This presentation material contains forward-looking statements that reflect Mitsubishi Chemical Holdings Corporation’s assumptions and beliefs based on currently available information. Actual results may differ materially from forecasts due to various risks and factors, and uncertainties. They include, but are not limited to, demand in Japan and overseas, exchange rate, price and procurement volume of crude oil and naphtha, market trends, technological innovation, National Health Insurance drug price revisions, product liabilities, lawsuits, laws and regulations, as the Group is engaged in a wide range of businesses, including Information, electronics and displays, Advanced moldings and composites, Advanced polymers, MMA, Petrochemicals, Carbon products, Industrial gases, and Pharmaceuticals.
List of Abbreviations

MCHC: Mitsubishi Chemical Holdings Corporation
MCC: Mitsubishi Chemical Corporation
MTPC: Mitsubishi Tanabe Pharma Corporation
LSII: Life Science Institute, Inc.
TNSC: Taiyo Nippon Sanso Corporation

Diamond Edge Ventures: Diamond Edge Ventures, Inc.
LSIM: LSI Medience Corporation
MCIS-UK: MC Ionic Solutions UK, Ltd.
MCIS-US: MC Ionic Solutions US, Inc.
MI: PT. MC PET Film Indonesia
Nippon Gohsei UK: Nippon Gohsei UK Limited
Noltex: Noltex L.L.C.
PTT MCC Biochem: PTT MCC Biochem Co., Ltd.
SAMAC: The Saudi Methacrylates Company
SIC: Science and Innovation Center
UMBM: Changshu UM Battery Materials Co., Ltd.

AddiFab: AddiFab ApS
Audi: Audi AG
CLOMA: Japan Clean Ocean Material Alliance
C-m-p: c-m-p gmbh
C.P.C.: C.P.C. Srl
DIGILENS: DigiLens Inc.
Goldman Sachs Japan: Goldman Sachs Japan Co., Ltd.
IMI: IMI Co., Ltd.
JST: Japan Science and Technology Agency
JXTG Nippon Oil & Energy: JXTG Nippon Oil & Energy Corporation
Lenovo: Lenovo Corporation
Linde: Linde AG
LLP: Limited liability partnership
Mazda: Mazda Motor Corporation
NEDO: New Energy and Industrial Technology Development Organization
PHCHD: PHC Holdings Corporation
RING: Research Association of Refinery Integration for Group-Operation
Piper Plastics: Piper Plastics, Inc.
Praxair: Praxair, Inc.
SkymatiX: SkymatiX, Inc.
Toyota: Toyota Motor Corporation

3DP: 3D printer
ABS: Acrylonitrile butadiene styrene
ALS: Amyotrophic lateral sclerosis
API: Active pharmaceutical ingredients
ASU: Air separation unit
BCS: Black column spacer
BMA: Methyl methacrylate
CASE: Connected, autonomous, shared, electric
CFRP: Carbon fiber reinforced plastic
CF-SMC: Carbon fiber-sheet molding compound
CVC: Corporate venture capital
DDS: Digital data storage
DX: Digital transformation
EVOH: Ethylene vinyl alcohol copolymer
GaN: Gallium nitride
GHG: Greenhouse gas
HyCO: Hydrogen (H2) and carbon monoxide (CO)
ICT: Information and communication technology
IoT: Internet of Things
ITO: Iodum tin oxide
LCA: Life cycle assessment
LIB: Lithium-ion battery
MAA: Methacrylic acid
MI: Material informatics
MR: Medical representative
MLCC: Multi-layered ceramic condenser
MOE: Management of Economy
MOS: Management of Sustainability
MOT: Management of Technology
MT: Metric ton
OLED: Organic light-emitting diode
PBS: Poly butylene succinate
PMMA: Polymethyl methacrylate
PoC: Proof of concept
PP: Polypropylene
SCAAT: Super critical acidic ammonia technology
SGDs: Sustainable Development Goals
SMC: Supply chain management
THVPE: Trihalide vapor phase epitaxy
UHC: Universal health coverage
VLP: Virus-like particle
Today’s Agenda

1. Progress with Financial Goals

2. Priority Management Measures
   2–1 Focus Market Growth Strategies and Action Plan Progress
   2–2 Healthcare Strategies
   2–3 Measures for Industrial Materials Domain and Establishment of Industrial Gas Major Position
   2–4 Driving Growth through Synergies
   2–5 Reinforce Foundations
   2–6 Initiatives for Creating New Businesses

3. KAITEKI Management Initiative

4. KAITEKI Vision 30
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3. KAITEKI Management Initiative
4. KAITEKI Vision 30
Operating Results

- Earnings deteriorated owing to impact of U.S.-China trade friction and absence of healthcare royalties
- Although maintaining final year target for APTSIS 20, hurdles to reaching goals are high

### Sales Revenue
(Billions of Yen)

<table>
<thead>
<tr>
<th>Year</th>
<th>JGAAP</th>
<th>IFRS</th>
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<tr>
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<td>2020 (Targets)</td>
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### Earnings
(Billions of Yen)

<table>
<thead>
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<td>2018</td>
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<td>2019 (Forecasts)</td>
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<td>210.0</td>
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<td>2020 (Targets)</td>
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<td>410.0</td>
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### ROE (%)

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<td>2014</td>
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<td>2020 (Targets)</td>
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**BGEIS 20**

- Operating income (Core operating income)
- Net sales (Sales revenue)
- Net income (Net income attributable owners of the parent)
With MTPC becoming wholly owned subsidiary, net D/E ratio rose to 1.8

<table>
<thead>
<tr>
<th>Financial Indicators (MOE)</th>
<th>FY2019 Forecasts</th>
<th>FY2020 Targets</th>
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<tr>
<td>Core operating income</td>
<td>¥210 billion</td>
<td>¥410 billion</td>
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<tr>
<td>ROS (Core operating income)</td>
<td>5.8%</td>
<td>9%</td>
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<tr>
<td>Net income attributable to owners of the parent</td>
<td>¥81 billion</td>
<td>¥220 billion</td>
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<tr>
<td>ROE</td>
<td>6.2%</td>
<td>13%</td>
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<tr>
<td>Net D/E ratio</td>
<td>1.8</td>
<td>1.0</td>
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</table>
1. Progress with Financial Goals

**Investment Plan Progress**

- **Undertook ¥1.0 trillion in investment and loans* by fiscal 2019 for major industrial gas acquisitions and others**
  *Limited to expenditures categorized as cash flows from investing activities and excluding funding to make MTPC and other subsidiaries wholly owned

**Priority Businesses for Investment**

- **Performance Products**
  - New technologies: Information, Electronics and display, Advanced polymers, Carbon fiber and composite materials

- **Industrial Materials**
  - Overseas development: Industrial gases, MMA
  - => Completed acquisitions of Praxair’s European business and of Linde’s U.S. HyCO business

- **Health Care**
  - Development in North America: Ethical pharmaceuticals, VLP vaccine
  - New markets: Regenerative medicine

- **Others**
  - => Constructing MCC’s SIC research building

**Resource Allocation Plan**

- **Investment and Loans**
  - Performance Products
  - Chemicals
  - Industrial Gases
  - Health Care
  - Others

- **Capital Expenditure**
  - Performance Products
  - Chemicals
  - Industrial Gases
  - Health Care
  - Others

- **R&D Expenses**
  - Performance Products
  - Chemicals
  - Industrial Gases
  - Health Care
  - Others

*Billions of Yen*

**Mitsubishi Chemical Holdings**
1. Progress with Financial Goals

Increasing Capital Efficiency

- Instituted ¥700 billion in financial structure reforms through asset efficiency measures

### Financial Structure Reforms

<table>
<thead>
<tr>
<th></th>
<th>APTSIS 20 Targets (FY2016 to 2020)</th>
<th>Forecasts (FY2016 to 2019)</th>
<th>Forecasts (FY2016 to 2020)</th>
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<tr>
<td>Lower cross-shareholdings</td>
<td>100</td>
<td>120</td>
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<tr>
<td>Cut working capital</td>
<td>100</td>
<td>80</td>
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<tr>
<td>Reduce cash and deposits</td>
<td>100</td>
<td>300</td>
<td>400</td>
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<tr>
<td>Divest assets</td>
<td>—</td>
<td>100</td>
<td>400</td>
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<tr>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Total from capital efficiency and other factors</td>
<td>300</td>
<td>660</td>
<td>680</td>
</tr>
</tbody>
</table>

(Billions of Yen)
Dividend policy is to balance growth investments and financial structure improvements and deliver stable dividends (setting a 30% medium-term payout ratio).
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2. Priority Management Measures

**Priority Management Measures under APTSIS 20**

### Performance Products
- Reinforce portfolio management
  - Accelerate portfolio reforms
  - Deploy focus market growth strategies

### Industrial Materials
- Reinforce business foundations
  - MMA, Industrial gases: Maintain and expand global share
  - Petrochemicals: Shift to high-performance materials and optimize productivity

### Health Care
- Ethical pharmaceuticals:
  - Strengthen pipeline
  - Expand U.S. businesses
- Life science:
  - Commercialize regenerative medicine
  - Cultivate healthcare and medical ICT businesses

- Generate integration benefits and synergies from new MCC
- Reinforce global market access and marketing (including by setting up regional headquarters)
- Swiftly commercialize next-generation businesses (through R&D, open innovation, and DX)
- Deepen KAITEKI Management and reform workstyles

### Reinforce Foundations
2-1. Focus Market Growth Strategies

Focus Market Growth Strategies

Automobiles, Aircraft (Mobility)

Sales Revenue (Billions of Yen)

<table>
<thead>
<tr>
<th>FY</th>
<th>Target</th>
<th>Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>320</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>310</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>420</td>
<td></td>
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</tbody>
</table>

Growth Measures

- Respond to trend toward CASE in the automotive industry, reinforce response to environmental issues
- Reinforce carbon fiber and composite materials business and accelerate overseas expansion
- Accelerate overseas expansion of resin compounds business

Progress

- Reinforcing overseas network for carbon fiber and composite materials business
  - Invested in C.P.C.; Constructing a new CF-SMC production facility in Italy; Acquired c-m-p, a German CF prepreg manufacturer
- Expanding adoption of CF-SMC: Toyota Prius PHV, etc.
- PP: Commenced commercial operation (150,000 MT/Y) at the Goi Plant (January 2020)
- Acquired two plastic compound producers (India and Indonesia)

IT, Electronics, Displays

Sales Revenue (Billions of Yen)

<table>
<thead>
<tr>
<th>FY</th>
<th>Target</th>
<th>Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>220</td>
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<tr>
<td>2018</td>
<td>350</td>
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</tr>
<tr>
<td>2019</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>410</td>
<td></td>
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</tbody>
</table>

Growth Measures

- Reinforce display-related products business: LCD, OLED materials
- **Expand semiconductor-related business:**
  - Production capacity increase in high-performance and high-quality polyester films for MLCC; Expand precision cleaning agent-related business; Develop thermal management materials

Progress

- Optical films: Constructed a new production line in China and started its operation
- OPL film™: Constructing a new production line at the Kumamoto Plant (Slated to start operation in March 2020)
- Precision cleaning of semiconductor manufacturing equipment: Acquired Cleanpart Group
- **Polyester films: Production capacity increase at MFI**

*Items in red are priority measures in fiscal 2019*
Aiming to build platforms at C.P.C. in Italy to expand CFRP applications for European luxury vehicles.

Constructing a new CF-SMC production facility located on a site adjoining C.P.C., aiming to establish and strengthen carbon fiber and composite materials supply system.

Establishing a prepreg supply system in Japan, the U.S., and Europe through the acquisition of c-m-p, and accelerating the expansion of composite materials business for automobiles and aircraft secondary structural materials by leveraging high-quality thick prepreg manufactured by c-m-p to press molding by C.P.C.
 Expand semiconductor-related business:
Deploying high-quality polyester films for electronic components for communications
Considering the development for in-vehicle applications utilizing durability

- Increase in polyester film production capacity at MFI (25,000 MT/Y)
- Invested approximately US$130 million in building a new production facility (Slated for completion at the end of 2021)
- Planning to produce high-performance and high-quality polyester films for MLCC for which demand is expected to increase

Multi-layered ceramic condenser (MLCC)

An important component when driving an electric circuit of a device

Approximately 700 or more MLCCs are used in one smartphone.

Polyester films are used as materials in the MLCC manufacturing process.

There are requirements for surface functionality of polyester films in order to enhance the capacity and performance of a condenser.

Planeness of surface
Reduction of scratches and foreign substances

Meet such requirements with MCC’s manufacturing technology

Surface shape design
Various surface shapes

Thorough control of scratches and foreign substances

MLCC Demand Forecast
Demand is rising with the advancement of ADS and the spread of IoT.
Projected to more than double
2-1. Focus Market Growth Strategies

Focus Market Growth Strategies

**Environment, Energy**

**Growth Measures**
- Expand sales of LIB materials
- Accelerate development of wastewater treatment business in China and water supply treatment business in Japan
- Develop products that reduce environmental impact

**Progress**
- Business expansion and high-performance product development in battery materials (electrolytes and anode materials)
  - Started full-scale sales of wastewater treatment facilities for farming villages and pig farms in China
- Expanding the business of biodegradable polymers and bio-based polymers

**Packaging, Labels, Films**

**Growth Measures**
- Barrier application: Accelerate overseas expansion of food packaging films, production capacity increase and sales expansion of new high-barrier performance products
- High-performance film: Develop new products by combining the Group’s technologies

**Progress**
- Started full-scale operation of a new polyester film line in 2018
- Launch of high-barrier performance deep-formed microwavable containers
- Constructing a new DIAMIRON™ production site in Thailand (Slated to start operation in 2020)
- Increasing the production capacity for Soarnol™
Business expansion and high-performance product development in battery materials:
Electrolytes: Production capacity increase in response to market expansion
Anode materials: Developed a new manufacturing process contributing to improvement of battery performance

Electrolytes

- Production capacity increase: U.S.: +7,000 MT (2019); Japan: +5,000 MT (Slated to start operation in 2020)
- Considering continuous capacity increase to meet demand for in-vehicle batteries

Anode Materials

- Developed the world’s first manufacturing process to control expansion, a problem in natural graphite-based anode materials
- Introducing a new anode material using the process that contributes to longer battery life and improves fast charging performance
Environment, Energy (2)

Expanding the business of biodegradable polymers and bio-based polymers

Accelerating application development for biodegradable polymer, BioPBS™

- Expanding demand driven by the microplastics problem tripled the sales volume compared to 2018, attracting many users through paper cups, straws, cutlery, etc.
- A paper cup coated with BioPBS™ received an innovative cup liners award in the NextGen Cup Challenge sponsored by the NextGen Consortium, founded by Starbucks and McDonald’s in the U.S.
- Accelerating application development: Shopping bags and others

BioPBS™ is a bio-based and biodegradable polymer developed and patented by MCC and manufactured by PTT MCC Biochem in Thailand.

Expanding bio-based polymer, DURABIO™

- Increased the production capacity of isosorbide-based DURABIO™ from 5,000 to 8,000 MT/Y
- In addition to automotive applications, adopted DURABIO™ for Lenovo smartphone housing; aiming to expand the business

BioPBS™: Trend of Sales Volumes

Left: Paper cups awarded in the NextGen Cup Challenge
Center: Coffee capsules and straws adopted at Washington Hotel and Keikyu Group facilities
Right: Shopping bags adopted at Commes des Garçons stores

Left: DURABIO™ is adopted for Mazda CX 5
Right: DURABIO™ is adopted for the housing (3D-shape rear panel) of Lenovo smartphones
Production capacity increase and sales expansion of new high-barrier performance products: Expanding global production and sales systems responding to the growing demand for food packaging materials

MCC decided to increase the annual production capacity of EVOH (ranked 2nd in estimated world market share with the brand name Soarnol™) of consolidated subsidiary Noltex to expand the global supply capability including Japan, the U.S., and Europe to 69,000 MT/Y, while considering further expansion.

Accelerating application development of food packaging materials by leveraging high gas barrier properties

- EVOH Global Market (MCHC estimate)

![Bar chart showing EVOH Global Market (MCHC estimate)](image)

- Nippon Gohsei UK: 18,000 MT/Y
- MCC: 10,000 MT/Y
- Noltex: +3,000 MT/Y

Global Supply Capability: 66,000 MT/Y + 3,000 MT/Y = 69,000 MT/Y
Focus Market Growth Strategies

Medical, Food, Bio Products

Sales Revenue (Billions of Yen)

Growth Measures
- Expand the implant materials business
- Expand the nutrition-related business
- Expand the medical gases business

Progress
- Acquired a U.S. high-performance engineering plastic company, Piper Plastics
- Food emulsifier: Expanding sales mainly in China and other ASEAN countries
- Respiratory-related business including home healthcare services: Acquired IMI
- Supplying oxygen gas for aquaculture

Healthcare

Sales Revenue (Billions of Yen)

Growth Measures
- Reinforce pipelines for ethical pharmaceuticals
- Develop the business in the U.S.
- Commercialize VLP vaccine
- Commercialize regenerative medicine

Progress
- Making MTPC a wholly owned subsidiary through TOB
- Started phase 3 clinical trials of Radicava™ oral suspension and ND0612 in the U.S.
- Acquired PoC for erythropoietic protoporphyria treatment in the U.S.
- Started clinical trials on spinal cord injury using Muse cells
- Obtained a license to manufacture regenerative medicine products
- Completed strategic alliance with PHCHD

*Include the impact of LSIM’s business transfer
Against the background of rising global demand for aquacultured fish due to increased health awareness in the developed countries and population growth in the emerging countries, established a new oxygen gas production base for marine aquaculture in Norway.

Supplying oxygen gas for aquaculture

Responding to rising demand for aquacultured fish

Area where marine aquaculture is thriving

New ASUs
Existing ASUs

Closed aquaculture facilities
Making MTPC a Wholly Owned Subsidiary

- Optimize pipeline value by making MTPC a wholly owned subsidiary
- Swiftly boost revenue to more than ¥500 billion

**Sales Revenue**

- **MT-6548** Renal anemia
- **MT-1186** ALS (Oral suspension)
- **MT-2271** (VLP vaccine) Seasonal influenza
- **MT-0551** Neuromyelitis optica spectrum disorder
- **ND0612** Parkinson’s disease
- **MT-7117** Erythropoietic protoporphyria
- **MT-2355** 5 combined vaccine
- **MT-5199** Tardive dyskinesia
- **MT-5547** Osteoarthritis
- **TA-7284** Diabetic nephropathy

**Clinical outcomes**

1. Provide drugs based on efficacy and safety evidence
2. Optimize treatment benefits and techniques for each patient
3. Provide treatment techniques that alleviate family burdens while optimizing patient outcomes
4. Contribute to systems that enable lifelong disease management
5. Contribute to society by optimizing and streamlining medical care

**Patient outcomes**

1. Contribute to UHC

**Improving patient and family QOL**

1. Materialize medical systems that extend healthy life expectancies

**Healthcare Solutions Outline**

- **Solutions Level 1**: Contribute to society by optimizing and streamlining medical care
- **Solutions Level 2**: Materialize medical systems that extend healthy life expectancies
- **Solutions Level 3**: Contribute to systems that enable lifelong disease management
- **Solutions Level 4**: Provide treatment techniques that alleviate family burdens while optimizing patient outcomes
- **Solutions Level 5**: Provide drugs based on efficacy and safety evidence
- **Solutions Level 6**: Contribute to UHC

**Development and Launch Year**

- FY2020
- FY2021
- FY2022
- FY2023

Late-stage pipeline products in Europe and the U.S.
Late-stage pipeline products in Japan
Existing operations in Japan

Contribute to society by optimizing and streamlining medical care

Contribute to systems that enable lifelong disease management

Contribute to society by optimizing and streamlining medical care

Provide treatment techniques that alleviate family burdens while optimizing patient outcomes

Materialize medical systems that extend healthy life expectancies

Provide drugs based on efficacy and safety evidence

Optimize treatment benefits and techniques for each patient

Provide drugs based on efficacy and safety evidence
# Generating Group Synergies

- Creating solutions to help solve social issues through agile and flexible use of technologies and human resources in the biotechnology, chemistry, and digital fields among Group companies
- Established the Synergy Creation Committee to start examination in each growth business field aiming to generate synergies

<table>
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<tr>
<th>Themes</th>
<th>MCHC</th>
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<th>MTPC</th>
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<th>TNSC</th>
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<td>Lactic acid bacteria, enteric-coated capsules, etc.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Integrated DX/healthcare platform</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Corporate cooperation</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>CVC</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
Regenerative Medicine Progress: Muse Cells

- Started clinical trials with the Muse cell-based product in patients with spinal cord injuries, in addition to acute myocardial infarction, cerebral infarction, and epidermolysis bullosa
- Planning to apply for marketing approval in fiscal 2020 and to obtain approval in fiscal 2021
- Obtained a license to manufacture regenerative medicine products (July 2019)
- Establish a marketing system and cold chain following cell production using proprietary technologies

**Characteristics of Muse cells**
- Intravenous infusion of Muse cells
- Concentrating (Muse cells) into the infarction site through blood vessels
- Tissues are repaired and functions are recovered
- Migration ability and spontaneous differentiation ability

**Proprietary technologies**
- Cell culture technique
- Cryopreservation technology

**Migration ability and spontaneous differentiation ability**

Muse cells, discovered by the team led by Prof. Mari Dezawa of Tohoku University in 2010, are pluripotent stem cells that exist in the human body.
Muse Cell Business Promotion

- Promoting commercialization and generate synergies through collaboration among MCHC operating companies

**LSII**
- Cell source

**MTPC**
- Utilization of human resources and know-how in the development, manufacture, and sales of pharmaceuticals

**MCC**
- Cell scaffolding materials and other culture peripheral materials
- Development of mass culture equipment

**TNSC**
- Establishing a cold chain

**Muse cells**, discovered by the team led by Prof. Mari Dezawa of Tohoku University in 2010, are pluripotent stem cells that exist in the human body.

Apply to those above diseases that are difficult to treat with conventional methods.
### Measures for the Industrial Materials Domain

#### Fundamental Industrial Materials

<table>
<thead>
<tr>
<th>Measures</th>
<th></th>
</tr>
</thead>
</table>
| - Expand presence in the market  
- Strengthen profitability of overseas business  
- Materialize a highly productive corporate structure |  |

<table>
<thead>
<tr>
<th>Progress</th>
<th></th>
</tr>
</thead>
</table>
| **Chemicals**  
- Started full-scale plant operations at SAMAC  
- Increased production capacity in MAA and BMA  
- Continuing review of MMA project in the U.S.  
- Promoting DX in MMA supply chain management  
- Reinforcing coke furnace to maintain conditions  
- Unified ethylene supply facilities in Mizushima  
- Continuing utility alliances at the petrochemical complex  
- Strengthening the competitiveness of polyolefins  
- **Expanding petroleum refining/petrochemical synergy:** Establishment of LLP with JXTG Nippon Oil & Energy |  |
| **Industrial Gases**  
- Completed business acquisitions of Praxair and Linde  
- New global management system  
- Expanded gas production facilities for electronic materials in East Asia  
- Construction of ASUs in the U.S. (completed) and Asia (under construction) |  |
Establishment of LLP with JXTG Nippon Oil & Energy

Considering measures to strengthen the coalition between petroleum refining and petrochemicals, including introduction of chemical recycling technology

- Considering improvement of the efficiency of the raw materials and manufacturing processes, utilization of gasoline base materials, and production optimization of petrochemicals

- Further considering commercialization of chemical recycling reusing waste plastics as raw materials for petroleum refining and petrochemicals

Importance of chemical recycling

<table>
<thead>
<tr>
<th>2018 Percentage of plastic disposal methods (%)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic recycling</td>
<td>Overseas recycling</td>
<td>Heat treatment</td>
</tr>
<tr>
<td>Simple incineration</td>
<td>Landfill</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>10</td>
<td>57</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Expected to shift to recycling in the future

Source: Japan Institute of Plastics Recycling, Material Flow of Plastics Products 2018

Strengthening coalition between petroleum refining and petrochemicals

Problems and response examples of general coalition between petroleum refining and petrochemicals

<table>
<thead>
<tr>
<th>Items</th>
<th>Major examples of response</th>
</tr>
</thead>
</table>
| Diversification of raw materials | • Inexpensive crude oil processing
    • Turn ethane and LPG into raw materials for ethylene decomposition furnaces |
| Improvement of heavy oil cracking capacity | • Increase the capacity of heavy oil cracking facilities |
| Petroleum products ↔ Petrochemical products | • Fuel oil ↔ Flexible production of petrochemical base products (olefins, aromas) and coordination and integrated operation of petroleum refining and production of petrochemicals |
| High-value-added fractions | • Effective use of unused fractions and shift to high-value-added materials |

Source: RING

Image of chemical recycling

Source: Mitsubishi Chemical Holdings
2-3. Establishment of the Industrial Gas Major Position

Establishment of the Industrial Gas Major Position (1)

- Completed business acquisitions of Praxair and Linde
- Capturing long-term management vision of the industrial gases, “¥1 trillion in sales revenue” within range

Acquisition of Praxair’s European business

- Acquisition value: €4,934 million (Approx. ¥635.8 billion*)
  *€1=¥128.86 (As of December 3, 2018)
- Major assets:
  - ASUs
  - Cylinder filling plants
  - Liquide CO2 plants
  - Dry ice plants

<table>
<thead>
<tr>
<th></th>
<th>ASUs</th>
<th>Cylinder filling plants</th>
<th>Liquide CO2 plants</th>
<th>Dry ice plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR (Portugal)</td>
<td>27</td>
<td>35</td>
<td>12</td>
<td>19</td>
</tr>
</tbody>
</table>

- Net sales: ¥168.0 billion*
- Core operating income: ¥25.5 billion*
  *€1=¥120 (Assumed rate for fiscal 2019)

Acquired assets

- HyCO SMR plants (5 locations), pipelines, remote supervision systems, supply contracts, operating technologies, human resources of HyCO businesses that Linde is developing in the U.S.
- Acquisition value: US$416 million (Approx. ¥46.1 billion)
  *US$1=¥110.59 (As of February 28, 2019)
Establishing post-acquisition global quadrupole operations (Japan, the U.S., Europe, and Asia/Oceania)
- Sharing best practices in each region to accelerate Group comprehensive strengths and synergies
- Building a global governance system

Shift to New Global Management System

New Global Management System (Effective October 2020)

- Global Headquarters (Nippon Sanso Holdings)
- Management
- Strategies
- Governance

Global Business Bases

- Europe
- Japan
- China
- India
- Southeast Asia
- Australia
- U.S.
## Driving Growth through Synergies

- **Boosted earnings by ¥20 billion by fiscal 2019 from growth through collaboration efforts**
- **Seeking to further enhance earnings by steadily deploying focus market growth strategies**

### ¥35 billion

**Fiscal 2016 – 2019: ¥20 billion**  
(Performance Products: ¥10 billion; Industrial Materials: ¥10 billion)

### Automobiles, Aircraft (Mobility)
- Respond to trend toward CASE in the automotive industry, reinforce response to environmental issues
- Reinforce overseas network for carbon fiber and composite materials business
- Accelerate overseas expansion of resin compounds business

### Environment, Energy
- Expand sales of LIB materials
- Accelerate development of wastewater treatment business in China and water supply treatment business in Japan
- Develop products that reduce environmental impact

### IT, Electronics, Displays
- Reinforce display-related products business
- Expand semiconductor-related business

### Packaging, Labels, Films
- Accelerate overseas expansion of food packaging films,
- Production capacity increase and sales expansion of new high-barrier performance products
- Develop new products by combining the Group’s technologies

### Medical, Food, Bio Products
- Expand the implant materials business
- Expand the nutrition-related business
- Expand the medical gases business

### Fundamental Industrial Materials
- Expand presence in the market
- Strengthen profitability of overseas business
- Materialize a highly productive corporate structure
Rationalization, Including from Integrating Three Chemical Companies

- Reached target of ¥15 billion from operational efficiency by fiscal 2019, including from integrating three chemical companies
- Looking to rationalize further, including through reorganizations, from making MTPC a wholly owned subsidiary

**Rationalization, including from integrating three chemical companies**

- **¥15 billion** Fiscal 2017 – 2019: ¥19 billion

**Integrating subsidiaries and affiliates**
- Reduce number of Group subsidiaries and affiliates by 25% from current level of 760
- Eliminate 164 subsidiaries and affiliates (86% of final target) by end of fiscal 2019

**Productivity improvements and workstyle reforms**
- Help improve productivity by deploying global communication tools
- Boost productivity by reducing working hours
- Implement safety measures
- Bolster R&D (Constructing MCC’s SIC research building)
- Introduce global enterprise system (SAP)
- Boost productivity through digital transformation efforts

**Rationalize by making MTPC wholly owned subsidiary**

**Challenges**
- Including integrate corporate functions, and reorganize research
2-5. Reinforce Foundations

**Progress with Business Structural Reforms**

- Liquidated and divested businesses generating ¥240 billion in sales from fiscal 2017
- Eliminate 164 subsidiaries and affiliates by end of fiscal 2019

### Targets

- **2017:**
  - Liquidated and divested businesses generating ¥30 billion in sales
  - Including to transfer generic drug business and sell U.S. PMMA sheet operations
- **2018:**
  - Liquidated and divested businesses generating ¥120 billion in sales
  - Including to integrate ABS resin business and divest European PMMA sheet operations
- **2019:**
  - Liquidated and divested businesses generating ¥240 billion in sales
  - Including to transfer LSIM business and sell recording media operations
- **2020 (FY):**
  - Liquidated and divested businesses generating ¥300 billion in sales
Promote Safety Measures

- Reinforce business foundations by ensuring thoroughly safe and stable production operations

**Reduce mentally and physically stressful work**
- Planning and implementing measures to reduce mentally and physically stressful work with the aim of “creating a human-friendly workplace environment” from the front-line job site point of view
  - Reduction targets: 257 tasks based on risk/work strength evaluation and operators’ opinions
    - To be reduced in 7 years by fiscal 2025
    - (Assumed investment of ¥40 billion)
  - Planning to reduce 136 tasks for fiscal 2019
    - (Investment of ¥5 billion)

**Develop plant maintenance technology**
- Joint development of plant facility management methods with SkymatiX utilizing drone image-processing technology

**Pursue progress under White Logistics Movement**
- Improve supply chain safety, stability, and security by collaborating with logistics firms to ensure sustainable logistics environment through the White Logistics Movement
Achieved an overseas sales ratio of 42% in fiscal 2018, compared to a 50% target (estimated at 45% in fiscal 2019)

Fostering recognition of “One MCC” initiatives

- Accelerate high-performance and high-value-added product development through modularization and systemization, and cost reduction efforts by package sales of products
- Publicized “One MCC” initiatives through exhibitions, etc., in the European market, where various automotive materials are being developed

Composition of Sales Revenue

FY2018
Total Sales: ¥3.9 trillion

FY2020 Target
Total Sales: ¥4.6 trillion

MCC’s exhibition booth at K2019 in Dusseldorf
2-5. Reinforce Foundations

DX Initiatives

- Deploy Groupwide activities under autonomous and sustainable DX promotion system
- Push ahead digital projects to cultivate on-site usage
- Fostering human resources and enhancing Groupwide infrastructure and techniques

**Value chain**

**DX portfolio**

**Operational Excellence**
- Stabilize plant operations
- Mathematical Optimization Center of Excellence (including in terms of wide-area energy cooperation and production, sales, and inventory optimization)
- Productivity improvement by image analysis
- Harness and disseminate knowledge from patents and diaries

**New Business Models**
- Drive business operation and SMC advances
- Business model reform that helps optimize customer operations

**New Digital Paradigms**
- Apply MI at sites and develop new techniques
- Use quantum computing experimentally
- Participate in government architecture assessments

**Common Foundation**
- Create digital maturity index and step up Groupwide activities
- Establish and deploy system to develop digital human resources
- Collaborate with startup companies in such areas as text mining and drones
- Collaborate with academia, such as through joint research division with the Institute of Statistical Mathematics

**Implementation stage examples**

1. Health Care
   Digital marketing to improve MR productivity

2. Industrial Materials: Petrochemicals
   Use mathematical optimization models to optimize wide area energy cooperation planning

3. Industrial Materials: MMA
   Optimize timely supply chain according to demand and raw material trends

4. Industrial Materials: Industrial Gases
   Reduce power consumption by analyzing operational data at production sites

5. Performance Products: New Energy
   Use MI to design electrolytes

6. Develop digital human resources
   - Collaborate with Shiga University to cultivate medical data scientists
   - Establish digital university
2-6. Initiatives for Creating New Businesses

**Initiatives for Creating New Businesses (1)**

### Constructing SIC research building in response to digitalization and open innovation

- Constructing SIC research building in Yokohama to strengthen R&D and promoting open innovation both internally and externally
- Introducing state-of-the-art digital infrastructure to enable the use of big data and AI
- Introducing facilities, such as collaboration areas and web conferencing systems that can be connected to internal and external partners in real/virtual ways, and improving the office environment

### Strengthening functions through reorganization of ethical pharmaceutical R&D bases

- Reorganizing the Toda Office and the Yokohama Office into the Shonan Office and the Yokohama Office, expanding opportunities for open innovation
- Transferring the Kashima Office’s CMC research function to the Onoda Office

---

*Artist rendering of the finished SIC research building*

*Artist rendering of interior of the finished SIC research building*
Accelerate commercialization in line with changes in the focus markets
1. 5G, 6G compatible: Power semiconductor materials
2. Higher performance displays: Next-generation display materials
3. Harness CVC to create new businesses
1. Power Semiconductor Materials

- **Development of GaN substrates for power electronics**
  - Development of high-quality 4-inch single crystals and substrates by the liquid phase growth method
  - Completion of crystal growth equipment to realize high-speed and continuous growth (THVPE method)

### Development of 4-inch single crystals and substrates

- Successful production of 4-inch, ultra-low-defect-density (power semiconductor compatible) GaN single crystals by proprietary liquid phase growth method (SCAAT™)
- Accelerating development with the aim of establishing substrate technology
  
  This result is based on the NEDO subsidy program.

### Completion of THVPE crystal-growing equipment

- Crystal growth at a higher temperature than in the HVPE method was completed with vapor phase growth equipment capable of achieving a low-defect-density (1/5 of conventional density), a high growth rate (3 times higher than conventional rate), and continuous growth.
  
  This result is based on the JST's subsidy program.
  
  (Joint research with Tokyo University of Agriculture and Technology)

  Accelerating product development by utilizing the features of each substrate growth method to realize ultra-low-defect GaN substrates
2. Next-Generation Display Materials

- Achieve lower costs and higher definition (4K/8K)
  - Low molecular weight coating material
    - RGB color coating method using inkjet which has benefits in terms of manufacturing cost and energy consumption (efficiency)
    - Favorable for 4K/8K panels with less risk of color mixing

- Improve color sharpness (light and dark contrast)
  - Black bank material
    - It is possible to express “jet black” by suppressing the reflection of external light, using black-colored bank material.
    - LCD technology (BCS) applied
    - Started sample work for panel giants

### Table: Comparison of Material Types

<table>
<thead>
<tr>
<th>Structure</th>
<th>Vapor-deposition-type OLED (White) + color filters</th>
<th>Coating-type OLED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High molecule type</td>
<td>Low molecule type</td>
</tr>
<tr>
<td>Developed by MCC</td>
<td>×</td>
<td>○</td>
</tr>
</tbody>
</table>

- Manufacturing cost
- Energy consumption (efficiency)
- Driving life
- In-plane uniformity
- High resolution

### Diagram:
- Cross-sectional schematic diagram of organic EL pixel
- Magnified picture of exterior appearance of organic EL model elements
  *Looking from the light emitting side of vapor-deposition type light-emitting layer/bank material/ITO film/glass substrate*
Harness CVC to Create New Businesses

- Globally access advanced technologies and new business models to generate advanced business opportunities beyond existing frameworks

Diamond Edge Ventures Investments (As of February 12, 2020)

**DIGILENS**
- Development of innovative light guide panel system to reduce the weight and to improve performance of AR/VR devices
- Started collaborating with MCC to enhance lightness and safety through resin substrates
- Invested in October 2018

**AddiFab**
- Speedy 3D printing of high-performance injection molds for complex shapes that were previously impossible to attain
- Jointly developing materials and collaborating to help customers accelerate product development
- Invested in June 2019

**Fluence Analytics**
- Polymer production monitoring system that accelerates industrial IoT
- Started trials with MCC to deliver high-performance resin production
- Invested in May 2019

2-6. Initiatives for Creating New Businesses
Today’s Agenda

1. Progress with Financial Goals
2. Priority Management Measures
   2–1 Focus Market Growth Strategies and Action Plan Progress
   2–2 Healthcare Strategies
   2–3 Measures for Industrial Materials Domain and Establishment of Industrial Gas Major Position
   2–4 Driving Growth through Synergies
   2–5 Reinforce Foundations
   2–6 Initiatives for Creating New Businesses
3. KAITEKI Management Initiative
4. KAITEKI Vision 30
Enhance sustainability by employing MOS activities to internally monitor corporate activities

<table>
<thead>
<tr>
<th>MOS Activities</th>
<th>FY2018 Results</th>
<th>Self-Assessment</th>
<th>FY2020 Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce burden on the atmosphere</td>
<td>488 LIME/¥100 million</td>
<td>☆☆☆</td>
<td>548.7 LIME/¥100 million</td>
</tr>
<tr>
<td>Provide products and services that contribute to reducing GHG emissions</td>
<td>7.5 million t-CO₂e reduction</td>
<td>☆☆</td>
<td>1.5 million t-CO₂e</td>
</tr>
<tr>
<td>Promote use of renewable energy</td>
<td>55.6 MW</td>
<td>☆☆</td>
<td>50 MW</td>
</tr>
<tr>
<td>Provide vaccines</td>
<td>7.8 points achieved</td>
<td>☆☆</td>
<td>14 points</td>
</tr>
<tr>
<td>Provide products and services that contribute to a comfortable society and better lifestyles</td>
<td>8.8% increase</td>
<td>☆</td>
<td>40%</td>
</tr>
<tr>
<td>Prevent accidents and injuries: Reduce lost time rates</td>
<td>17.0% decrease</td>
<td>-</td>
<td>50%</td>
</tr>
</tbody>
</table>

MOS Indices

- Comfort
- Health
- Sustainability

*Include the impact of LSIM’s business transfer
Endeavor to improve sustainability by participating in initiatives and joint research

Pursue Initiatives to develop new techniques to calculate corporate value

The first Japanese member of the Value Balancing Alliance (VBA)
Deploying life cycle assessments and developing techniques to measure the social impacts of companies

**Comments from Mr. Daigo Shimizu, General Manager, Equity Sales Group, Business Development Department, Securities Division, at Goldman Sachs Japan**

- People forget that non-financial information will eventually become financial information
- This VBA initiative should prove very valuable in filling the time gap

Joint research to materialize KAITEKI

**Launching the Global KAITEKI Center**

- Joint research with Arizona State University to materialize a sustainable society
  (Research themes: Visualization and quantification of social values in future businesses, Introduction of CE concept and roadmap to chemical industry, Food loss reduction, Urban heat management and material development)
- Serving as a hub from which to disseminate KAITEKI to the world

Initiatives to lower environmental impacts

- AEPW
- JalME
- CLOMA
- Circular Economy 100
- Carbon Recycling Fund Institute

* LCA: Life Cycle Assessment
### 3. KAITEKI Management Initiative

**Maintaining and Enhancing Corporate ESG Assessment**

- Monitoring progress with KAITEKI Management through corporate ESG assessments
- Selected for the Dow Jones Sustainability World Index for three consecutive years

#### Dow Jones Sustainability Indices

![Dow Jones Sustainability Indices](image)

In collaboration with RobecoSAM Sustainability Award Bronze Class 2020

#### FTSE4Good Index

![FTSE4Good](image)

Score: A-

#### CDP

![CDP](image)

- Climate Change
  - Score: A-
- Water
  - Score: B

#### RobecoSAM Sustainability Award

Bronze Class

#### Nikkei SDGs Management Survey

![Nikkei Smart Work](image)

★ 4.5

#### S&P/JPX Carbon Efficient Index

![S&P/JPX](image)

#### Nikkei Smart Work Management Survey

![Nikkei Smart Work](image)

#### Nikkei SDGs Management Survey

![Nikkei Smart Work](image)

#### MSCI Japan ESG Select Leaders Index*

![MSCI Japan ESG Select Leaders Index](image)

2019 Constituent

#### MSCI Japan Empowering Women Index*

![MSCI Japan Empowering Women Index](image)

2019 Constituent

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   2–6 Initiatives for Creating New Businesses

3. KAITEKI Management Initiative

4. KAITEKI Vision 30
Clarifying MCHC Group vision for 2030, as backbone of next medium-term management plan

Environmental and Social Issues
- Faster climate change
- Water stress and pollution
- Plastics in the ocean
- Rising populations and aging societies
- Globalization and widening disparities
- Increasing protectionism (Populism and trade wars)
- Expanding regional economic zones
- Increased medical expenses

KAITEKI Vision 30

< Innovation & Solutions >

The Earth
Addressing climate change and improving resource and energy efficiency
- Reduce greenhouse gases
  - Manage carbon through LCAs
  - Establish CO2 usage and other technologies

Society
Foster a circular economy
Help materialize healthy and vibrant societies
Resolve social issues by transforming business models and the utilization of digital technologies

People
Enhance work satisfaction and improve creativity and productivity
- Personnel system that encompasses diversity, expertise, and mobility
- Organization that accelerates growth by addressing global needs

Prospective solutions
Reflect in next medium-term management plan

Regulatory Trends
- Paris Agreement: Zero GHG emissions early in second half of this century
- Countries strengthening automotive fuel efficiency regulations
- Europe’s 2030 circular economy target: Recycle 75% of packaging waste
- G7’s 2018 announcement of Ocean Plastics Charter
- More carbon taxes
- Strengthening soft laws relating to human rights, etc.

Social Vision
- A recycling-oriented society
- Sustainable well-being

Corporate Approach
- Identify new social issues and provide ongoing solutions

Backcasting

Dramatic Changes

Globalization
Irreversible trends
Digitization
Transcending of time, borders, and languages
Converging real and virtual worlds
Socialization
Diversification and networking
Constant connections
<table>
<thead>
<tr>
<th>Social Vision</th>
<th>Sustainable carbon</th>
<th>Resource recycling-centric</th>
<th>Freedom from food and water insecurity</th>
<th>Healthy and vibrant lifestyles</th>
<th>Sustainable cities</th>
<th>Diversity</th>
<th>Data and digital technology infrastructure</th>
<th>Develop biotechnology based on information science</th>
</tr>
</thead>
</table>
|               | • **GHG neutral** by managing carbon globally | • **Optimal resource-recycling society** that deviates from an intention to expand entropy  
• Valuing usage over ownership | • Establish **food and water systems** that sustainably overcome population and economic growth and climate change | • **Significantly extend healthy life expectancies**  
  - Offer preventive medicine based on individual health data  
  - Optimize individualized medicine through new modalities and digital technologies | • Establish **smart and sustainable urban systems** through telecommunications, digital processing technologies, distributed energy generation systems, and nuclear fusion and other new technologies | • **Workstyles that integrate diverse abilities, skills, and ideas to create new value**  
• Leverage digital technology to materialize time- and place-independent workstyles  
• Empower **people to keep acquiring skills** in response to technological innovations | • Evolve technologies (**apply quantum computing**) needed to acquire, process, and output enormous amounts of data  
• Human and AI coexistence | • **Develop genome editing technology and harness non-depleted resources** |
Social Issues that MCHC Group Should Help Resolve

Identify social issues and business areas in which MCHC Group should contribute to resolutions by reviewing SDGs and megatrends in light of its mission and values.

Identifying Social Issues Requiring Resolution

Mission
Values

Sustainability
Health
Comfort

Social issues requiring resolution

1. Reduce GHGs and use resources effectively
2. Manage resources sustainably
3. Supply food sustainably
4. Supply and use water sustainably
5. Materialize healthy and vibrant lifestyles
6. Ensure safe, secure, and comfortable lives
7. Drive telecommunications and digital processing technology advances
8. Human resources and workstyles

Priority business areas

GHG reductions
Carbon recycling
Food and water supply
Medical advances
Greater human comfort
Digital infrastructure
Human resources management reforms

- Improve financial functions
- Control poverty
- Non-business
- Non-innovation
- Unhealthy
- Uncomfortable
- Prevent substance abuse
- Entertainment
- Justice and equity
- Redistribute income
- Privatization
- Protect proprietary rights

SDGs
Megatrends

We create innovative solutions globally based on our core values of Sustainability, Health, and Comfort, striving for the well-being of people, society, and our planet Earth.
Identifying Growth Businesses

- Identify growth businesses (solutions) in light of pressing social issues
- Selection perspectives: Trends in risks, regulations, markets, and technologies, business model transformation, market attractiveness, and room for innovation

**Society in 2050**

- GHG reductions
- Resources recycling
- Food and water supply
- Medical advances
- Greater human comfort
- Digital infrastructure

Priority business areas

- Estimated cost of failing to resolve social issues (Approx. ¥1 trillion)
- Regulatory trends (Paris Agreement and plastics recycling, etc.)
- Market and technology trends

Perspective growth businesses

- Lighter mobility
- Bio-based polymers
- Long storage lives
- Electrification
- Symbiosis of humans and robots
- Regenerative medicine

Review business model transformation

Pursue Chemistry as a Service by driving innovation and improving solution levels

Evaluate market attractiveness in terms of growth potential, and, scale

**Growth businesses: Central to business portfolio in 2030**

Mitsubishi Chemical Holdings
4. KAITEKI Vision 30

**Business Model Transformation**

**Pursuing Chemistry as a Service by driving innovation and improving solution levels**

- Regenerative medicine
- Preventive medicine
- Electrification solutions
- Bio-based polymers
- Next-generation high-speed communication solutions
- Next-generation display solutions
- Solutions for symbiosis of humans and robots
- Precision medicine
- Long storage lives, alternative foods, and tasty food ingredients
- Lighter mobility
- Semiconductors solutions
- Decentralized energy management
- Decentralized food and water systems
- Chemicals and materials recycling
- CO₂ collection and usage

**Innovation levels**
- Materials technology innovations
- Data accumulation
- Algorithms and architecture
- Open innovation
- Human resources

**Solution levels**
- Spec products
- Customize products
- Optimize customer operations
- Optimize entire customer businesses
- Optimize subsystems as core of social systems
- Optimize entire social systems

**Healthcare solution levels**
- Clinical outcomes
- Patient outcomes
- Improving patient and family QOL
- Materialize medical systems that extends healthy life expectancies
- Contribute to UHC

*Mitsubishi Chemical Holdings*
4. KAITEKI Vision 30

Business Portfolio for 2030

- **Growth businesses contributing to resolve social issues**

  **KAITEKI**
  The sustainable well-being for people, society and our planet Earth

  - **Sustainability**
  - **Health**
  - **Comfort**

  **GHG reductions**
  - Expand renewable energy
  - Decentralized energy management
  - CO₂ collection and usage
  - Use natural resources
  - Recycle resources
  - Bio-based polymers
  - Decentralized food system
  - Increase food production
  - Reduce environmental impacts of food production
  - Reduce food losses
  - Use energy more efficiently
  - Lighter mobility
  - Electrification solutions
  - Chemical processes to lower environmental impacts

  **Digital infrastructure**
  - Next-generation high-speed communication solutions
  - Semiconductor solutions
  - Next-generation display solutions
  - Diversify communication techniques

  **Food and water supply**
  - Collect and use GHGs
  - Extend renewable energy
  - Chemical processes to lower environmental impacts
  - Decrease food losses
  - Reduce food losses
  - Increase food production
  - Reduce environmental impacts of food production
  - Decrease food losses
  - Extends renewable energy
  - Chemical processes to lower environmental impacts
  - Decrease food losses
  - Use energy more efficiently
  - Lighter mobility
  - Electrification solutions
  - Chemical processes to lower environmental impacts

  **Medical advances**
  - Next-generation high-speed communication solutions
  - Semiconductor solutions
  - Next-generation display solutions
  - Diversify communication techniques

  **Greater human comfort**
  - Safe and secure social systems
  - Connect more people and things more quickly
  - Increase processing capacity
  - Diversify communication techniques

  **Health**
  - Regenerative medicine
  - Preventive medicine
  - Precision medicine
  - Provide care
  - Maintain health
  - Cure diseases

  **Comfort**
  - Comfortable and enjoyable lifestyles
  - Safe and secure social systems
  - Connect more people and things more quickly
  - Increase processing capacity
  - Diversify communication techniques

  **Social issues requiring resolution and priority business areas**
  - Carbon recycling
  - Greenhouse gas reductions
  - Food and water supply
  - Medical advances
  - KAITEKI Value for Tomorrow
Transform business portfolio based on selected growth businesses

**2018**

Sales Revenue
¥3.9 trillion

**2030**

Sales Revenue (Target)
¥6 trillion

- GHG reductions
- Carbon recycling
- Food and water supply
- Digital infrastructure
- Greater human comfort
- Medical advances

Above 70%
Sustainability Management Measures

- **Help improve environmental and social sustainability through progress in five key areas**

  1. **Evolve LCA tools**
     - Leverage LCAs in carbon management

  2. **Reduce environmental impact**
     - Cut GHG emissions through value chains
     - Use CO₂
     - Use less water
     - Reduce waste

  3. **Create a circular economy**
     - Cultivate business that accelerate shift to circular economy
     - Chemicals recycling
     - Materials recycling
     - Bio-based polymers
     - Biodegradable polymers

  4. **Feasibility studies of KAITEKI factories**
     - Integrate ecosystems (KAITEKI factories) with local communities, centered on smart factories

  5. **Build foundations for supporting sustainability initiatives**
     - Manage using LCA tools

- **GHG emissions**: Lower domestic emissions 26% from fiscal 2013 level by fiscal 2030
- **Pursue reductions overseas in line with national and regional target levels**

- **Build foundations for zero environmental impact by 2050**
4. KAITEKI Vision 30

Human Resources System Reforms and Global Management

- Diversity, mobility, and expertise are central to reforms
- KAITEKI Values connect talent and the Group

Global trends
- Globalization
  - Capital, people, and information move across national and regional borders
- Digitization
  - Digital technology is irreversibly changing society, industrial structures, workstyles, and values
- Socialization
  - Everyone connecting and communicating online beyond geographical limitations

Personnel situations (work environment and workstyles)
- Diversity
  - Working together regardless of age, gender, race, area of residence, experience, workstyles, values, or disabilities
- Mobility
  - Diversifying values and workstyles improving in-house and external human resources mobility
- Expertise
  - Greater social complexity demanding more expertise

Perspectives in reform human resources systems
- Respect for individuals
  - Providing workplaces that empower self-actualization
- Flexibility
  - Human resources systems that embrace diversity, mobility, and expertise
- Market value/performance
  - Compensation and treatment based on employee market values and performances

Globalizing Management
- Shift away from Japanese style management
- Establish global governance system
- Develop management system that embraces different cultures and societies
Changes in Structural Environment
- Companies that cannot resolve social issues will be weeded out
- Recycling-oriented societies and sharing economy evolving
- Accelerating commoditization of production technology
- DX reducing barriers to entry from other industries
- Increased diversity, mobility, and expertise of human resources

2030 Goals
- Identify social issues and providing ongoing solutions
- Maximize corporate value through growth businesses that help optimize social systems
- Thoroughly implement sustainability management (become environmental impact neutral)
- Providing a working place where humans, robots, and AI are cooperating

2050 Goals
- Digitization progress: Significant change in value of human presence in 2045 (singularity)
- Development of biotechnology: IT-based biology and gene editing technologies
- Energy system conversion: Extensive renewable energy usage

Advances in science and technology
- Globalization
- Socialization

Backcasting

Advances in science and technology

Extent of social changes

Time
2030 Goals

Become a solutions provider that leads social issue resolutions for a sustainable future

- Accelerate growth and enhance corporate value by making resolving social issues a business opportunity
- Establish innovative R&D structure and keep supply solutions to social issues
- Build infrastructure to ensure environmental impact neutrality by reinforcing sustainability management
- Create flexible human resources system that embraces the diversity, expertise, and mobility of its people
- Maintain dynamic digital natives who are sufficiently skilled to accelerate growth
- Intensify global management structure to meet regional needs and accelerate growth
Society in 2050

- Healthy and vibrant lifestyles
- Sustainable cities
- Diversity
- Resource recycling-centric
- Sustainable carbon
- Freedom from food and water insecurity

Data and digital technology infrastructure
Develop biotechnology based on information science