2021 Medium-Term Business Plan Progress (FY2021-2023)

May 12, 2022
Seiji Izumisawa, President & CEO
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2021 MTBP (FY21-23)

Strengthen profitability

Profitability
Business profit margin 7%
ROE 12%

Develop growth areas

Growth
- New business revenue-
100 billion yen by FY23
1 trillion yen by FY30

Profitability

Financial Stability
Total assets turnover 0.9
Maintain FY20 level of interest-bearing debt

Dividends
Record-high dividend per share
Overcame negative impact from delayed COVID-19 recovery in Aero Structures as well as semiconductor shortages and materials cost inflation with successful profitability improvement measures to achieve all KPI targets.

Impact from Russia/Ukraine conflict currently limited. Will continue to closely monitor situation.

Profitability
- Business Profit Margin: ✓
  - (Contribution from progress in revenue scale recovery and profitability improvement measures)
  - 2020: 1.5%, 2021: 4.0%, 2022: 4.2%, 2023: 5.1%, 2024: 7.0%

ROE: ✓✓
- (Same as Profitability)
  - 2020: 3.1%, 2021: 7.0%, 2022: 7.7%, 2023: 12.0%

Financial Stability
- Total Asset Turnover: ✓
  - 2020: 0.8, 2021: 0.8, 2022: 0.8, 2023: 0.9

Interest-Bearing Debt: ✓✓
- (Contribution from increased cash flow due to profit increases and working capital management)
  - 2020: 0.9, 2021: 0.9, 2022: 0.7, 2023: 0.8, (tr yen)

Growth
- Good progress toward meeting FY23 targets
  - See III. MHI Group Sustainability Initiatives for details

Shareholder Return
- Dividends per Share: ✓✓
  - (Contribution from Profitability and Financial Stability results exceeding plan)
  - 2024: 160, (yen)
II. Strengthening Profitability
The Changing Market Landscape and Its Effects

Advancing world-wide climate change initiatives

Increasing geopolitical risk

Widening supply/demand gap caused by regional differences in COVID-19 infection rates

- Destabilization of energy supplies
- Worsening supply chain disruptions

Realistic Energy Transition
- Multiple paths to decarbonization utilizing existing facilities accounting for regional needs and economic factors
- Use of hydrogen and CCUS* in addition to renewables

Increased Security Awareness
- Growing momentum toward strengthening national security in many countries
- Renewed interest in nuclear power from perspective of energy security

Global Inflation
- Cost inflation and competition for energy resources, materials, semiconductors, and logistics
- Time lag in cost pass-through

* CO₂ Capture, Utilization and Storage
### Path to FY23 Target Achievement

- Continue timely response to changes in business environment and position FY22 as a springboard for further profit improvement
- Determined to achieve 7% business profit margin in FY23, the final year of the 2021 MTBP period, as the culmination of our key initiatives

#### FY21 Results

<table>
<thead>
<tr>
<th>COVID-19 Recovery</th>
<th>Existing Business Growth</th>
<th>Profitability Improvements &amp; Organizational Transformation</th>
<th>Fixed Cost Reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistics, Thermal &amp; Drive Systems and Aero Engines recovered as forecasted</td>
<td>Strengthened sales networks and service organizations in anticipation of market recovery</td>
<td>Pivoted to services, Consolidated organization and locations. Continued pursuing business divestments.</td>
<td>Cut SG&amp;A (excl. innovation investments), Increased corporate function efficiency by integrating with Mitsubishi Power</td>
</tr>
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#### Actions to Achieve FY22-23 Targets

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<thead>
<tr>
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<tbody>
<tr>
<td>Aero Engines to strengthen internal manufacturing capabilities by opening new Nagasaki Plant</td>
<td>Further fixed cost reductions in Aero Structures</td>
<td>Grow businesses with improved sales networks and service bases (Europe, Asia [incl. China], and Australia)</td>
<td>Grow services by strengthening DX organization, Continue business portfolio optimization</td>
</tr>
<tr>
<td>Further optimization through DX and other initiatives, Shift human resources.</td>
<td>Continue underutilized asset sales</td>
<td>Increase business opportunities by proposing Energy Transition initiatives tailored to each region’s needs</td>
<td>Contribute to Japan’s national security, Strengthen support for both Japan domestic and international new nuclear power plant installations (next-generation reactors, component export)</td>
</tr>
<tr>
<td>Little direct impact in FY21, but recognized as important medium-term trend</td>
<td></td>
<td></td>
<td>Pursue appropriate cost pass-throughs. Revisit contract terms.</td>
</tr>
</tbody>
</table>

#### 2021 MTBP Initiatives

- **COVID-19 Recovery**
- **Existing Business Growth**
- **Profitability Improvements & Organizational Transformation**
- **Fixed Cost Reductions**

#### Adapt to Changing Business Environments

- **Realistic Energy Transition**
- **Increasing Security Awareness**
- **Global Inflation**

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III. MHI Group Sustainability Initiatives & Carbon Neutrality
MHI Group Sustainability Initiatives

- Achievement of Carbon Neutrality is essential to realizing a sustainable society that is safe, secure, and comfortable.
- MHI Group will promote decarbonization of energy supplies through the Energy Transition together with energy conservation, automation, and decarbonization of energy use with Smart Infrastructure.

Safe, secure, and comfortable society

Energy Supply
Energy Transition

- Decarbonization of Existing Infrastructure
- Hydrogen Solutions Ecosystem
- CO₂ Solutions Ecosystem

Energy Use
Smart Infrastructure (New Mobility & Logistics)

- Energy Conservation
- Decarbonization and Energy Conservation of Data Centers
- Infrastructure to Support Autonomous Mobility
- Intelligent Logistics Systems
Carbon Neutrality commitments, which began in Europe, **spread** to U.S., China, and **rest of world**

In response to this, the consideration of **specific measures** for a variety of regions and industries is **accelerating**

- Awareness level of the **importance of diverse paths to Carbon Neutrality** is rising as a reflection of recent urgency of energy security concerns. Multiple paths should be developed **with a view to S + 3Es**¹, without limiting to a renewables-only approach
- **Interest took off in specific projects in the CCUS space**, which will enable Carbon Neutrality in hard-to-abate industries², such as steelmaking, cement, and chemicals

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Due to prolongation of COVID-19 pandemic, e-commerce experienced explosive growth driven by consumer demand during lockdowns. **Labor shortages in the logistics industry are becoming more severe**, and the trend toward automation in logistics and manufacturing is accelerating

**Demand for data centers is booming** as the digitalization of society accelerates

Further demand for **decarbonization and energy conservation** of energy use

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¹ Safety + Energy Security, Economic Efficiency, and Environment, the basis of Japan’s energy policy since 2014

² Industrial or energy sectors which are considered difficult to decarbonize
III-1. Energy Supply
Energy Transition
Realizing a CO₂ Solutions Ecosystem

- CO₂ capture (1/4 of current emissions) combined with emissions cuts is essential to achieve Carbon Neutrality
- Need increasing for compact CO₂ capture systems for industrial plants in addition to large scale capture systems for energy and chemical sectors
- Initiatives in capture, transport, storage, and utilization are gaining momentum

MHI Projections Based on Major Reports*

Expansion of renewables
Maximization of nuclear power use
Energy conservation, electrification, and decarbonization of social infrastructure
Fuel conversions (H₂ & ammonia)

CO₂ capture from diverse emissions sources
Expansion of CO₂ storage & commercialization of utilization technologies

Achieve Net Zero

approx. 7.6 Gton

*Includes IEA Net Zero by 2050 and McKinsey 1.5C Scenario reports
Realizing a CO₂ Solutions Ecosystem

- Need to build a CO₂ solutions ecosystem to connect diverse emissions sources with storage and utilization providers
- MHI Group will respond to the CO₂ capture needs of diverse industries by leveraging our long track record with this technology
- Invest in technological innovation to grow the utilization market
- Proposing a digital platform (CO₂NNEX) to help build a value chain

**CCUS Digital Platform**

1. **Grow CO₂ capture market**
   - Chemicals
   - Steelmaking
   - Thermal Power
   - Cement
   - Waste-to-Energy
   - Biomass Power
   - DAC*

2. **Develop and validate of a variety of capture products**
   - DAC*: Direct Air Capture

3. **Establish a CO₂ value chain**
   - Agriculture & Industry
   - Fuel Synthesis
   - Chemicals
   - Mineralization
   - Food & Beverage

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1. Grow CO₂ Capture Market

- Inquiries for CO₂ capture increasing in North America, Europe, and Japan
- Booked orders for feasibility studies representing approximately 27 Mton/year of CO₂ leveraging MHI Group’s proven track record, unique technologies, and capability to operate across sectors
- Will continue responding to customer inquiries and maintain world’s top market share

**Inquiries Increasing**

**CO₂ Capture Volume**

<table>
<thead>
<tr>
<th>Region</th>
<th>FY20</th>
<th>FY21</th>
<th>Inquiries</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Europe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan</td>
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</tbody>
</table>

- Breakdown of Booked Feasibility Studies by Region

- 18x capture volume of the world’s largest CO₂ capture project, Petra Nova (a 1.5 Mton/year MHI-supplied CO₂ capture facility in Texas, U.S.)

**Examples of Major Inquiries in Europe**

- EU (>10.5 Mton/year)
  - Thermal Power
  - Waste Incineration
  - Cement
  - Steelmaking
  - Oil Refining
  - Gas Processing

- UK (>4.2 Mton/year)
  - Thermal Power
  - Waste Incineration
  - Cement

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1 MHI calculation based on currently available daily capture rates assuming 300 days/year operation
2. Develop and Validate a Variety of CO₂ Capture Products

- Expand product lineup by standardizing and modularizing CO₂ capture systems to address projected growth in compact capture systems for diverse industries (including hard-to-abate sectors). Finish validation testing with partners by end FY23.

- Proposing new service businesses, including automated and remote operation as well as CaaS* and working to build a CO₂ solutions ecosystem. Commercialize starting in FY24.

### CO₂ Emissions Sources

#### Current

- Large Scale (Build to Order)
  - Energy & Chemicals
    - Gas-Fired Thermal Power
    - Coal-Fired Thermal Power
    - Chemical Plants
  - Cement
    - Gas Engines
    - LNG Liquefaction
    - Waste-to-Energy
    - Biomass Power
  - Diverse Industries
    - Ships

#### Future

- Compact (Standardized/Modularized)
  - Energy & Chemicals
    - Gas-Fired Thermal Power
    - Coal-Fired Thermal Power
    - Chemical Plants
  - Cement
    - Gas Engines
    - LNG Liquefaction
    - Waste-to-Energy
    - Biomass Power
  - Diverse Industries
    - Ships

### MHI Group Initiatives

#### Expand product lineup

<table>
<thead>
<tr>
<th>Type</th>
<th>Standard CO₂ Capture Volume</th>
<th>Footprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.3 tons/day</td>
<td>7 m x 2 m</td>
</tr>
<tr>
<td>B</td>
<td>3 tons/day</td>
<td>12 m x 4 m</td>
</tr>
<tr>
<td>C</td>
<td>30 tons/day</td>
<td>15 m x 15 m</td>
</tr>
<tr>
<td>D</td>
<td>100 tons/day</td>
<td>25 m x 20 m</td>
</tr>
<tr>
<td>E</td>
<td>200 tons/day</td>
<td>35 m x 25 m</td>
</tr>
</tbody>
</table>

Validation Partners

- Ships: Kawasaki Kisen
- Cement: Tokuyama Corporation
- Biomass Power: Drax/Taihei Dengyo
- Waste-to-Energy: Yokohama City/Tokyo Gas
- LNG Liquefaction: Next Decade
- Gas Engines: Internal Validation

* CaaS: CO₂ Capture as a Service

Standardize & Modularize
3. Establish a CO₂ Value Chain

- Need to utilize and store CO₂ in order to drive growth in CO₂ capture. Exploring and applying technological innovation through open innovation.
- Need to connect capture, transport, storage, and utilization to build a complete value chain
- MHI proposes the CO₂NNEX digital platform as a way to achieve this and is planning several Proofs of Concept (PoC) mainly in Japan
- Executing feasibility study on commercialization of transport portion of value chain

**CO₂NNEX Digital Platform**

**Emissions Sources (Capture)**
- Chemicals
- Thermal Power
- Biomass Power
- Waste-to-Energy

**Transport**
- Pipelines
- Land Transport
- Maritime Transport

**Final Storage**
- Agriculture & Industry
- Mineralization
- Fuel Synthesis
- Chemicals
- Food & Beverage

**Utilization**

- Executed MOU on deployment of Infinium Electrofuels™ in Japanese market (Apr 2022)
- Strengthed partnership with leading industrial biotechnology start-up with innovative technology using CO₂ (Oct 2021)

*LCO₂: Liquefied CO₂
Decarbonizing Existing Infrastructure
Nuclear Power’s Contributions to Decarbonization (1/2)

- Renewed interest in nuclear power from decarbonization and energy security perspective has led several countries to announce plans for new installations
- Within Japan, the latest Strategic Energy Plan aims to increase percentage of national power generation from nuclear to 20-22% by 2030
- As a leader in the nuclear power technology space, MHI Group will pursue the following initiatives:
  - Continue existing plant restarts and construction of SSFs\(^1\). Complete the nuclear fuel cycle.
  - Design a next-generation light water reactor with further safety improvements
  - Other initiatives including development of a high temperature gas-cooled reactor for hydrogen production and collaboration with U.S. start-up TerraPower on fast reactor development

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**Existing Plants**
- PWR restarts and SSF construction (10 plants restarted with 16 more slated for restart)
- Expand support for BWRs

**Fuel Cycle**
- Working to complete construction of nuclear fuel reprocessing facility and MOX processing plant. Will provide maximum support for maintenance after completion.

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**Next-Generation Light Water Reactor**
(high output, stable power)
- Further improve safety with innovative technologies (incl. core catcher and radiation leak prevention system)
- Improve compatibility with renewables by increasing output adjustment capability

**Small Modular Light Water Reactor**
(distributed power)
- Improve safety with innovative technologies such as integrated reactor vessel design

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**High Temperature Gas-Cooled Reactor**
(high volume, stable hydrogen production)
- Began demonstration program for hydrogen production using High Temperature Engineering Test Reactor (HTTR) with JAEA\(^2\) (Apr 2022)

**Fast Reactor**
(efficient resource usage, reduction of radioactive waste volume)
- Executed MOU with U.S. start-up TerraPower for development collaboration (Jan 2022)

**Microreactor**
(for remote islands/emergency power supply)
- Pursuing development with new concept (all-solid-state reactor)

**Fusion Reactor**
(perpetual energy source)
- Manufacturing main equipment for ITER\(^3\). Developing plan for prototype reactor.

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1 SSF: Specialized Security Facilities  2 JAEA: Japan Atomic Energy Agency  3 ITER: International Thermonuclear Experimental Reactor
### Decarbonizing Existing Infrastructure
Nuclear Power’s Contributions to Decarbonization (2/2)

#### Advanced Light Water Reactor Series

<table>
<thead>
<tr>
<th>Next-Generation Light Water Reactor</th>
<th>Small Modular Reactor (SMR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Power generation for existing grids (power output: max 1.2 GW)</td>
<td>✓ Power generation for distributed, small-scale grids (power output: 300 MW)</td>
</tr>
<tr>
<td>✓ Targeting commercialization in mid-2030s. In addition to great economics, will realize the world’s safest nuclear reactor with innovative technologies</td>
<td>✓ Fully passive safety systems and integrated reactor vessel design</td>
</tr>
</tbody>
</table>

- **Radiation Leak Prevention System**
- **Core Catcher**

#### High Temperature Gas-Cooled Reactor

| ✓ Achieve high volume, stable hydrogen production using high core temperature (over 900°C) | ✓ By completing the nuclear fuel cycle, fast reactors can be used to efficiently utilize nuclear resources and reduce the volume and hazard level of high-level radioactive waste |

- **HTGR**
- **H₂ Production Facility**
- **Heat transfer with high temperature helium**

#### Fast Reactor *

- **Steam Generator**
- **Core Fuel**

#### Microreactor

- **Portable nuclear reactor which can be used as a power source for isolated islands and remote areas as well as after natural disasters**
- **MHI proprietary all-solid-state reactor design**

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*Part of this presentation includes development results from the Technology Development Regarding International Cooperation on Fast Reactors Program, under contract from the Japan Ministry of Economy, Trade and Industry*
III-2. Energy Use
Smart Infrastructure
(New Mobility & Logistics)
Commercialized highly maneuverable Automated Guided Forklift (AGF) and natural refrigerant chiller to meet market needs for automation and decarbonization

Developing intelligent logistics to achieve smooth coordination among humans and multiple logistics systems

Achieve large-scale energy conservation and decarbonization by optimizing operation of logistics, power supply, and air-conditioning (AC) systems

Intelligent Logistics Systems

- Coordinate logistics, power supply, and AC systems
- Revenue target: ¥150 bn in FY26
Validation of Intelligent, Automated Warehouse Logistics

- Developing automated picking solutions, which will coordinate highly maneuverable AGF, Automated Guided Vehicles (AGV), and palletizers in beverage or refrigerated warehouses. Will begin validation at Yokohama Hard Hub (YHH) in FY22.
- Increase throughput by efficient swarm control of multiple systems and optimized picking plans using ΣSynX core technology.
Data Center Decarbonization and Energy Conservation

- Providing high-efficiency AC and power generation systems for hyperscale data centers
- Working on proof of concept for micro data center using next-generation systems
- Will contribute to building of power supply and AC systems infrastructure for micro data centers

<table>
<thead>
<tr>
<th>2021~</th>
<th>2024~</th>
<th>2027~</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Generation Systems</td>
<td>Decarbonization of power generation systems (hydrogen power)</td>
<td>Commercialization</td>
<td></td>
</tr>
<tr>
<td>AC Systems</td>
<td>High-Efficiency AC Systems</td>
<td>High density + micro footprint (12 ft container)</td>
<td></td>
</tr>
<tr>
<td>Solutions</td>
<td>Next-generation cooling systems (incl. immersion cooling)</td>
<td>Commercialization</td>
<td></td>
</tr>
</tbody>
</table>

Optimize power supply, AC, and systems management

- Hyperscale
- Micro

- CO$_2$ reduction: 65 → 0 kton/year*
- Power Usage Effectiveness 1.1 or below

Revenue target: ¥40 bn in FY26

*For 1 standard hyperscale data center
Validation of Next-Generation Cooling Technology for Container Type Micro Data Centers

- Achieve data center miniaturization and energy conservation with immersion cooling systems
- Demonstrated 43% decrease in micro data center energy consumption during tests at YHH in FY21
- Will begin testing at Japanese telecommunications company KDDI’s Oyama Technical Center in FY22, aiming to contribute to decarbonization by commercializing the technology in FY24

Validation testing ongoing since June 21, 2021 at MHI YHH with 50 kVA equivalent IT equipment (incl. servers) and an immersion cooling system in a 12 ft container. (Joint effort with KDDI and NEC Networks & System Integration)

- Increase cooling efficiency
  Achieved 43% decrease* in server cooling system energy use and PUE of 1.07 with immersion cooling
- Miniaturize the data center
  Fit entire data center including an immersion cooling system (immersion cooling unit + radiator) and ventilation equipment into a 12 ft small-size container using innovative package design and miniaturized systems

*When comparing data center total power use of PUE 1.7
Cooperative Development with Customers Supported by DX

- Create solutions to intelligently connect multiple machinery systems and new value chains through cooperative development with customers.
- Leverage DX platform technologies accumulated during development of diverse product groups to maximize machinery systems’ potential.

**DX Processes**

- Connect

  - Data Analytics Technologies
    - Integrate data analysis know-how
    - Convert to valuable information

- Intelligently Transform

  - AI Technologies
    - Voluminous data
    - Deep knowledge
    - Efficient learning
    - Highly reliable testing

- Optimize

  - Modeling & Simulation Technologies
    - High fidelity models
    - Accurately ascertain system status with Digital Twin

- Build Value Chain

**MHI Group Digital Transformation Technology Platform**

*Real Data*

*Physical Models*

*Diverse Product Groups*
IV. Key Takeaways
Key Takeaways

- Overcame COVID-19 impact with a variety of countermeasures and achieved FY2021 plan. Despite uncertainty in global markets, we will further increase profitability with an adaptive and proactive approach.

- Carbon Neutrality is an essential step toward attaining a truly sustainable society, and a realistic Energy Transition will be an important tool to help achieve this. MHI Group will make great contributions to this global effort with a variety of products and solutions in both energy supply and use areas.
  - In the energy supply area, we will provide a wide range of solutions tailored to the needs of each country and region, including fuel conversions of existing infrastructure, nuclear power, and CCUS.
  - In the energy use area, we will provide innovative energy conservation, automation, and decarbonization solutions by intelligently connecting systems through our DX technology platform, \( \Sigma \text{SynX} \)

- MHI Group will contribute to the realization of a sustainable society through our Carbon Neutrality initiatives, which balance Energy Security, Economic Efficiency, and Safety
V. Appendix
(Energy Supply)
Decarbonizing Existing Infrastructure: Thermal Power

- Progressing with validation testing with the goal of commercializing carbon-free power generation using hydrogen.
- Achieved 50% mixed hydrogen firing during combustor test, an important step toward achieving commercialization in 2025.

*Part of this presentation includes development results from the National Laboratory New Energy and Industrial Technology Development Organization (NEDO) programs.*
Building a Hydrogen Solutions Ecosystem: Projects under Development in U.S.

- Marked progress in the Advanced Clean Energy Storage Project in Utah, U.S.
- Progress in order intake and development through strategic partnerships

**Puget Sound Energy (Apr 2021)**
- Executed MOU for joint development of strategy and project to achieve PGS' goal of Beyond Net Zero Carbon by 2045

**Advanced Clean Energy Storage Project (Apr 2022)**
- U.S. Department of Energy committed conditional loan of 500 m USD for green hydrogen production and storage project

**Capital Power (Dec 2020)**
- Received order for hydrogen-ready, natural gas-fired M501JAC GT

**Bakken Energy (Jun 2021)**
- Executed MOU for building of hydrogen hub in North Dakota for production, storage, transport, and use of hydrogen

**Entergy (Sep 2020)**
- Executed MOU for joint development of project to achieve Entergy's goal to halve CO₂ emissions (vs. 2000 levels) by 2030

**El Paso Electric (Oct 2021)**
- Executed MOU for joint development of strategy and projects to achieve El Paso Electric’s goal of 100% carbon-free energy mix

**Harrison (Jan 2020)**
- Hydrogen-ready, natural gas-fired M501JAC GT (1,084 MW) selected by customer

**DT Midstream (Nov 2021)**
- Signed MOU for joint development of hydrogen production project for industrial uses incl. power generation, transport, steelmaking, oil refining, and fertilizer manufacture

**Texas Brine (May 2021)**
- Executed MOU for joint development of hydrogen hub utilizing salt domes

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V. Appendix

(Energy Use)
Support the development of autonomous mobility with environmental control and digital twin technologies
- Support autonomous mobility with road infrastructure featuring monitoring and communications technologies
- Convert mechanical parking garage technology to operation and maintenance infrastructure able to support Mobility as a Service (MaaS)

**Development Support**
- Integrated Environment Testing System

**Operation Support**
- Safety Monitoring Service
- Support & monitoring

**Operation & Maintenance**
- Autonomous Valet Parking
- Electrification of mechanical parking garages

**Revenue Targets:**
- 2021: ¥30 bn
- 2030: ¥90 bn

**2021**
- First Unit Begins Operation

**2024**
- Autonomous Driving Support Infrastructure

**2027**
- Digital Twin

**2030**
- Smart Stockyard
  - Convert to MaaS support center infrastructure

**2040**
- Help realize MaaS society
Infrastructure to Support Autonomous Mobility (2/2)

- Support efficient development and validation of autonomous mobility using high-level environmental control and digital twin technologies
- Support autonomous mobility with road infrastructure featuring monitoring and communications technologies accumulated during the development of diverse transportation systems

(1) Integrated Environment Testing System

- Reliable testing
- Cause analysis of anomalies

(2) Autonomous driving support infrastructure

- Support efficient development and validation of autonomous mobility using high-level environmental control and digital twin technologies
- Support autonomous mobility with road infrastructure featuring monitoring and communications technologies accumulated during the development of diverse transportation systems
MHI Group DX Platform

**DIA**

Netmation 4S

Reliably operate

A control system used in various infrastructure products and industrial facilities. Complies with international functional safety standard IEC 61508: 2010 (SIL 3).

**InterSePT**

Safely connect

Cybersecurity technology for critical infrastructure (social infrastructure) control systems. Enables real-time error detection and response to unknown cyber-attacks.

**EXROVR**

A proxy for dangerous tasks

Performs inspections day or night under conditions which could create an explosive atmosphere, contributing to improved worker safety, operational efficiency, and facility utilization.

**SynX-Vehicle**

Coordinate humans and machines

Automated logistics equipment featuring action planning technology for swarm control and non-verbal human interface technology for human-machine coordination.

**TOMONI**

Intelligently operate

Provides services utilizing remote monitoring and high-precision analysis functions to monitor signs of trouble and propose necessary corrective measures at an early stage, improving plant reliability and profitability.

**Efficiently supply energy**

Forecasts energy demand with high accuracy and ascertains facility conditions to support improvements in energy procurement and power generation efficiency using data measurement and analysis from facility operation monitoring.

**QoEn**

Evaluate with diverse criteria

Supports sustainable growth in energy infrastructure with quantitative evaluation from the perspectives of societal impact, economics, and the environment.

**Build a new economy in cyberspace**

A digital platform to visualize the distribution of CO₂ within the value chain and enable a new kind of society that utilizes this CO₂ as a valuable resource. Its ultimate goal is to realize Carbon Neutrality.

**ΣSynX**

Coordinate humans and machines

- A solutions concept aiming to automate and intelligently transform all MHI Group products, ΣSynX will become a standard platform that integrates our digital technologies by synchronizing and coordinating among diverse machinery systems.
- We believe strongly in developing human-centric technologies to enable collaboration between operators and machines. This is based on the assumption that, even in our modern world, where the pace of automation and intelligent transformation of technology with AI and machine learning is accelerating, humans must remain at the center of society.
V. Appendix
(FY2021 Highlights by Segment)
### FY2021 Highlights

#### GTCC Business Grew with Strong Orders
- Orders increased for new installations of large gas turbines incl. latest model J-class as well as small and mid-sized turbines incl. H-25 and aero-derivative gas turbines
- Won orders for upgrades and after-sales services for existing GTCC facilities in Japan and around the world

#### Mihama Unit 3 Restart
- Improved safety of KEPCO Mihama Nuclear Power Plant Unit 3 in accordance with new safety standards
- Contributed to safe operation of Japan’s first nuclear reactor to remain in service for over 40 years (Jun ‘21)

#### TOMONI Intelligent Solutions Network Growth
- The fifth TOMONI Hub began operation in Duisburg, Germany. Other operating hubs: Takasago, Nagasaki, U.S., and Philippines
- TOMONI supports O&M of diverse energy systems, from thermal power plants to distributed power sources

#### MHIAEL Nagasaki Plant for Manufacture of Aero Engine Combustors to be Expanded
- Announced plans to build new Building 2 to expand current plant due to projected increase in demand for aero engine parts for short- and medium-haul commercial aircraft
- While strengthening internal manufacturing capabilities and cost competitiveness, we will meet the needs of the aviation industry, which is expected to resume growth in the post-COVID period

#### Ikata Unit 3 SSF Completed
- Construction of a Specialized Security Facility for Shikoku Electric Power Company’s Ikata Nuclear Power Plant Unit 3 completed (Oct 21)

#### Established Takasago Hydrogen Park
- Established Takasago Hydrogen Park within Takasago Machinery Works. It will be the first facility in the world where the integrated validation of hydrogen power from hydrogen production to power generation can be achieved.
- Will increase reliability of MHI products by validating at in-house facilities with the aim of early commercialization of hydrogen gas turbine technology
FY2021 Highlights

Strengthened Transportation Systems After-Service Sales Business
- Booked order to enhance capacity of Singapore’s Sengkang-Punggol Light Rapid Transit (LRT) system
- Began providing high added-value services meeting the needs of customers in Asia through the MHI-AP Technical Service Center

Expanded CO₂ Capture Sources
- Received order for compact CO₂ capture system for biomass power plant in Hiroshima, Japan
- Contributing to the realization of a Carbon Neutral society by meeting CO₂ emissions reduction needs in a wide variety of industries

LCO₂ Carrier
- Executed agreement for construction of the world’s first validation test ship for LCO₂ transportation
- Rallied all liquid gas handling technologies in anticipation of future long-distance, high-volume transportation needs

Bagan Sale of New Model of Antiseptic Beverage Filling Machine
- Began sale of a new model of antiseptic filling machine for beverages (preform sterilization), which excels in the areas of running costs, production efficiency, and footprint
- Promoting both within Japan and internationally together with new market entry by various beverage manufacturers

Contributed to Decreasing CO₂ Emissions from Steelmaking
- Environmentally conscious miniaturized steel mill combining a new electric arc furnace EAF Quantum and Arvedi ESP began operation in China
- CO₂ emissions are 85% of those of traditional manufacturing methods

EAF: Electric Arc Furnace     ESP: Endless Strip Production

Received Order to Refurbish Municipal Solid Waste Incineration Plant
- Received order from Sendai City (Miyagi Pref., Japan) to refurbish its Matsumori Waste-to-Energy Plant, an incineration plant for municipal solid waste
- Will reduce CO₂ emissions by 8%/year by extending the plant’s life and enhancing its energy efficiency

Plants & Infrastructure Systems

Arvedi ESP / Primatech Technologies, Limited
Began Sale of New Engine-Powered Forklift ERSIS

- Began sales of the first new integrated model forklift since the battery powered ALESIS was introduced in Nov 2019 after the founding of Mitsubishi Logisnext
- This marked the completion of the integration of all domestic Japanese models. Going forward, there will be a phased integration with this model in international markets as well

Aquifer Thermal Energy Storage System

- Awarded The Energy Conservation Center Japan Chairman’s Award in the Best Practices Category at the 2021 Energy Conservation Grand Prize
- Focused on unutilized geothermal energy, the system cycles heat throughout the year for effective energy utilization
- Reduces atmospheric heat emissions and attains underground heat balance of zero for the full year period, which helps to protect the global environment

Intelligent, Automated Warehouse Project Enabled by ΣSynX Kicked Off

- Developing automated picking solutions coordinating AGF, AGV, and palletizers. Aiming for validation in FY2022
- Will contribute to solving logistics operator shortages by installing in multi-tenant warehouses

Heat Pump Chiller Q-ton Circulation Won 2021 Minister of the Environment Award for Climate Action

- By utilizing a low-GWP refrigerant, the product contributes to reduction of environmental impact, energy usage, and CO₂ emissions arising from hot water supply
- This is the latest in a series of awards received by the product, including the Technology Award from the Japan Society of Refrigerating and Air-Conditioning Engineers in 2019 as well as the Japan Association of Refrigeration and Air-Conditioning Contractors’ Excellent Energy Saving Equipment Award and a Grand Prize at the Nikkan Kogyo Shim bun’s Protect the Ozone Layer, Prevent Global Warming Awards, both in 2021

Triple Hybrid Stand-Alone Power System EBLOX Demo Plant to be Constructed in Turkey

- Promoting mainly in the Middle East and Africa, where electric grids are still developing
- Able to optimize use of renewables in accordance with power demand within a region

Jointly Developed High-Efficiency Gas Cogeneration System

- Jointly developed a gas cogeneration system with output of 850 kW which achieves a world top-class efficiency of 41.9%
- Increased both output and efficiency from the existing 815 kW model while maintaining BCP functionality and footprint
FY2021 Highlights

Aircraft, Defense & Space

Launched Frigate “Mikuma”
- Launched new 3,900-ton-class frigate at Nagasaki Shipyard on contract from the Japan Ministry of Defense

H-IIA Launch Vehicle
- Successfully launched with H-IIA Launch Vehicle No. 45, which carried the first satellite in Inmarsat’s (UK) Inmarsat-6 series

Handover of First Taigei-Class Submarine
- Held handover ceremony for the first Taigei-class submarine on contract from the Japan Ministry of Defense at MHI Kobe Shipyard

Mitsubishi Heavy Industries Maritime Systems Began Full-Scale Operations
- Mitsubishi Heavy Industries Maritime Systems, which continues the former Mitsui E&S Holding naval & governmental ships businesses, began full-scale operations on Oct 1, 2021
- Handed over multi-purpose training ship “Kaijinmaru” to Kobe University at the university’s Fukae Campus

Announced Collaboration with Regional Jet Hydrogen Propulsion Technology Start-Up
- CRJ business announced collaboration with ZeroAvia, a start-up developing a propulsion system for regional jets using hydrogen fuel cells