Essential Chemicals & Plastics

Businesses	Polyolefin Business	Methyl Methacrylate (MMA) Business	Licensing and Catalysts Business
	Polyethylene, Polypropylene	MMA Monomer, MMA Polymer, MMA Sheet	

Strengths of the Essential Chemicals & Plastics Sector

Our bases in Japan and Singapore develop high value-added products that anticipate customer needs and provide a stable supply of high-quality products. Our strength lies in the relationships of trust we have cultivated over the years with our blue-chip customers in the Asian market. At our Saudi Arabian base, we manufacture cost-competitive products by utilizing inexpensive raw materials and fuels.

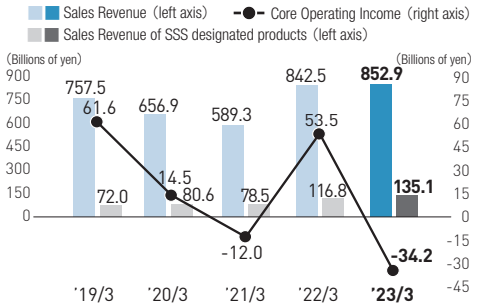
Initiatives in FY2022

In addition to the decision to install pilot facilities for the commercialization of material recycling using waste plastics obtained from end-of-life vehicles, we also started operation of a demonstration facility for chemical recycling of acrylic resin at our Ehime Works thereby promoting efforts to realize a recycling-oriented society. In addition, we established a flexible manufacturing and sales structure by launching a new MMA Division and centrally managing Japan and Singapore. At the same time, we are working to improve our business structure by withdrawing from the caprolactam business.

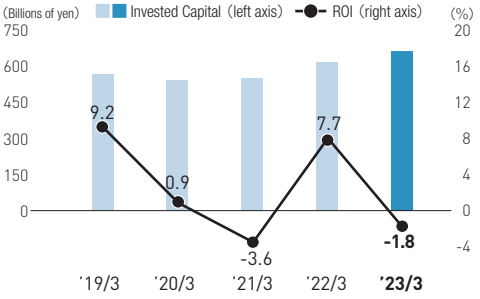
Future Initiatives

We will transform our business portfolio with an awareness of green transformation (GX) and develop carbon neutral technologies, including material recycling and chemical recycling, to accelerate their implementation in society. In addition, we will shift products from existing businesses to high value-added products, optimize production in Japan and Singapore, and engage in external collaboration with a view to carbon neutrality. The Saudi Arabian business will continue to be a cash cow, so to speak, and we will strive to ensure stable operations.

Sales Revenues and Core Operating Income/ Sales revenue of SSS designated products



Invested Capital・ROI



Transition to date

Despite the suspension of ethylene production facilities at the Chiba Works and efforts to lift the completion guarantee and stabilize operations for the second phase of the Rabigh project, ROI has fluctuated widely due to volatile petrochemical market conditions. As for invested capital, investments other than business maintenance are limited, but have increased since FY2021 due to high raw material prices and other factors.

Future Measures and Issues

We will focus on licensing and the catalyst business, etc., to achieve high added value independent of market conditions, and promote integrated management of Japan and Singapore (product portfolio, optimization of polyolefin production), external collaboration, and business restructuring.

Activities aimed at becoming Carbon Neutrality

We will make various efforts to become carbon neutral including collaborations with other companies and academia.

Major Initiatives

- Expand material recycling business
- Pursue technology development in chemical recycling

→ P.43 Contribute to Recycling Resources

Progress

- Started a business alliance with REVER.
- Completion of PMMA chemical recycling demonstration facility, plans to begin providing samples in the fall of 2023
- Meguri® brand product certification

Our Website : Circular System for Plastics Website

Secure stable revenues via licensing and catalyst business

In accordance with the following three basic strategies, we aim to achieve both stable earnings and sustainable business expansion, while contributing to the realization of carbon neutrality in society.

Basic strategy

Establish stable revenue base	Expand portfolio	Brush up technology
●Expand capacity to supply catalysts ●Expand opportunities to contact potential customers	●Quickly establish technologies that reduce environmental impact, expand lineup in license ●Diversify business models through operational support services	●Bolster competitiveness in processes ●Extend catalyst life and improve costs

Progress

- Start contacting potential licensees
- Promote website renewal and marketing enhancements

Our Website : Technology Licensing Website

Bolster competitiveness via unified operations with Singapore

By combining the strengths of the two centers–Japan as the center of R&D and Singapore with its huge infrastructure and customer network–we will further enhance the competitiveness of each business and accelerate the social implementation of carbon neutral technology.

Major Initiatives

- Review and evolution of MMA, polyolefin business, etc.
- Implementation of Japanese carbon neutral technology using Singapore's infrastructure

Progress

- Optimized production and sales balance by establishing MMA Division
- Started to study the optimization of polyolefin production

Direction of medium- and long-term initiatives in Japan and Singapore

	Japan	Singapore
CN	Accelerate development of technologies that reduce environmental impact	Deploy technologies into society
Existing businesses	**Exit unprofitable businesses** After caprolactam, continue to study exiting or shrinking low-profit businesses, focus on businesses that are not affected by market conditions, such as licensing businesses. **Production optimization** Study production optimization in Japan and Singapore with the aim of maximizing earnings	
Collaboration	**Tri-party collaboration in Keiyo*1** Begin joint studies on fuel conversions and recycling **Keiyo Coastal Industrial Complex Council on Carbon Neutrality** Study how to realize a carbon neutral industrial complex that is internationally competitive	**Discussions with Singaporean government (EDB)** Accelerate technology studies at PDH and CCUS*2 with support from EDB

*1 Maruzen Petrochemical, Mitsui Chemicals and Sumitomo Chemical *2 PDH: Propane Dehydrogenation. CCUS: CO_2 capture, utilization and storage

Status of Global Expansion

Global Expansion Using the Strengths of Each Location

The Essential Chemicals & Plastics Sector has three major production locations: Japan, Singapore and Saudi Arabia.

Japan and Singapore

In addition to producing and selling products primarily aimed at customers in Japan, our facilities serve as centers for research and development, developing new technologies and high value-added products while also undertaking initiatives aimed at reducing environmental impact. In addition, as the core of our licensing business, our facilities in Japan also handle not only technology development, but also production, sales, and other duties relating to catalysts.

On the other hand, the Singapore base produces ethylene and propylene at PCS*1, polyethylene and polypropylene at TPC*2. Sumitomo Chemical Asia produces MMA. We have developed high value-added products and produced stable supplies of high-quality products in Singapore for many years, building extremely strong relationships of trust with customers, while creating high brand value in the Asian market.

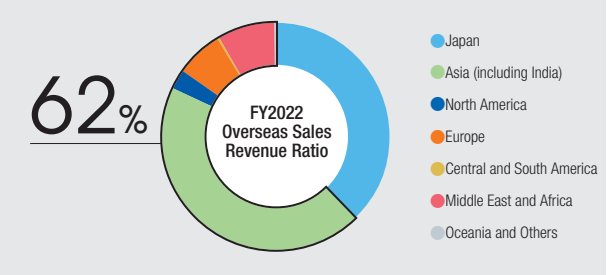
By integrating the operation of these two bases, we will review and evolve the structure of our business including MMA, polyolefin and others. We will also utilize the Singapore base to put into practice the carbon neutral technology developed in Japan.

Saudi Arabia

Petro Rabigh, a joint venture with Saudi Aramco, produces all sorts of petrochemical products. The strength of the Rabigh business, as shown on the next page, is its cost advantage due to utilizing ethane. We are focusing on stable production in order to maximize this advantage.

*1 PCS Pte. Ltd. (affiliated company)
*2 The Polyolefin Company (Singapore) Pte. Ltd. (consolidated subsidiary)

Sales Revenue Ratio by Region



Q&A

Q : As the movement to reduce environmental impact expands, what is the strategy of the Essential Chemicals & Plastics Sector?

A: We will promote GX-conscious transformation of our business portfolio and contribute not only to our own reduction of greenhouse gas (GHG) emissions but also to society's reduction of GHG emissions through the development and commercialization of superior technologies for reducing environmental impact. In addition, we aim to generate continuous profits through licensing of these technologies and related catalyst business. Already in progress is a business alliance with REVER to commercialize material recycling and product certification for the recycled plastic brand Meguri®.

License / Catalyst

Propylene Oxide (PO)-only Process

The PO-only process, developed by Sumitomo Chemical, is the world's first successfully commercialized cumene-based PO-only production process, based on utilizing cumene recirculation. The process produces no byproducts, and when combined with a proprietarily developed high-performance epoxidized catalyst, provides high yields, reduced energy costs, and high operational stability. This sort of technology license contributes to reducing environmental impact even outside of Sumitomo Chemical's factories.

Catalyst Business

Sumitomo Chemical conducts development and sales for high-performance catalysts that maximize the effects of licensed technologies and contribute to reducing environmental impact. Because these catalysts can be expected to secure stable returns in addition to reducing GHG emissions, we are focusing on expanding this business.

Technological Development

Material Recycling and Chemical Recycling

We are working to develop and commercialize material recycling technology, which turns waste plastics and other wastes back into resources that can then be used in new products, and chemical recycling technology, which chemically converts trash and waste plastics into the raw materials used for new plastics.

→ P.43 Contribute to Recycling Resources

Effective Use of CO_2

Within our petrochemical complex in Singapore, we are considering combining propane dehydrogenation (PDH) technology, which produces propylene from propane, with a CO_2 fixation technology that synthesizes methanol very efficiently, using CO_2 as a raw material, alongside the hydrogen produced as a byproduct of the PDH process. If this initiative succeeds, this could be a new breakthrough that can both reduce environmental impact, by reducing the amount of CO_2 emitted from chemical plants and other facilities, and also improve economic performance by increasing the production of certain products.

Value Creation Model: Rabigh Business

Value Chain

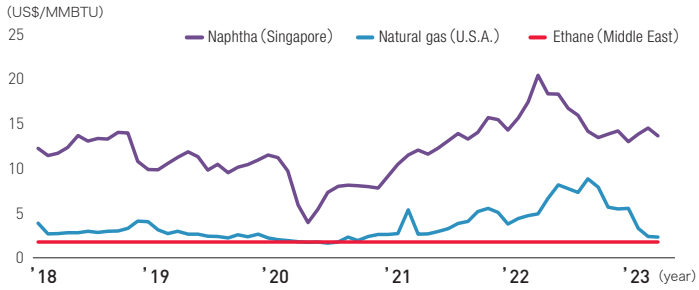
Petro Rabigh produces a variety of petroleum and petrochemical products using crude oil and cost-competitive ethane from Saudi Aramco as its primary feedstocks.

System for Providing Added Value

Competitive Advantages of Rabigh Business

Procuring ethane from Saudi Aramco as the main feedstock offers outstanding cost competitiveness, as raw material prices can be fixed at lower levels compared to competitors using naphtha as feedstock, and margins will expand as product prices increase, among other factors. In addition, it is the world's largest integrated complex, which leads to competitive advantages due to lower unit costs.

Cost Difference of Petrochemical Feedstocks



Major Processes Generating Competitive Advantages

Petro Rabigh produces a variety of petroleum and petrochemical products using crude oil supplied by Saudi Aramco and cost-competitive ethane as main raw materials. The company makes products such as PP, PE, and PO, using technology licenses from Sumitomo Chemical, which boasts world-class technology. Moreover, the local staffs' operational technique is improving by receiving training at overseas facilities, particularly in Singapore. Moreover, Sumitomo Chemical Asia, which handles sales, has facilities throughout Asia, shortening delivery times and reducing logistics costs.

Work in progress at Petro Rabigh

Providing Customer Value

Because there are risks of obstructions to procurement in the Middle East region of Asia, where logistics can be unstable, customers have a strong desire for accurate and stable product delivery. By having inventory in locations close to customers, we can meet these needs by offering sales with more reliable and shorter delivery times than competitors, securing a high level of trust. In addition, while it has the flexibility to change a certain volume of sales and customers according to market conditions in each region, by focusing more on continued sales to core customers, the company further increases the reliability of its stable supply. Through these efforts, Sumitomo Chemical Asia is working to build long-term relationships with customers.

Added Value Provided to Society

Contributing to Reducing Environmental Impact by Using Cutting-edge Technology in Plants

Petro Rabigh uses the breakthrough, environmentally friendly PO-only process to produce PO, which, compared with conventional production processes, reduces CO_2 emissions by 300 thousand tons of CO_2 for an annual production volume of 200 thousand tons of PO. We not only produce stable supplies of a product essential for society, we also use energy and resources efficiently throughout the plant with this sort of cutting-edge technology, thereby contributing to reducing environmental impact.