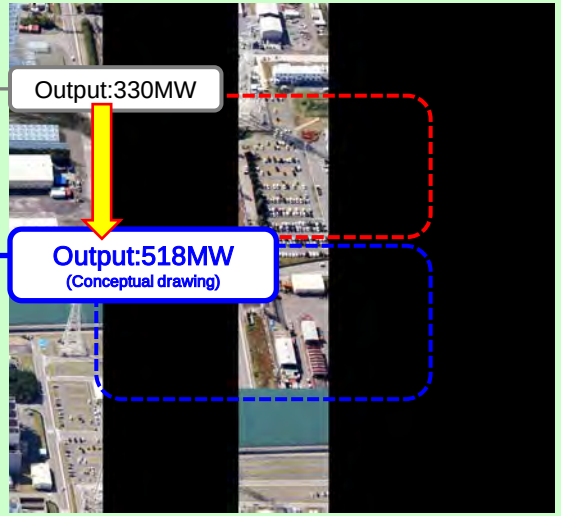
- World-class size demonstration facility
  - Targeting continuous verification of next-generation gas turbine technologies and reliability enhancement
- History of development at Demonstration facility
  - Development is underway as planned

1997 1,500℃-class G-series gas turbines

2010 1,600℃-class J-series gas turbines

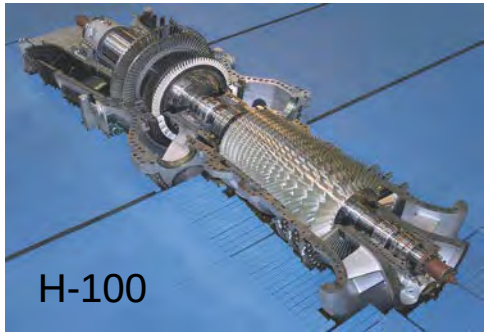
2020 **1,650℃-class next-generation gas turbines**

Demonstration facility
(Takasago Machinery Works)



2. Strengthening of small/medium-scale gas turbine business

- Expand technical and manufacturing synergies with large-scale GT
- Use as LNG plant compressor driver
  - Collaboration with Exxon Mobil



GT : Gas Turbine LNG : Liquefied Natural Gas

Respond with competitive products

- Large-scale :

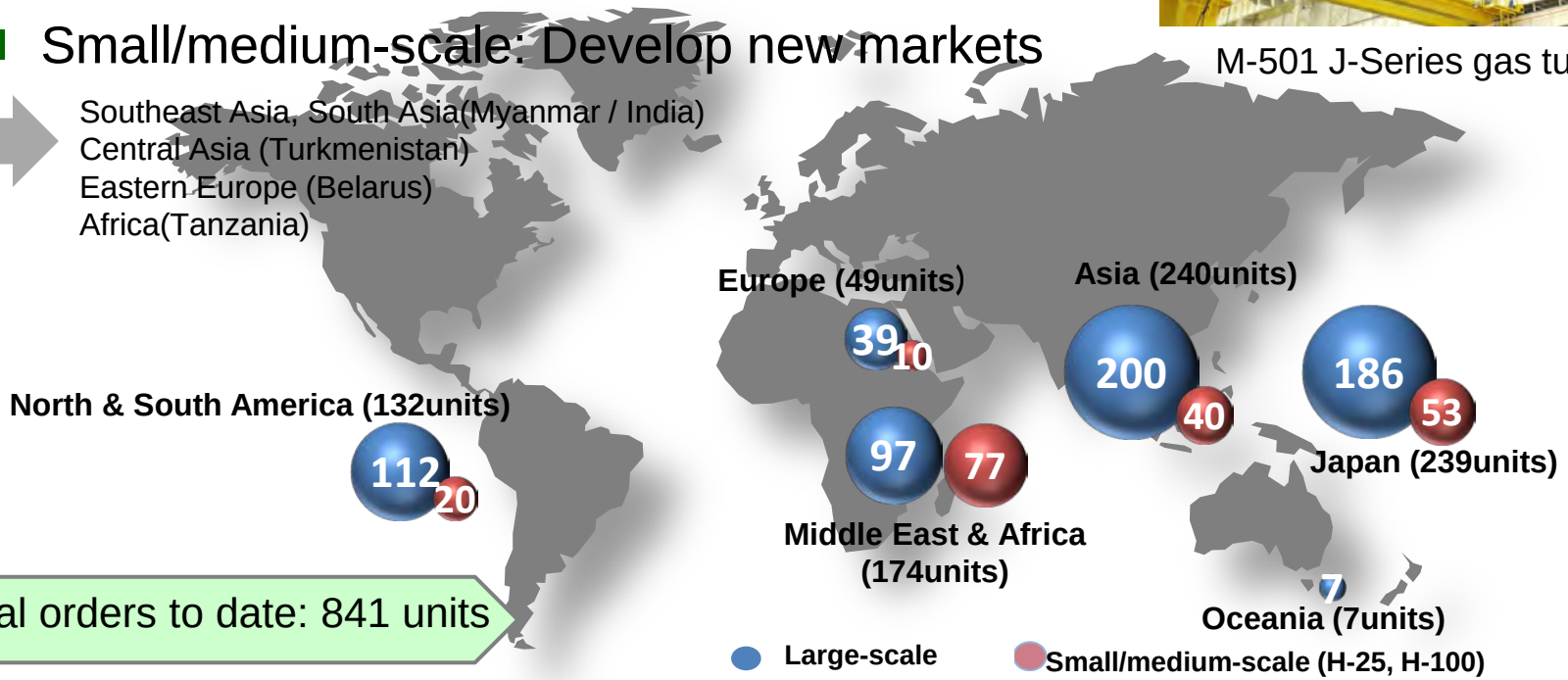
  Respond to intensifying competition with product competitiveness

  → Total J-type units delivered to date worldwide:41
  No.1 global share in 300MW and larger (cumulative, 2011-2015)

M-501 J-Series gas turbine

- Small/medium-scale: Develop new markets

  → Southeast Asia, South Asia(Myanmar / India)
  Central Asia (Turkmenistan)
  Eastern Europe (Belarus)
  Africa(Tanzania)



Total orders to date: 841 units

* Not including GTs converted from aircraft engines

*As of Mar. 31 2016

Business expansion through addition of small/medium-scale GT lineups

- Full-scale launch of FT4000
- Strengthen FT8 MOBILE PAC sales structure

PW Power Systems Acquired in Dec. 2012

Company undertaking sales, installation and after-sale servicing of gas turbines converted from aircraft engines

FT4000

- **FT4000**
  Strengthen sales cooperation relationship with MHPS
  Liaise technology development with MHI and MHPS
- **FT8 MOBILE PAC**
  Easy to transport and install
  Total units delivered to date: 131

FT8 MOBILE PAC

Further strengthen environmentally friendly coal-fired plants

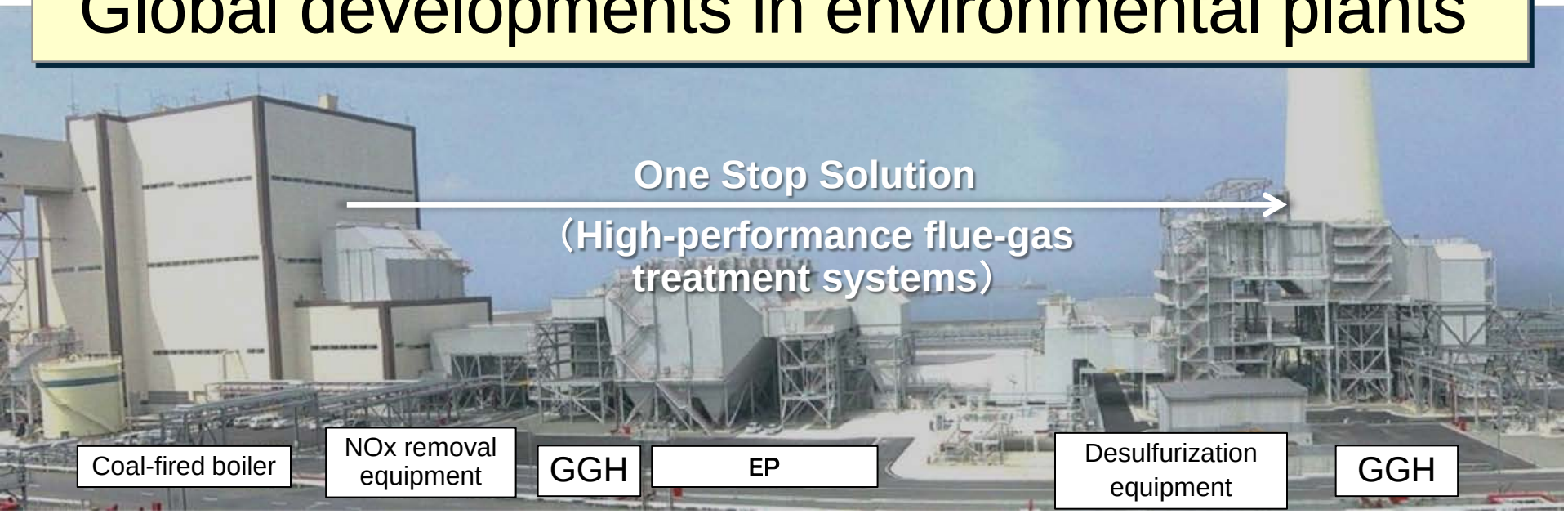
- **Proactive development of domestic and overseas markets**
  - -In domestic power generation plant bidding, received successive orders for large-scale and 110MW coal-fired plants
  - -Orders received for ultra-supercritical-pressure power plant projects (Korea, Indonesia, Philippines)
- **IGCC: proactively develop overseas business for world-leading technologies cultivated in Japan**
  - -Joban Joint Power Co. Nakoso Plant: in commercial operation (extending world record in continuous IGCC plant operation)
  - -Osaki CoolGen: demonstration to commence toward end of 2016
  - -Fukushima recovery power plants (Nakoso/Hirono): currently under design, working toward start of operations in 2020

Osaki CoolGen Corporation's IGCC demonstration plant(conceptual drawing)
(within Chugoku Electric Power Co.'s Osaki Power Station)

Fukushima recovery IGCC(Conceptual drawing)

IGCC : Integrated coal Gasification Combined Cycle

Global developments in environmental plants



- **Provide environmentally friendly coal-fired power plants through achievement of full product lineup**
  - -Established new electrostatic precipitator business company (MHPS-ES) in October 2015; consolidation of water treatment business completed in April 2016
  - -System optimization (denitrification, precipitation, desulfurization) achieved, enabling reductions in equipment and operating costs
- **Export coal-fired power plants incorporating cutting-edge environmental equipment**
  - -Business developed in China for environmental plants to address PM2.5 issue (high-performance dust removal system, low-temperature electrostatic precipitator)
  - -Propose coal-fired power plants equipped with regionally optimized environmental systems to Southeast Asia and India
- **Desulfurization equipment: No.1 global share in both FY2014 and FY2015**

GGH : Gas Gas Heater

3-2. Engineering Headquarters ①Purposes of establishment

Established in Jan. 2012

Engineering Headquarters

Consolidate EPC of MHI's plant division

Positive dissolution along with shift to domain structure in Oct. 2013

Established in Apr. 2016

Engineering Headquarters

Function-based organization spanning 4 domains, centered on EPC of Energy & Environment and Commercial Aviation & Transportation Systems

Chemical plant | Transportation system | Cruise ship

Enhance EPC capability in quantity and quality	Flexibly share expertise and resources Promote more advanced and efficient EPC functions
Accelerate human resources strengthening measures, including outside experts	Promote active use of experts (new company to be established in July 2016)
Strengthen risk resilience	Improve problem resolution capability and reduce risks through EPC knowhow provision and support

3-2. Engineering Headquarters ②Roles and functions

Changes in external business environment

Going forward: solution proposals

- EPC execution capability
- Project management capability


- Diversification of customer demands
- Increasing scale and complexity of deals

Until now: individual products

- Standardized design


Response to changes

Strengthen engineering capabilities throughout the MHI Group, centered on Engineering Headquarters

Engineering Headquarters

Chemical plant

Transportation system

- Mutually share human resources
- Exchange knowledge of advanced cases
- Forge an engineering foundation

MHI GROUP (MITSUBISHI HEAVY INDUSTRIES)

MITSUBISHI HITACHI POWER SYSTEMS

MITSUBISHI HEAVY INDUSTRIES, LTD. Nuclear division

MITSUBISHI HEAVY INDUSTRIES ENVIRONMENTAL & CHEMICAL ENGINEERING CO., LTD.

PRIMETALS TECHNOLOGIES

Liaison between shared technology divisions

Marketing & Innovation Headquarters, Value Chain Headquarters, Research & Innovation Center, ICT Solution Headquarters

Provide EPC knowhow and Groupwide support

3-2. Engineering Headquarters ③Chemical plant

Expand orders by strengthening competitiveness of MHI's major lineup (fertilizer plant, methanol plant, etc.)

FY2015 (Actual)

1. Conversion of business model (i.e. investment, entering new business)
- -Further participation in operation and maintenance through capital investment
- -Strengthened design capability by reflecting knowledge acquired through business participation
- -Capital investment in methanol/dimethyl ether plant for Trinidad & Tobago

→ Completed capital investment and construction underway

2. Focused on marketing on designated strategic regions: Russia, Central Asia -Fertilizer plant for Turkmenistan

→ Other than Turkmenistan, order for fertilizer plant received from Uzbekistan

Since 2010, five plant orders received from Russia and Central Asia

3. Commercialization of largest CO2-EOR* in the world (Production: Around 5,000 t/day)

-4,776t/day plant in USA , world's largest, to start operation in Q4 2016
(Global maximum to date: 3,000t/day)

EOR : Enhanced Oil Recovery

→ Construction proceeding smoothly

FY2016 (Targets)

Targets set on the following, while carrying on plans of FY2015

- Strengthen earning capability by steadily executing previously received orders. Apply the increased earnings to further investments and business expansion.
- Further expansion of orders, especially from Russia and Central Asia

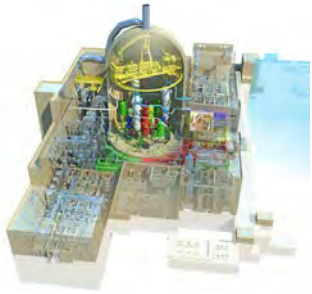
Fertilizer complex (ammonia, urea)

Contribute to restarting of plants in Japan
Drive overseas projects forward (Sinop, Turkey)

- Support restart of plants in Japan
  - Focused allocation of human resources and technologies to support restarts
  - Continue contribution through safety enhancement measures
- Drive overseas projects forward
  - Performing feasibility study for Sinop project in Turkey
  - Developing ATMEA1 global strategic reactor
- Respond to nuclear fuel cycle
  - Supporting safety enhancement measures
- Support stabilization of TEPCO's Fukushima No.1 NPP
  - Delivering contaminated water storage tanks
  - Participating in national project to introduce remotely controlled robots to undertake decontamination work and remove fuel debris

* Respond to SONGS arbitration
- Preparing for early settlement (2016 or 2017)

PWR in Japan



ATMEA1

Rokkasho reprocessing plant

MOX fuel plant

Container for transport and storage of spent fuel

Nuclear fuel cycle

Contaminated water storage tanks

Remotely controlled robot MHI-MEISTeR(*)

*As part of national project by Agency for Natural Resources and Energy, entrusted with International Research Institute for Nuclear Decommissioning and developed by MHI

Stabilization of TEPCO's Fukushima No.1 NPP

SONGS : San Onofre Nuclear Generating Station　　FS : Feasibility Study

Become a global leader in the offshore wind business

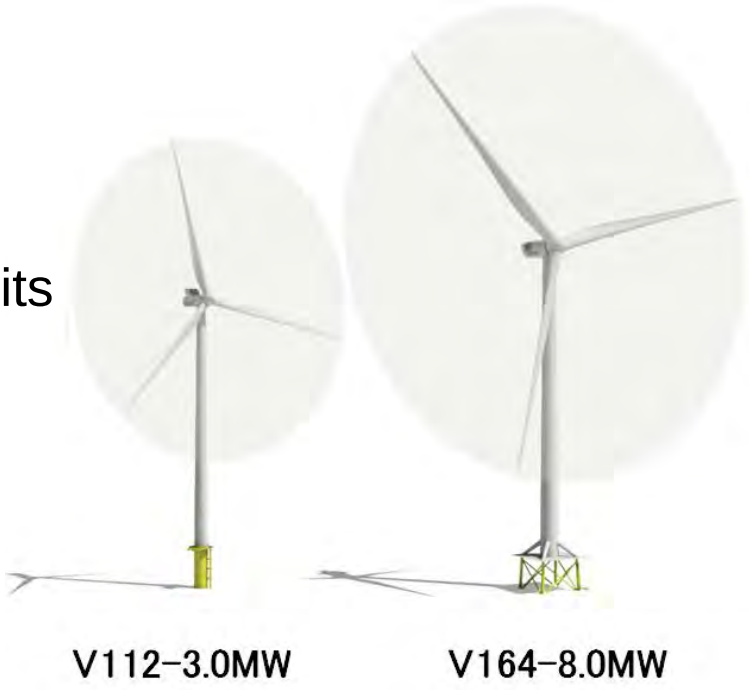
MHI VESTAS OFFSHORE WIND™

MHI Vestas Offshore Wind

Established in Apr. 2014 (JV with Vestas Wind Systems, Denmark)
2015: Started production of V164-8.0MW and mass production

Major recent back orders
- Walney (UK): order received for 40units
  (World's highest power output 164-8.0MW)
- Nobel Wind (Belgium): order received for 50 units
  (V112-3.0MW)

- Integration of MHI's comprehensive technical capability and manufacturing reliability with Vestas' leading experience in offshore wind



Further expand market share in geothermal plants

- Advantages of geothermal power generation
  - Environmentally friendly (zero CO2 environmental load because there is no combustion)
  - High operating rate (stable renewable energy unaffected by weather)

- Proactive entry into Japanese and overseas markets
  - Further expanding No.1 global share level
    Successive orders received from Mexico: Los Azufres No.3, Domo de San Pedro
  - Proactive entry into Japanese and overseas markets (Latin America, Indonesia, Philippines)

    Strengthening earning capability through cooperation with MHPS-INDIA

Los Azufres No.3 plant (Mexico)

Domo de San Pedro plant (Mexico)

Expand business through addition of ORC turbine lineup -Enter domestic market, strengthen orders received

Turboden (Italy)

Company that designs, manufactures, markets and installs Organic Rankine Cycle power generation systems
Dec. 2012: began operations as an MHI Group company

ORC applications

- Biomass power generation
- Waste heat recovery
- Geothermal power generation
- Power generation by waste incineration

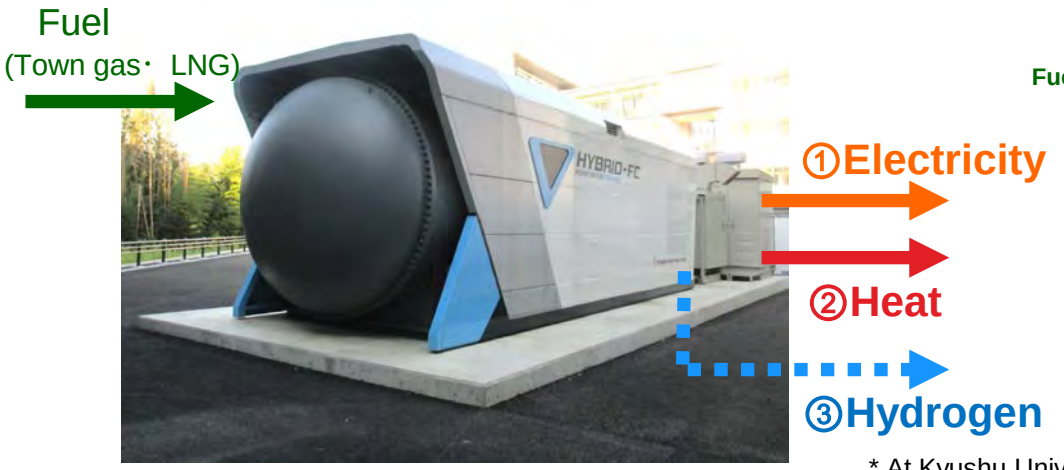
Turboden's Organic Rankine Cycle (ORC) power generation system

- 327 units delivered to date, primarily for biomass plants in Europe
- Delivered 1st unit for waste heat recovery plant in Japan
  - Started operation May 2016 at Aichi Steel Corp.
- Sales tie-up with Daiichi Jitsugyo Co., Ltd.
  - Concluded domestic distributor contract

Initiatives to achieve a low-carbon and hydrogen society

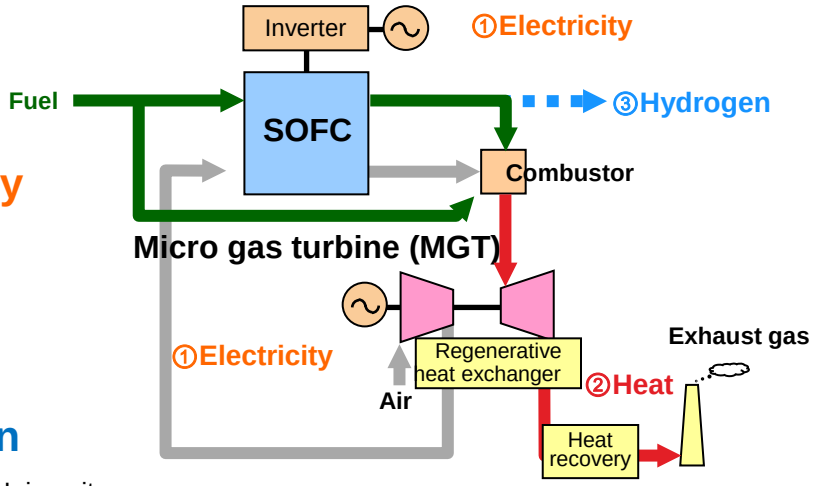
- **In FY2017, market launch of a 250kW-class SOFC-MGT hybrid power generation system**
  - Received high evaluation in more than 7,500 hours of power generation testing using the Kyushu University demonstration system
  - In FY2016, demonstrations scheduled for 4 additional units in Japan
  - To be introduced at 2020 Tokyo Olympic/Paralympic Games2020
- **Initiatives for future gas turbine fuel cell (GTFC) hybrid power generation system**
  - Development underway as core technology of next-generation thermal power plants

* SOFC :Solid Oxide Fuel Cell, MGT : Micro Gas Turbine



SOFC-MGT Hybrid Demonstration model (Kyusyu University*)

* At Kyushu University, only electricity being used



SOFC-MGT Hybrid model systemization

3-5. Cross Domain Initiatives ①Energy total solution

Customer

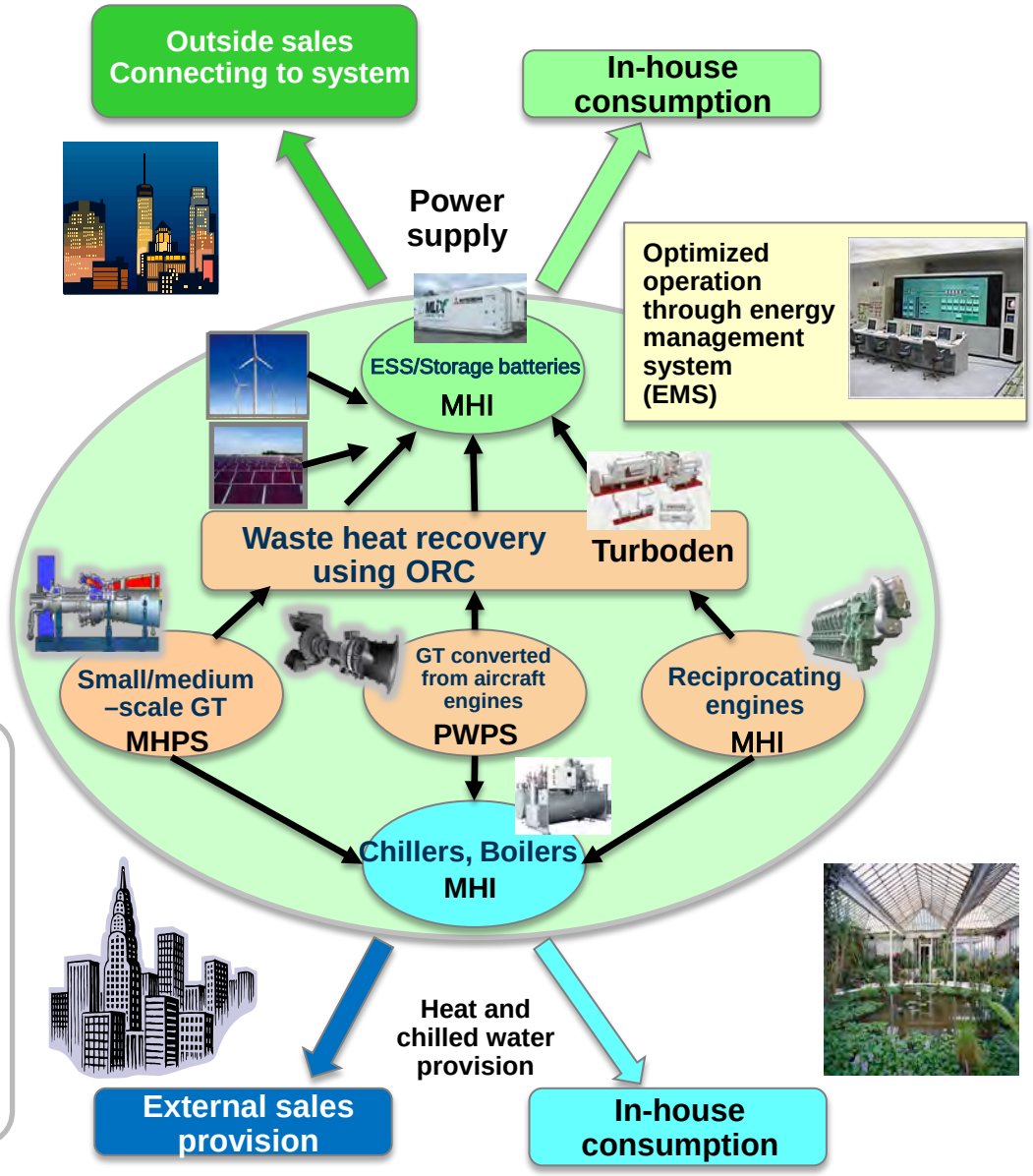
- Large energy users owning manufacturing plants

Value provided to customers

- Reduced energy consumption from supply/demand data analysis
- Facilities optimization according to business operations
- Support to external marketing of power and heat
- Higher operating efficiency through asset leasing

MHI's business model

- Service fee income through optimization and reduction of energy use
- Contract income from comprehensive utility services
- Maintenance services for delivered energy systems

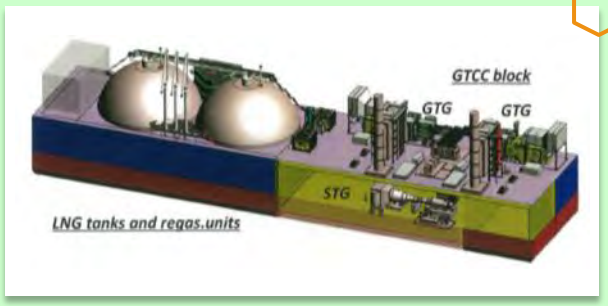


Floating LNG Power Plant

- New concept achievable from position as world's only company with both technologies in-house
  (Ship building & high efficiency power generation)

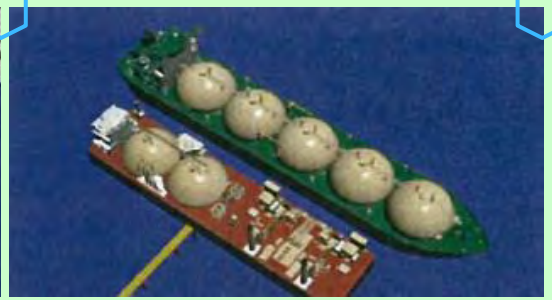
Energy & Environment Domain

Commercial Aviation & Transportation System Domain



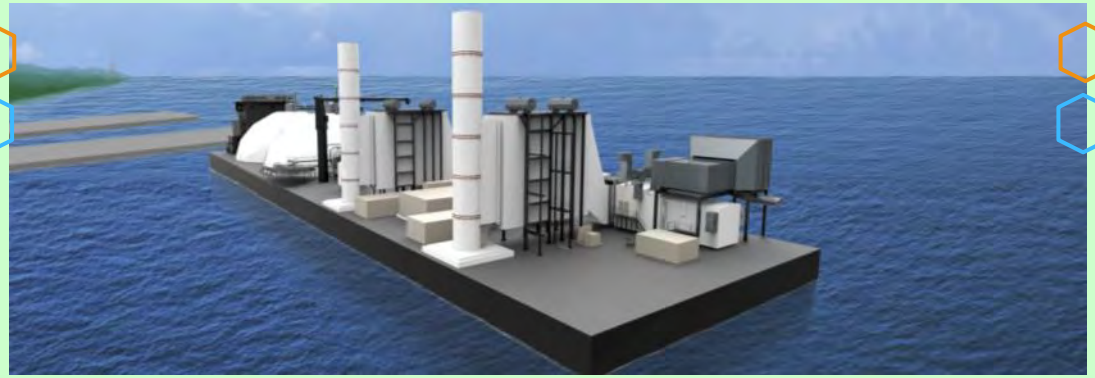
Technical drawings for LNG tanks and power plants

Mooring at shore



Mooring at a jetty

Easy to relocate by using LNG carrier



Perspective of the portable floating platform

Concept advantages

- Short delivery time
- Minimal construction risk
- Outstanding convenience from movability

Table of Contents

4. Summary ①Measures to be taken in FY2016 and FY2017

As MHI's core business domain, Energy & Environment will play an active role in achieving Companywide measures and targets

Status & challenges	Delays in orders received and net sales from opacity of global economy ⇒Gap emerged between the original ordinary income target and the current outlook, calling for improvement efforts.		
Companywide targets	Strengthen ability to generate cash through stronger earning capability and improvement in asset efficiency		
Companywide measures	Strengthen earning capacity	Concentration into core competencies	Improve operating capital Reduce total assets
Domain activities & targets	■ Accelerate PMI ■ Strengthen servicing operations	■ Determine which businesses have more competitive strength ■ Allocate resources into IoT/AI	■ 50-day CCC ■ Initiatives to achieve net sales≧total assets

4. Summary ②from “Reforms” to “Take off (Stage #1)”

See social changes as opportunities for expanding business scale; build strong financial and technology foundations; and prepare for take off

AQCS :
Air Quality Control System

		2015 Business Plan (FY2015-FY2017) Period of reforms		Direction of 2018 Business Plan (2018-2020) Take off (Stage#1)
Expand business scale, accelerate PMI	M&A Establishment of MHPS	PMI - Establish management foundation - Streamlining bases	Build solid financial foundation	Pursue higher targets approaching levels of GE and Siemens Expand business scale, raise margin
Concentration into core competencies		Strengthen thermal power plant lineup and AQCS business Choose among renewable energy businesses Promote specific business strategies		Develop new businesses Strengthen overseas market strategies Fully expand involvement in overseas nuclear power plant projects
Build Management foundation		Improve operating capital Reduce total assets		Achieve further (technology, management, financial) advances through links within shared technology framework* *Research & Innovation Center, Engineering Headquarters, Marketing & Innovation Headquarters, Value Chain Headquarters, ICT Solution Headquarters
Strengthen risk resilience		Technology risks: Improve development and design processes Business risks: Liaise with Business Risk Management Division		
Utilize IoT, Strengthen servicing operations		Strengthen services portfolio Find customer needs		Reform business models and expand business through active use of IoT/AI

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