

Excite the Imagination

*N.E. CHEMCAT*

# SUSTAINABILITY REPORT

N.E. CHEMCAT CORPORATION

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# 2023

## Corporate Philosophy

We contribute to achieving a sustainable and quality global environment and affluent society through chemistry.

We at all times strive to develop technologies and provide high-quality products to our customers, and bring about the creation of new value.

We respect human rights and fulfill corporate social responsibilities, seek to co-exist with the environment and society around us, and aim to become a company that is trusted by stakeholders.

We promote transparent and sound management, develop the potential of each employee, and foster a culture that maximizes the achievement of the entire company.

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## Editorial Policy

The aim of this report is to present N.E. CHEMCAT's approach to sustainability and its efforts to help solve environmental and social issues through its business activities. The company's wide range of initiatives related to sustainability are presented in the ESG categories of environment, society, and governance. We hope this report will help our stakeholders gain a better understanding of our sustainability management.

#### Reporting period:

Fiscal 2022 (April 2022 to March 2023)

Some data from before/after the reporting period are included.

#### Reporting scope:

N.E. CHEMCAT CORPORATION

#### Reporting frequency:

Once a year

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Note: This report is the English version of the Japanese original.



### Contributing to the realization of a sustainable society with catalyst technology

**Susumu Endo**  
President and Representative Director

### Promoting sustainability management to help solve social issues, based on the cornerstones of our Corporate Philosophy and Long-Term Vision

N.E. CHEMCAT was established in April 1964 and will celebrate the 60th anniversary of its founding in 2024.

Over the past 60 years, we have successfully helped to build a sustainable, affluent society through the provision of catalysts. We have contributed to society through the development and production of catalysts used in a variety of applications including air purification by detoxifying the harmful substances contained in automobile exhaust gas, and the manufacture of pharmaceuticals, agrochemicals, fertilizers, electronic materials, and other products.

In recent years, global warming and other environmental issues have increased in severity, resulting in mounting global-scale social issues. There is a heightened awareness of sustainability among the public and corporations are also being pressured to take steps to solve those issues.

Our company has contributed to environmental conservation through the business of exhaust catalysts, precious metal recycling, and others.

Our approach to management is to “contribute to achieving a sustainable and quality global environment and affluent society through chemistry” as stated in our Corporate Philosophy.

We have also formulated Vision 2030 as our long-term goal based on this Corporate Philosophy and aim to achieve it by visualizing our ideals in the three areas of finance, business, and management infrastructure, and pursuing 16 key drivers as concrete measures.

Although the business environment surrounding our company is undergoing major changes aimed at decarbonization, including the transition to renewable energy and the shift to zero-emission vehicles (ZEV) in the automotive industry, we intend to promote sustainability management to achieve sustainable growth while continuing to respond to society’s needs. We will build business models and systems that are beneficial to society by helping to solve social issues as part of our business activities, in alignment with our Corporate Philosophy and Vision 2030.

### Fulfilling our role in building a sustainable society by developing new technology

We need to pursue technological development to solve social issues. Our company will continue to perform research and development on automotive exhaust catalysts that produce even higher performance to adapt to the increasingly stringent regulations on gas emissions. We will also improve technological capabilities in extraction, recovery, and refining to recycle and reuse rare precious metals, thereby helping to build a recycling-oriented society.

In addition to the initiatives described above, we are focusing on carbon neutrality as a key area of social contribution. Carbon neutrality is a global mission, with more than 150 countries and regions having declared their intention to achieve this goal and which are pursuing a range of initiatives. Recently, hydrogen and ammonia are drawing attention as new energy sources that do not emit CO<sub>2</sub> during use, but our company has been developing products for hydrogen use since the 1990s.

Our fuel cell catalyst technology is already being used for stationary fuel cells for residential use and we are developing technology to achieve higher power output to expand application to industrial fuel cells used in plants, stores, and other commercial facilities.

The use of hydrogen in mobility is also an important area of contribution. Many countries are considering the application of fuel cells for medium- to long-distance buses, trucks, trains, ships, and other modes of transport.

Our company is working on electrode catalysts, which are the core components of fuel cell vehicles (FCVs). We are pursuing initiatives targeted at development of next-generation catalysts and the establishment of technology to recover precious metals from used electrode catalysts.

From the perspective of the entire value chain (manufacturing, storage and transport, and usage), areas of application for the technologies we possess include manufacturing and effective usage of ammonia as an energy source, aftertreatment of exhaust gas emitted through combustion, and other technologies, in addition to the use of catalysts in the manufacture and transport of hydrogen.

In addition to hydrogen and ammonia, carbon capture and utilization (CCU) is another area where we can make full use of the knowledge we have accumulated. This is accomplished by various means such as direct air capture (DAC) of CO<sub>2</sub> from the atmosphere, methanation, which is a process of producing methane from CO<sub>2</sub>, and e-fuel synthesis.

As I have described, there are wide range of technological areas where we can contribute. I take pride in the fact that demonstrating such capabilities to help solve social issues is a mission of our company and we will continue to pursue technological innovation to achieve carbon neutrality.

### Developing human resources willing to take on challenges

People are the driving force behind promoting sustainability management and supporting initiatives aimed at solving social issues. Fostering a spirit of challenge is important in order to pursue new innovation in the future.

We are therefore continuing to build a culture and system capable of drawing out the potential of each employee and establish an environment that encourages each employee to take on challenges by supporting participation in new businesses and different projects, and other means.

I aim to engage in open innovation even more actively

than in the past, and work to build a sustainable society and develop new technologies as we cooperate with our stakeholders.

N.E. CHEMCAT has sincerely worked with society in operating its business since the company was founded. We will continue to promote sustainability management as a company that continues to be needed and trusted by society, as we think about how we can help to solve social issues from now into the future.

I would like to ask you, our stakeholders, for your continued support and cooperation.

Vision 2030 was formulated to identify the company we want to be in 2030 based on three areas of finance, business, and management infrastructure, with an eye toward the social environment we will operate in, in 2050.

To achieve this vision, we will continue to pursue corporate transformation and contribute more to building a sustainable society and protecting the global environment.

## SUSTAINABLE DEVELOPMENT GOALS



Catalysts are used in a broad range of industries, including the petrochemical, automotive, and pharmaceutical industries. They have contributed to improvement of environmental challenges such as detoxifying vehicle emissions while also supporting industrial development. Meanwhile, global warming, ocean pollution, food shortages, and other social challenges have been mounting in recent years. Stronger demands are being made for companies to contribute to the resolution of such challenges since the Sustainable Development Goals (SDGs) were adopted by the United Nations General Assembly in 2015.

Our Vision 2030 was formulated by first forecasting the desired social environment of 2050 and then working backwards to connect that specified future to the

present (backcasting). The Long-Term Vision identifies the company we want to be in 2030 based on the three areas of finance, business, and management infrastructure, in order to proactively help solve increasingly diverse social challenges.

Internal corporate transformation to achieve fundamental change in the values and structure of our company is essential to achieve Vision 2030. We have therefore specified 16 key drivers as the infrastructure and systems for such transformation. By implementing these drivers, we aim to establish the internal corporate structure and propel transformation to provide new value for catalysts and thereby contribute even more to the development of a sustainable society and protection of the global environment.

### 16 Key Drivers to Achieve Vision 2030



Finance

- (1) Strengthen business management process and financial base focusing on ROIC
- (2) Restructure the business execution framework to strengthen existing businesses and create new businesses
- (3) Explore new areas and develop new technologies (products)
- (4) Strengthen marketing functions and optimize the value chain
- (5) Streamline the development process and create new technologies by utilizing digital transformation (DX), etc.



Business

- (6) Establish a lean production process by strengthening the process engineering functions
- (7) Improve the overall process through the promotion of Lean Six Sigma (LSS) activities
- (8) Strengthen procurement functions and secure a sound supply chain
- (9) Optimize the precious metal management process
- (10) Establish a system to promote corporate-wide digital transformation (DX)



Management Infrastructure

- (11) Reduce environmental load substances throughout the business activities; prevent environmental and labor accidents
- (12) Strengthen the management of precious metals and chemical substances at plants
- (13) Enforce safe & hygiene workplace and environmental management through promotion of responsible care (RC) activities
- (14) Strengthen stakeholder engagement through appropriate information disclosure and dialogue
- (15) Establish an HR system to encourage and support aggressive challenges
- (16) Promote ESG management and create a lively working environment

# History of N.E. CHEMCAT

We have continued to take on the challenge of providing new value through catalysts based on the knowledge and technology we have accumulated over more than a half a century, since N.E. CHEMCAT was founded in 1964.

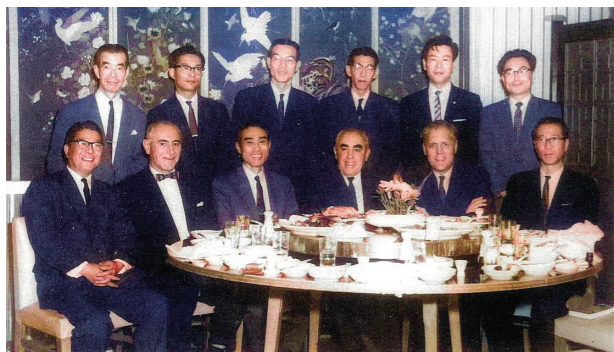
## Early Years

1964-1978

**As a catalyst manufacturer, N.E. CHEMCAT contributed to the development of the Japanese chemical industry during the country's period of rapid economic growth.**

Founded as Nippon Engelhard Ltd. on April 9, 1964, the company was established with a total of 37 employees as a 50:50 joint venture between Sumitomo Metal Mining Co., Ltd. and Engelhard Corporation of the United States. The Ichikawa Laboratory was set up later in the same year. In 1970, operations began at the Numazu Factory (now Numazu Plant), which is still a base for manufacturing and R&D today.

By manufacturing a wide range of products, including catalysts, chemical products (precious metal salts, plating chemicals, electrodes, etc.), as well as liquid gold (luster), and through its precious metal recovery and refining business, N.E. CHEMCAT helped promote the development of the Japanese chemical industry.



First management team



Numazu Factory at the start of operations

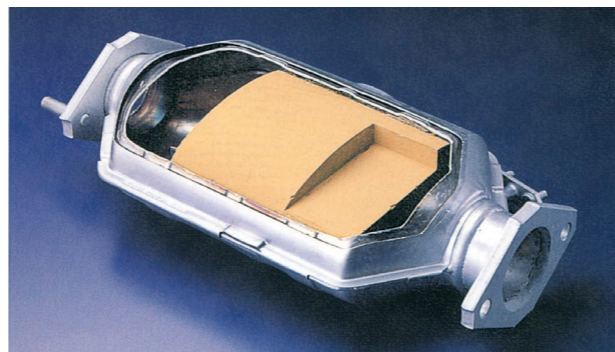
## Breakthrough Period

1979-1995

**Expanding the exhaust catalyst business along with the motorization of society**

In 1979, the company started manufacturing auto exhaust catalysts. As automobile use grew, the health effects of harmful substances contained in exhaust gas, such as carbon monoxide (CO), hydrocarbons (HC), and nitrogen oxides (NOx), began to raise concern. At that point, the exhaust catalyst business expanded rapidly due to the tightening of emissions regulations.

In June 1989, the company name was changed to N.E. CHEMCAT CORPORATION, and the company went public in September of the same year.



Catalytic converter



First shipment of auto exhaust catalysts

## Expansion Period

1996-2019

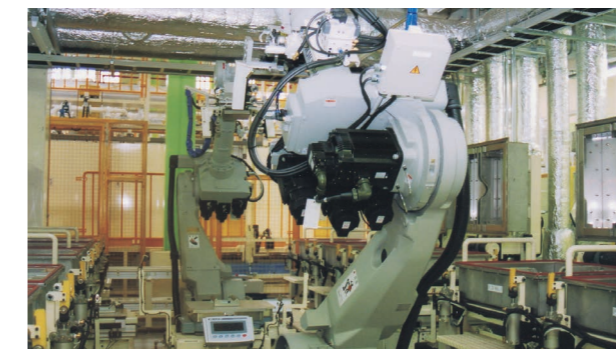
**Eco-friendly business expanded beyond Japan**

The company began its global expansion in 1996, and by 2002, it had sites in locations including Singapore, Thailand, and China. In response to stricter vehicle emission regulations for diesel vehicles, the company opened the Tsukuba Plant in 2002 to create a mass production system for diesel auto exhaust catalysts.

In order to accelerate decision-making capabilities, the company delisted in 2010, and became a 50:50 joint venture between Sumitomo Metal Mining Co., Ltd. and the BASF Group.



BASF Chemcat (Thailand) Limited



Mass production equipment for diesel auto exhaust catalysts

## Toward the Next Stage of Challenges

2020-

**Management focused on building a sustainable society**

The Numazu Plant celebrated its 50th anniversary in July 2020, the head office relocated in May 2021, and the Tsukuba Plant marked its 20th anniversary in February 2022.

In April 2021, the company formulated a new Corporate Philosophy and started practicing sustainability management.

While helping to achieve the UN Sustainable Development Goals (SDGs), N.E. CHEMCAT is now pursuing structural reforms to achieve Vision 2030, which outlines the company's long-term direction and aims.

In April 2022, the new corporate tagline, "Excite the Imagination," was unveiled.



Moved to a new head office in May 2021

**N.E. CHEMCAT**  
Excite the Imagination

"Excite the Imagination" expresses the company's aspiration to bring about new innovation by spurring the imagination. It conveys a passion for building an even better future by fostering excitement and motivation in all employees.

# N.E. CHEMCAT Business Fields

N.E. CHEMCAT contributes to achieving a sustainable and quality global environment and affluent society through the provision of catalysts that support a wide range of industries and help solve social challenges.

## Process Catalysts

Process catalysts are used for accelerating chemical reactions or selectively producing specific compounds, and are indispensable for industrial manufacturing. We develop and manufacture process catalysts used in a variety of fields, from energy plants to the manufacturing of pharmaceuticals, agrochemicals, fertilizers, and organic electroluminescence. Through these activities, we provide support to many aspects of society, from cutting-edge industries to the everyday lives of citizens.



## Exhaust Catalysts

Substances emitted from plants and other stationary sources and from the internal combustion engines of vehicles and other machinery are harmful to the environment and to the human body. Exhaust catalysts convert such harmful substances into harmless substances through chemical reactions and thereby make a substantial contribution to solving air pollution and other environmental challenges.



### Products



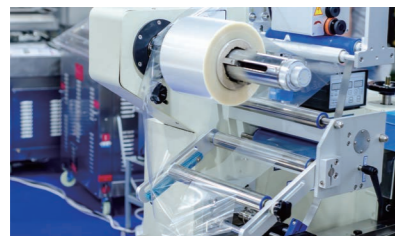
#### Fine Chemical Catalysts

Fine chemical catalysts are used in the process of manufacturing high value-added chemicals such as pharmaceuticals and agrochemicals. They are used to produce antidiabetic and antihypertensive medicine, antibiotics, and other medicine, and improve agricultural productivity, thereby supporting the lives of everyone. Fine chemicals also require a high degree of purity and are manufactured through production processes that involve many stages and which generate a great deal of waste. There have been demands to reduce waste generation in recent years and fine chemical catalysts possessing high activity and selectivity are contributing to more efficient production with a lower environmental impact.



#### Gas Purification Catalysts

Gas purification catalysts refine inert gas to an ultra-high degree of purity by removing minute impurities such as oxygen (O<sub>2</sub>), carbon dioxide (CO<sub>2</sub>), hydrogen (H<sub>2</sub>), and moisture. The catalysts are used in the chemical, steel, machine, and many other industries with a high need for ultrapure gas. We are also developing methanation to recycle CO<sub>2</sub> and produce methane, the main raw material in city gas, and other carbon recycling technologies aimed at achieving carbon neutrality.



#### Petrochemical Catalysts

Catalysts are essential to the petrochemical and petroleum refining processes and have contributed greatly to the development of the industry to where it is today. We support affluent living by providing the catalysts needed to produce basic chemicals used in manufacturing apparel, carpet, plastics, and other petrochemical products, as well as catalysts that serve as the raw material for the gas barrier films widely used in food packaging and for other purposes in recent years.

Providing value to society

Supporting industrial development and flourishing lifestyles

### Products



#### Stationary Off-Gas Treatment Catalysts

The hydrocarbons (HC) and carbon monoxide (CO) contained in industrial emissions are the main sources of air pollution and are a big problem for society as whole. N.E. CHEMCAT helps to prevent air pollution by providing DASH catalysts that remove volatile organic compounds (VOCs) and other contaminants contained in exhaust gas from plants and recover and reuse the thermal energy emitted from them.



#### Gasoline Auto Exhaust Catalysts

Gas exhaust from gasoline engines contains carbon monoxide (CO), hydrocarbons (HC), and nitrogen oxides (NO<sub>x</sub>), which are harmful substances. We help to prevent air pollution by providing three-way catalysts that convert these harmful substances into the harmless substances, carbon dioxide (CO<sub>2</sub>), water (H<sub>2</sub>O), and nitrogen (N<sub>2</sub>). Regulations on vehicle emissions and fuel efficiency continue to grow stricter worldwide year after year. We are working to prevent global warming and solve environmental challenges by working together with automotive manufacturers to develop and manufacture high-quality catalysts that have superior durability and good purification performance, and low-temperature and high heat-resistance performance.



#### Diesel Auto Exhaust Catalysts

Diesel engines emit less CO<sub>2</sub> than gasoline engines, but exhaust higher amounts of sulfuric acid mist, other particulate matter (PM), and nitrogen oxides (NO<sub>x</sub>), in addition to soluble and insoluble organic compounds. To address these problems, we are developing and manufacturing catalysts that can be adapted to various post-treatment systems such as diesel particulate filters (DPF) to capture particulate matter (PM) and convert into CO<sub>2</sub> and selective catalytic reduction (SCR) catalysts to treat nitrogen oxides (NO<sub>x</sub>). These catalysts render such substances harmless and help to protect the global environment.

Providing value to society

Promoting a livable planet by eliminating substances that are harmful to humans and nature

# N.E. CHEMCAT Business Fields

## Catalysts for Fuel Cell Applications

Fuel cells, which generate electrical energy through the reaction of hydrogen and oxygen, are attracting increasing attention as a clean energy technology. We develop and manufacture electrode catalysts for fuel cell vehicles (FCVs), and reforming catalysts and preferential oxidation (PROX) catalysts needed to produce hydrogen gas, and we are working to develop a hydrogen-based society.

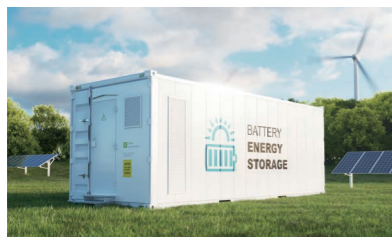


### Products



#### Catalysts for FCVs

We develop and manufacture electrode catalysts for FCVs, which are drawing interest as zero-emission vehicles that will help achieve carbon neutrality. We are focusing on improvement of platinum (Pt) catalysts and development of next-generation catalysts (platinum alloy catalysts and platinum core-shell catalysts) and are contributing to resource recycling up to precious metal recovery from electrode catalysts.



#### Electrode Catalysts for Stationary Use

Fuel cells use hydrogen to generate heat and electricity, and are an essential system for hydrogen use. For stationary fuel cells, we develop and manufacture reforming catalysts that convert methane to hydrogen, such as catalysts needed to produce hydrogen from city gas, and PROX catalysts that remove carbon monoxide (CO). We will continue our work to provide catalysts offering even high performance and will support the proliferation of clean energy as the demand for it continues to grow in the future.



#### Catalysts for Hydrogen Value Chain

The use of catalysts is being considered for each step of hydrogen production, storage, transport, and use. Reforming catalysts and PROX catalysts are used in the production process, and the use of catalysts is also promising for the technology to extract hydrogen from hydrogen carriers in the storage and transport steps. Catalysts are also effective at removing nitrogen oxides (NOx), nitrous oxide (N<sub>2</sub>O), and other harmful substances generated by mixed combustion of hydrogen and ammonia (NH<sub>3</sub>) during use. These hydrogen-related catalysts support the hydrogen value chain and help solve environmental, resource, and other social challenges.

Providing value to society

Facilitating the adoption of clean energy and promoting a sustainable society

## Precious Metal Recycling

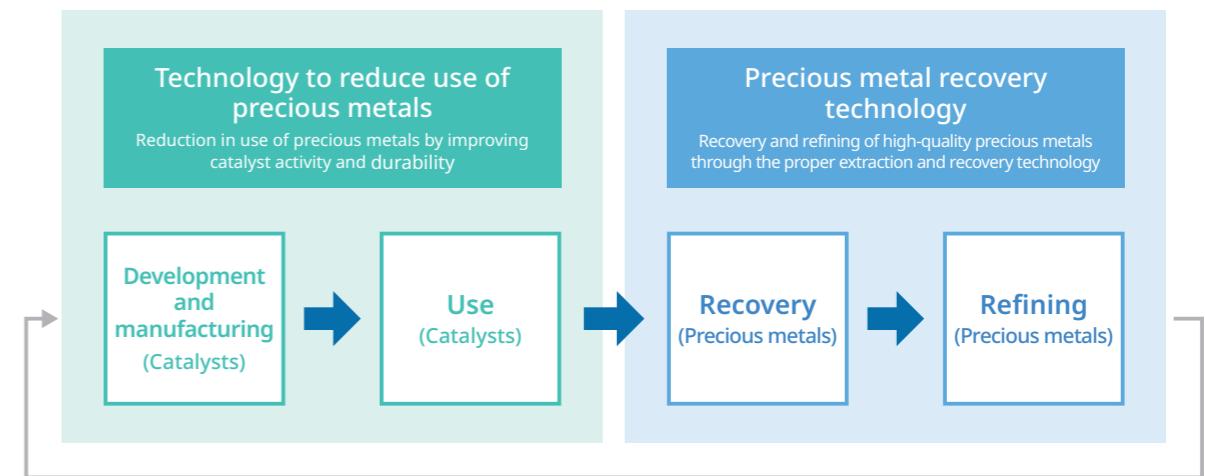
N.E. CHEMCAT separates and recovers precious metals from spent catalysts, including platinum (Pt), palladium (Pd), rhodium (Rh), ruthenium (Ru), and gold (Au). Our proprietary process allows impurities to be removed and the precious metals to be refined to a high degree of purity.



We also have precious metal reduction technology to formulate catalysts that use fewer precious metals while offering performance that is equal to or better than conventional catalysts. We are helping to conserve scarce precious metal resources by providing integrated services, from the development and manufacture of catalysts to the recovery and refining of precious metals.

### Initiatives

#### Initiatives Targeting Effective Use of Precious Earth Resources



The Numazu Plant has been involved in the precious metal recycling business since N.E. CHEMCAT was first established.

In addition to metal recovery, our recycling technology is also used for refining high-purity adsorbents for waste treatment and high-purity semiconductor encapsulants and raw materials for encapsulants.

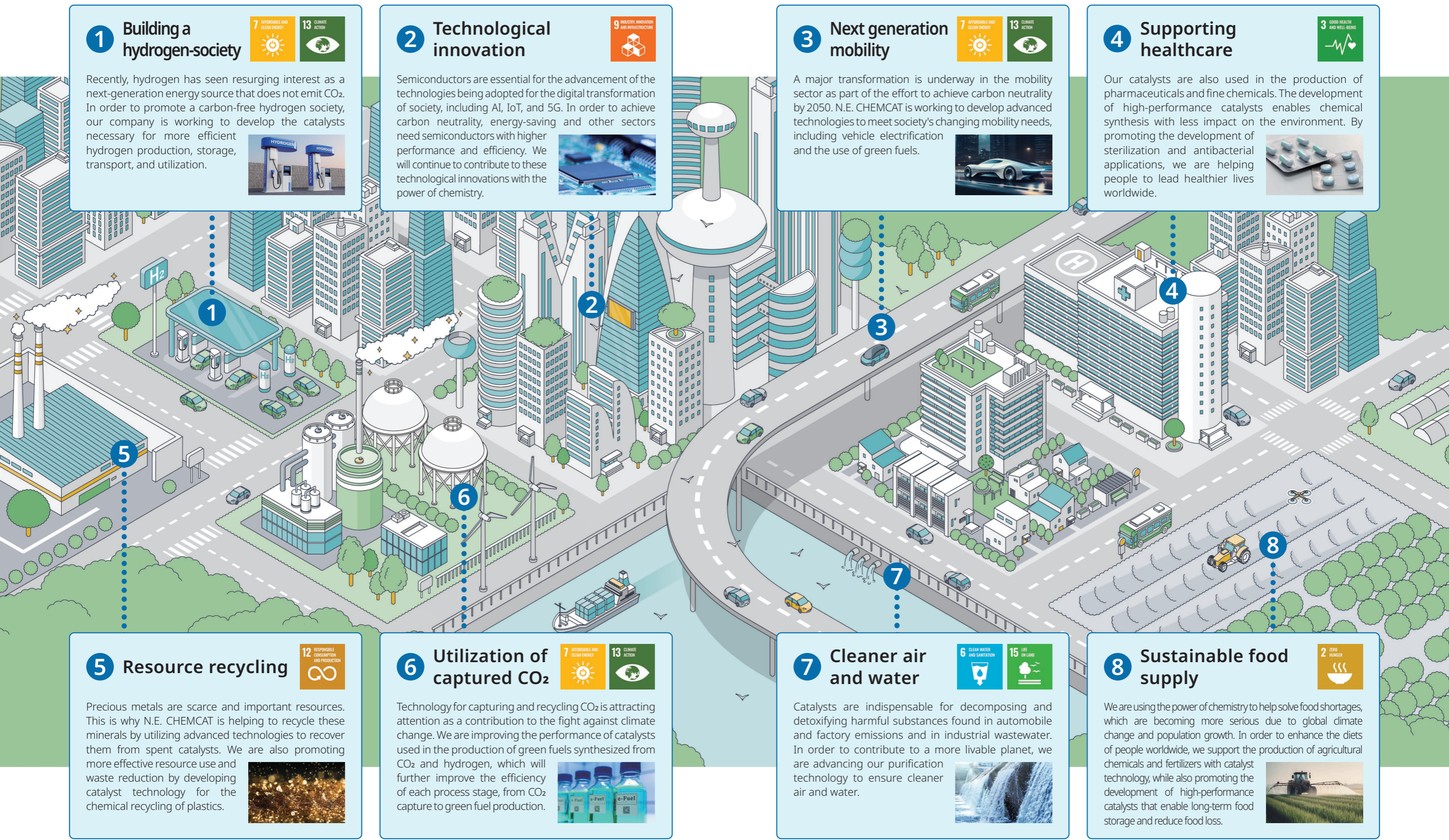


Providing value to society

Promoting the effective use of scarce resources and helping to build to a recycling-oriented society

# Helping to Build a Sustainable Future

By continually advancing the technologies we have amassed in developing our catalyst, precious metal recovery, and other businesses, we aim to help create an even more sustainable, affluent world for future generations.



## 1 Building a hydrogen-society



Recently, hydrogen has seen resurging interest as a next-generation energy source that does not emit CO<sub>2</sub>. In order to promote a carbon-free hydrogen society, our company is working to develop the catalysts necessary for more efficient hydrogen production, storage, transport, and utilization.



## 2 Technological innovation



Semiconductors are essential for the advancement of the technologies being adopted for the digital transformation of society, including AI, IoT, and 5G. In order to achieve carbon neutrality, energy-saving and other sectors need semiconductors with higher performance and efficiency. We will continue to contribute to these technological innovations with the power of chemistry.



## 3 Next generation mobility



A major transformation is underway in the mobility sector as part of the effort to achieve carbon neutrality by 2050. N.E. CHEMCAT is working to develop advanced technologies to meet society's changing mobility needs, including vehicle electrification and the use of green fuels.



## 4 Supporting healthcare



Our catalysts are also used in the production of pharmaceuticals and fine chemicals. The development of high-performance catalysts enables chemical synthesis with less impact on the environment. By promoting the development of sterilization and antibacterial applications, we are helping people to lead healthier lives worldwide.



## 5 Resource recycling



Precious metals are scarce and important resources. This is why N.E. CHEMCAT is helping to recycle these minerals by utilizing advanced technologies to recover them from spent catalysts. We are also promoting more effective resource use and waste reduction by developing catalyst technology for the chemical recycling of plastics.



## 6 Utilization of captured CO<sub>2</sub>



Technology for capturing and recycling CO<sub>2</sub> is attracting attention as a contribution to the fight against climate change. We are improving the performance of catalysts used in the production of green fuels synthesized from CO<sub>2</sub> and hydrogen, which will further improve the efficiency of each process stage, from CO<sub>2</sub> capture to green fuel production.



## 7 Cleaner air and water



Catalysts are indispensable for decomposing and detoxifying harmful substances found in automobile and factory emissions and in industrial wastewater. In order to contribute to a more livable planet, we are advancing our purification technology to ensure cleaner air and water.



## 8 Sustainable food supply



We are using the power of chemistry to help solve food shortages, which are becoming more serious due to global climate change and population growth. In order to enhance the diets of people worldwide, we support the production of agricultural chemicals and fertilizers with catalyst technology, while also promoting the development of high-performance catalysts that enable long-term food storage and reduce food loss.





# Sustainability Management

Based on its Corporate Philosophy, N.E. CHEMCAT contributes to achieving a sustainable society through its business activities. We are implementing sustainability management to achieve sustainable growth as a company that is beneficial to society.

## Making the Most of Our Strengths to Help Solve Social Issues

Environmental challenges such as climate change, marine pollution, and deforestation have worsened in recent years. Meanwhile, society faces many other issues such as poverty and human rights violations. In order to make society more sustainable going forward, it is important for companies to help achieve the UN Sustainable Development Goals (SDGs). The underlying purpose of companies is being questioned, and the public is asking what they can do to help overcome these challenges.

Since N.E. CHEMCAT's founding in 1964, the company has been focused on catalysts as well as precious metal recovery and refining. Through these efforts, our company

has helped develop the chemical industry, while promoting the prosperity of society. We have also played a major role in reducing environmental impact, including through air pollution control.

With the technology and knowledge we have accumulated over the decades, we are well-positioned to address challenges such as climate change, sustainable energy, food preservation, and healthcare. With this considerable potential to help build a sustainable society, a key mission for N.E. CHEMCAT is to fully demonstrate its strengths by helping society overcome these challenges.

## Value Creation at N.E. CHEMCAT

In accordance with our purpose, which is set forth in our Corporate Philosophy, we are working to strengthen relationships of trust with our diverse stakeholders. In addition, we are striving to ensure sustainable operations and create

businesses and products based on ESG awareness, thereby helping to solve the social issues identified by the SDGs. In doing all this, we seek to improve corporate value and help build a sustainable society.

### Value Creation Story



## Identification of Material Issues

As part of our mission to help build a sustainable society, we have identified important social issues that we can and must prioritize by leveraging our strengths, specifying these as our material issues.

### Material Issue Identification Process

To identify our material issues, we set up an ESG & SDGs Promotion Project team made up of employees and held discussions for about five months. Based on our past and present initiatives that are closely related to ESG and SDG issues, and a discussion of the company's vision for the

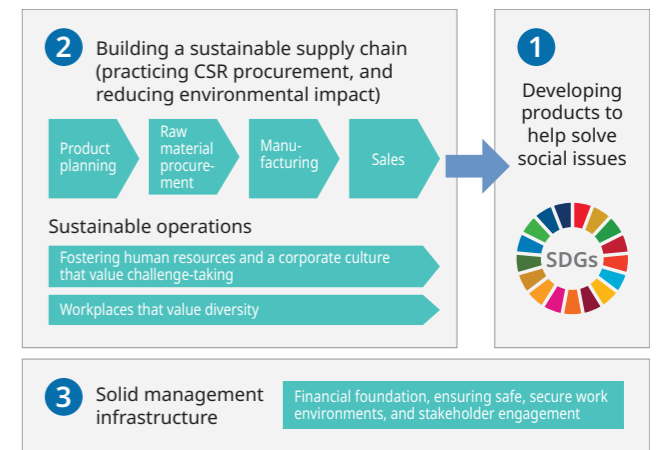
future, we identified the issues N.E. CHEMCAT should address. The issues were categorized into the two areas of economic value and social value, before being prioritized, and the results were mapped.

Through this mapping, initiatives with both high economic value and social value were identified as key candidate issues. After consulting external experts, eight material issues were chosen.

### Elements for Practicing Sustainability Management

To ensure the effective practice of sustainability management, we categorized the chosen material issues into three elements and identified the relationship with each one. The elements are: (1) creating products that help solve social issues; (2) establishing sustainable supply chains and operations; and (3) building solid management infrastructure.

Moreover, each material issue has been arranged from the perspective of important ESG issues and the SDGs. Specific individual issues are now incorporated into our Vision 2030, and we are pursuing various initiatives accordingly.



### Material Issues (Materiality)

Classification	Material issues	Important ESG issues	Details	SDG-based targets
E	Developing products to help solve social issues	Helping to solve environmental challenges and other social issues through business activities	- Developing eco-friendly products - Developing products that enhance health and safety - Developing resource-saving products	
	Reducing environmental impact across the entire supply chain	Targeting carbon neutrality by 2050, reducing the environmental impact of all business operations Establishing systems to minimize the use of hazardous substances and prevent environmental accidents	- Continuing to reduce CO <sub>2</sub> emissions, water use and waste in all business activities - Practicing high-efficiency energy management - Implementing Responsible Care (RC) activities	
S	Stakeholder engagement	Good communication with stakeholders Continued efforts to earn the trust of society as a fair company	- Deepening mutual understanding with customers, suppliers, employees, and shareholders - Enhancing corporate branding - Strengthening employees' sense of belonging	
	CSR procurement	Building a sound value chain, including the avoidance of conflict minerals	- Establishing procurement policies to avoid conflict minerals and promote green procurement, etc. - Examining supplier selection and implementing monitoring	
G	Building of stable management infrastructure	Developing management systems and organizations for disclosure of management information in a timely and appropriate way	- Enhancing the compliance promotion system - Developing crisis management and response systems (including PR activities and BCM) - Improving business efficiency based on thorough ROIC management - Setting and managing financial targets	
		Creating efficient business management systems based on numerical targets Promoting compliance and establishing a comprehensive risk management system		
	Realization of safe and secure workplaces	Constructing a system to comprehensively manage environmental protection, as well as health and safety	- Creating a comprehensive system to prevent workplace accidents (RC activities)	
		Creating workplace environments where human rights are respected and employees can work with peace of mind	- Eliminating workplace harassment	
Fostering human resources and a corporate culture that value challenge-taking	Clarifying employee roles and targets, and creating of a system that appropriately evaluates their achievements	- Clarifying employee roles and targets as well as required conduct - Developing a fair, transparent personnel evaluation system		
	Creating work environments where the individuality and diversity of employees is respected and where they are encouraged to take on challenges	- Developing human resources who can take on challenges - Fostering a corporate culture that welcomes diverse opinions and encourages open and frank discussions		
Workplaces that value diversity		- Increasing the recruitment and promotion of diverse human resources - Diversifying work styles (remote work, etc.)		

## Realizing a Decarbonized Society through Innovative Technologies

### Conversation

# Helping to make fuel cell vehicles (FCVs) a practical reality with the power of catalysts



**Hiroshi Igarashi**

Vice President, General Manager of R&D Center



**Prof. Akihiro Iiyama**

Specially Appointed Professor, Director of the Hydrogen and Fuel Cell Nanomaterials Center, University of Yamanashi

N.E. CHEMCAT has positioned the Fuel Cell Catalyst Business as one of the important pillars for achieving Vision 2030. We invited Dr. Akihiro Iiyama, a specially appointed professor at the University of Yamanashi and leading authority on the development of fuel cell vehicle (FCV) systems to discuss topics such as trends in the practical use of hydrogen in society and FCVs in Japan and overseas, as well as the challenges of catalysts in the future with Hiroshi Igarashi, Vice President of N.E. CHEMCAT and General Manager of our R&D Center.

### Why hydrogen now?

— To begin with, Professor Iiyama, please tell me about the Hydrogen and Fuel Cell Nanomaterials Center where you serve as Director.

**Iiyama:** The University of Yamanashi has put effort into research on catalysts for fuel cells since the 1960s. The university's efforts were recently recognized and the Fuel Cell Nanomaterials Center was established in 2008 as a project of the New Energy and Industrial Technology Development Organization (NEDO). The name was subsequently changed in 2022 in light of the growing importance of hydrogen.

**Igarashi:** Interest in hydrogen has surged globally since the Declaration of the Carbon Neutrality Coalition in 2021, hasn't it?

**Iiyama:** Maximum utilization of renewable energy is necessary to achieve carbon neutrality. The key to that is the handling of surplus electric power.

In Europe, surplus electric power is used to operate water electrolysis equipment. They are gradually installing systems for converting electric power to hydrogen and storing it, and converting it back to electric power

when necessary. They are also using hydrogen as alternative fuel, as a heat source for plants and other facilities. Efforts have also emerged to produce synthetic fuel (e-fuel) using hydrogen and atmospheric CO<sub>2</sub> as raw materials and use this as a new energy source. Clean hydrogen is the key to both of these efforts.

**Igarashi:** Looking back, Japan pursued research on the use of hydrogen early on, since the Sunshine Project in 1974. They were looking at hydrogen use from the perspective of energy conservation at the time, but hydrogen is now drawing interest as a CO<sub>2</sub>-free energy source and, unlike electric power, it is viewed as an energy source that is easy to use because it is possible to store and transport it. I think hydrogen is drawing interest as a new energy source due to these advantages.

— How will the world approach hydrogen in the future?

**Iiyama:** Europe is where conditions have changed rapidly with respect to energy sources. Europe was pursuing the introduction of clean hydrogen as part of the trend toward carbon neutrality when Russia suddenly invaded Ukraine. As a result, Europe had to rapidly wean

itself from natural gas imported from Russia and transition to new energy sources. The target for introduction of hydrogen has doubled, also out of consideration for energy security.

**Igarashi:** The U.S. has also announced a National Clean Hydrogen Strategy. Just the other day, at the presentation session related to energy that I attended with you in the U.S., I was surprised by the statement that the hydrogen fuel cell market size has increased from the previous level of several tens of millions of dollars to several billions of dollars. A huge budget has also been set for establishing infrastructure and I feel that the budget for hydrogen energy will really increase rapidly and keep pace. Europe and the U.S. are also investing in building a supply chain to sustain a hydrogen-based society.

**Iiyama:** The Japanese government has also reacted to such movements with acute sensitivity and announced an updated Basic Hydrogen Strategy in June 2023. This strategy has set a target of 15 GW for the introduction of water electrolysis equipment for 2030 in companies related to Japan, both in Japan and overseas. It is noteworthy that Japan has set a target in both Japan and overseas, or in other words, a target for Japan's share of the global power generation market. I know the Japanese government is thinking of a plan for expanding the water electrolysis industry in Japan overseas and think companies are probably getting a fresh sense of the enormity of the ex-

pectations. Moreover, the Japanese government also announced an additional new intermediate target for 2040, even though they have only set targets for the domestic introduction of hydrogen in 2030 and 2050. The concrete plan, which also includes energy exports from Japan, is an unprecedented move, and it is having a strong impact on hydrogen-related industries.

— How is the industrial world taking the government's activity?

**Igarashi:** As a company, up to this point we haven't known the specific indicators for how far we should proceed on R&D, how much volume to target, by when, and to what level. To be honest, I thought the hydrogen conversion as an energy source would be difficult by only using surplus electric power and renewable energy to produce hydrogen. However, the fact that Japan has determined the policy as a country also clarifies our policy on investment as a company. I see the national strategy as a strong push from behind.

**Iiyama:** Seeing the movement at the national level gives me a strong sense of wanting to develop hydrogen into a competitive industrial field. For example, using the water electrolysis equipment of Japanese companies in the Middle East and other areas with an abundance of renewable energy to produce clean, cheap hydrogen and transport it to Japan. I think movement in that direction will accelerate from this point on.

### Catalysts, the key to the hydrogen value chain

— Catalysts are essential technology in thinking about the value chain for hydrogen, as hydrogen increases in importance. What challenges do catalysts present?

**Iiyama:** Catalysts present the problem of resources for iridium, which is a rare metal. As a catalyst with high oxygen generation activity and high durability, iridium is the first rare metal I would mention. The underground reserves and the amount extracted are both extremely small. I look forward to N.E. CHEMCAT using its technological prowess to make progress on resource conservation, on that point.

**Igarashi:** We, of course, also recognize the problem with using a large amount of iridium. We are therefore developing catalysts that can minimize the amount of iridium used as much as possible, and are also taking on the challenge of open innovation with the National Laboratories

in the U.S. It is the role of catalyst manufacturers such as N.E. CHEMCAT to provide a stable supply of high quality catalysts that offer high performance. I am convinced that it will be difficult to develop practical applications of innovative catalysts, including the cost involved, as long as we limit our research to the current trajectory. We are therefore aiming to develop high performance catalysts that have the potential to change the world if we can develop them successfully.

**Iiyama:** Expanding the discussion to the entire hydrogen value chain, how do you think it will develop?

**Igarashi:** The use of ammonia and other hydrogen compounds to store and transport hydrogen, and the use of hydrogen to produce clean fuel are examples. Catalysts play an important role in either case so we are also keeping in mind contributions in these areas.

## Realizing a Decarbonized Society through Innovative Technologies

### Roadmap to developing a hydrogen-based society and practical use of FCVs

— The proliferation of FCVs is a major key to expanding the demand for hydrogen. How do you think it will proceed?

**Iiyama:** We need to divide FCVs into passenger cars and commercial vehicles and think about them separately. In the passenger car category, there are a huge number of competitors such as battery electric vehicles (BEVs) and plug-in hybrid vehicles. The market is also established. On the other hand, we cannot say that a sufficient number of hydrogen stations have been established to provide the infrastructure for FCVs. At present, it is difficult to make progress on establishing hydrogen stations because of the cost, so it is hard to choose an FCV for a passenger car as a practical matter.

**Igarashi:** However, the situation changes completely in the case of commercial vehicles.

**Iiyama:** That's true. For example, BEVs are not practical as large trucks because their continuous driving range is limited. In that case, the competitors in the commercial vehicle category are e-fuel, hydrogen engines, and similar technologies, but FCVs are the most practical option in terms of cost and efficiency in that case. I therefore think that widespread proliferation of FCVs will begin from large commercial vehicles.

**Igarashi:** In the U.S., there is movement toward using FCVs for trans-continental trailers and other transport vehicles. If transport is limited to certain routes, it will suffice

to establish hydrogen stations in the necessary locations, so this will likely make practical implementation possible.

**Iiyama:** However, we are not just ignoring passenger cars because of this. Research on FCVs as large commercial vehicles is proceeding at NEDO as well. If this research is successful, it is conceivable that FCVs hold future promise in segments such as large vehicles where they are competing with BEVs, even in the passenger car category.

**Igarashi:** We are also working with the auto manufacturers to develop FCVs, but this is mainly focused on commercial vehicles, and on large passenger cars, after that. If FCVs spread to this genre, I think the means to solve the problem of infrastructure will become clear. In Europe and the U.S., hydrogen stations are being established based on the premise of accommodating long-distance travel. If FCVs begin to become popular as commercial vehicles in Japan, this will likely spur efforts to establish the infrastructure to stimulate demand here as well.

— Catalysts play an important role in practical applications for FCVs. Practically speaking, what technological requirements and standards would suffice?

**Iiyama:** NEDO has created a roadmap for the level of requirements and has disclosed the numerical values that should be met for catalysts used in fuel cells for large commercial vehicles. The values set are on a completely different level than before. The operating temperature was set at 95°C up to this point, but stable operation is now required at 120°C, a far higher level. The target is so high that it strikes catalyst researchers as absurd.

**Igarashi:** It is certainly an inconceivable target, in a sense. In my view, achieving this target will necessitate joint development in which materials manufacturers work with technology manufacturers as a team.

**Iiyama:** I see the establishment of an extremely high target as the flip side of the sense of urgency. In short, pursuing technological development along conventional lines cannot overcome the limitations, so it will require material informatics and other types of disruptive innovation. Innovation is essential in order to achieve the level of practical application we want to see in 2040.

**Igarashi:** I have been involved in fuel cell development for 30 years. At the time, I thought that FCVs would be driving all over the world in 30 years' time. Many researchers held the same view, so much so that the comment "it isn't going as well as we expected and we are really struggling"

took the place of the customary greetings when meeting with auto manufacturers overseas. However, just as you stated, we will not aspire to game-changing innovation unless we set a target that strikes us as impractical now. My dream for the future is to make the FCV a car for the general public. I want the presence of the FCV to be high enough so it is the first thing everyone thinks of when they think about buying a car.

**Iiyama:** I look forward to the development of the next-generation catalysts and core-shell catalysts that will make that possible. Use platinum and other materials

with high activity on the surface of catalyst particles, or apply in one layer on the shell, and use different materials for the core. This will drastically reduce the amount of platinum, a rare metal, used. Ultimately, how far catalyst development on a monoatomic layer progressed?

**Igarashi:** As I mentioned earlier, we are engaged in joint development with the U.S. National Laboratories and, to be honest, I cannot discuss the details at present. However, I want to create a world in which FCVs are routinely driving around by around 2040. To achieve that, I think our proposal for 2030 needs to be concrete in form.

### Developing human resources for the next generation in the field of hydrogen

— Hydrogen is bursting with potential and it is essential to have the human resources to achieve that potential. How are you thinking of developing human resources?

**Iiyama:** We are implementing two initiatives at present. One is conducting a Hydrogen and Fuel Cell Industrial Technology Human Resources Training Course for technicians in small and medium-sized companies in Yamanashi Prefecture, under contract with the prefecture. This training course provides an opportunity for participants to attend lectures by guest lecturers who are engineers in companies that are at the forefront of the hydrogen fuel cell field and learn new skills, including the actual technology used in fuel cells.

The other initiative is a Hydrogen and Fuel Cell Class designed for local elementary and middle school students. I want the youth who will be responsible for the future to learn what is exciting about hydrogen. In that sense, the new Clean Energy Chemistry Course established in the University of Yamanashi Faculty of Engineering in April 2024 is also one way to develop the human resources who will be responsible for hydrogen energy in the future.

**Igarashi:** I think excellent talent will emerge from those initiatives. N.E. CHEMCAT also has great expectations of your initiatives, Professor Iiyama. As you mentioned, the skills of young people are essential to R&D. There are also cases in which innovative ideas waft in from people outside of specialized areas. We therefore also make a conscious effort to give form to small insights and discoveries. It is extremely important to have an environment where everyone can debate ideas and technology, regardless of their position in the hierarchy, and stimulate one another



**Akihiro Iiyama**

Joined a major auto manufacturer after graduating from The University of Tokyo. After working on R&D on fuel cells, EV systems, and other topics and serving as the General Manager of the Fuel Cell and EV System Laboratories, he became a specially appointed professor of the University of Yamanashi Graduate School for Engineering in February 2015. Professor Iiyama performs research on automotive fuel cell systems, electrode catalysts, electrolyte materials (membranes), MEA, and other areas. PhD, Engineering.

to innovate. I pay more attention to "creating the environment to develop people" rather than "developing people."

**Iiyama:** Our discussion today has given me a fresh awareness of how catalysts are used in manufacturing and a wide range of other areas in society, in addition to hydrogen, and how essential catalysts are to achieving carbon neutrality. I think there is business for your company at each point, so keep up the good work and do not miss out on such opportunities.



Every company has a social responsibility to be proactive in its efforts to protect the global environment. N.E. CHEMCAT seeks to minimize environmental impact in all processes of its business activities.

### Environmental Management

Our Corporate Philosophy includes the commitment to fulfill corporate social responsibilities and seek to co-exist with the environment and society around us. To further promote this, N.E. CHEMCAT has established an environmental policy and is actively engaged in environmental protection activities.

#### Environmental Policy

- Under our Responsible Care Policy, we consider global environmental conservation to be one of our most important missions. We strive to reduce the environmental impact of our business activities with help from the creativity and ingenuity of all our employees. We also actively promote business activities that aim to control environmental pollution.
- As one effort to fulfill our key mission of conserving the global environment, we properly manage chemical substances while taking into consideration technical and economic factors. This includes the management of substances in all equipment, parts, and products that we design, manufacture, and deliver.

### Promotion System for Environmental Management

Environmental Conservation Committees have been established at each plant to promote initiatives related to environmental conservation, chemical substance management, and energy, as part of our Responsible Care (RC) activities.

Initiative progress is reported to the supervisory company-wide RC Committee chaired by the General Manager of the Production and Technology Div. (See P. 24 for RC Activities and RC Promotion System)

### Environmental Management System

N.E. CHEMCAT has obtained ISO 14001 environmental management system certification, and the company's system is constantly being enhanced. We have also prepared an environmental manual, and conduct environmental activities as part of daily operations.

#### Business Sites with Environmental Management System Certification

ISO 14001:2015	Numazu Plant, Tsukuba Plant
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### Environmental Education

In addition to providing employees with our environmental manual, we conduct education and training to improve employee environmental awareness and to comply with relevant environmental laws and regulations.

#### FY2022 Environmental Training Programs

Training name	Frequency
Internal auditor course	Once a year
Environmental safety patrol	Four times a year
Environment Month (Message from the President)	Once a year
Emergency equipment training	Once a year
High pressure gas (LNG) leak training	Once a year
Chemical leak and emergency shutoff valve training	Once a year
Chlorine gas leak training	Once a year

### Initiatives to Reduce Environmental Impact

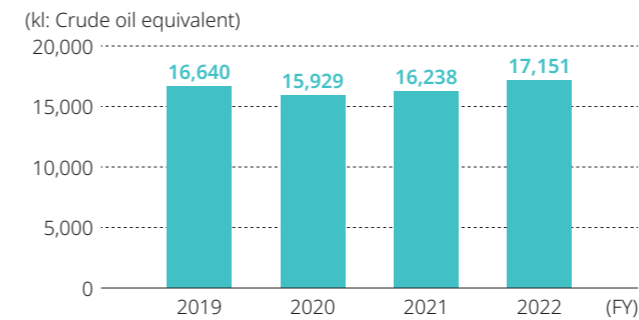
#### Promote Energy Conservation

Our Energy Management Committee promotes company-wide energy plans, including the adoption of new energy-saving technologies.

We have also positioned dedicated efforts to reduce environmentally hazardous substances and prevent environmental accidents and occupational accidents and injuries in all business activities as one of the 16 key drivers to achieve Vision 2030.

While energy consumption increased along with an increase in our operations in FY2022, we are implementing measures to reduce CO<sub>2</sub> emissions, including setting energy conservation targets at each office and plant, making improvements to development and production processes, and installing high-efficiency equipment to achieve energy savings.

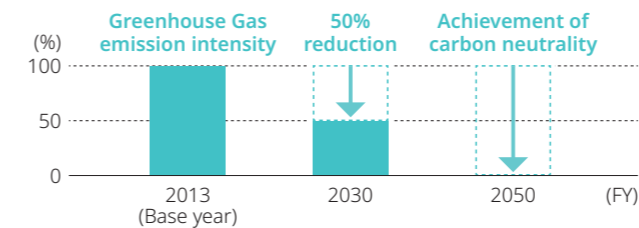
#### Annual Energy Consumption



### Target to Reduce Greenhouse Gas Emission Intensity

We have set a target to achieve a 50% reduction in our greenhouse gas (GHG) emission intensity by 2030, compared to the 2013 level. GHG emissions are considered to be the cause of global warming, and we are pursuing initiatives to reduce them.

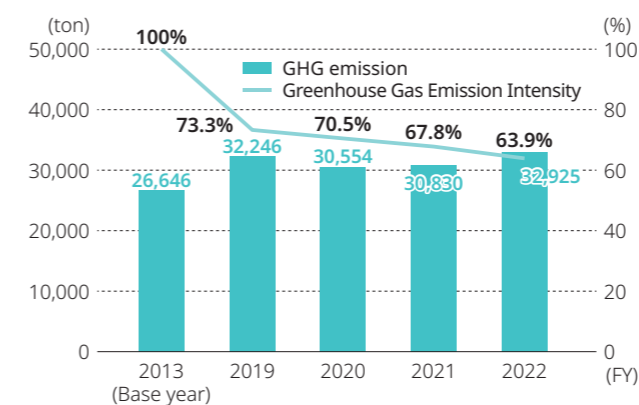
#### Target to Reduce Greenhouse Gas Emission Intensity



#### Initiatives for Target Achievement

- Energy conservation and loss reduction measures for electricity and liquefied natural gas (LNG) use (installation of LED lighting and higher-efficiency air conditioning equipment)
- Adoption of highly energy-efficient equipment and technology
- Improvement in development and production efficiency
- Adoption and expanded use of renewable energy

#### Annual Greenhouse Gas Emissions and Emission Intensity\*

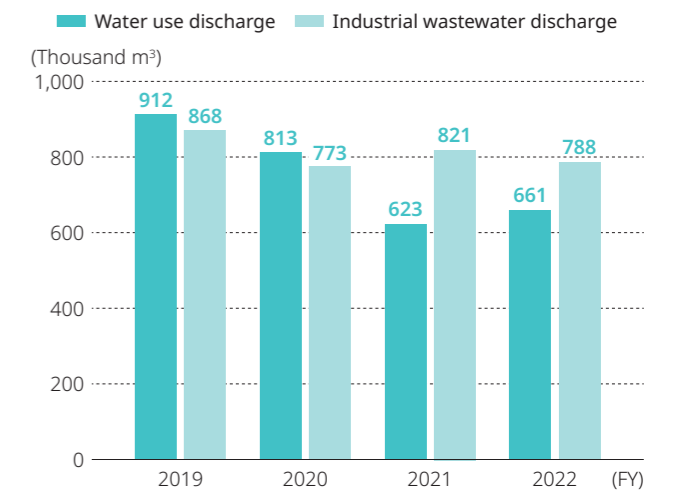


\*GHG emissions with 2013 emission level set as 100%

### Effective Water Use

We have installed our own water supply equipment and are working to minimize water usage by recycling water.

#### Annual Water Use and Industrial Wastewater Discharge

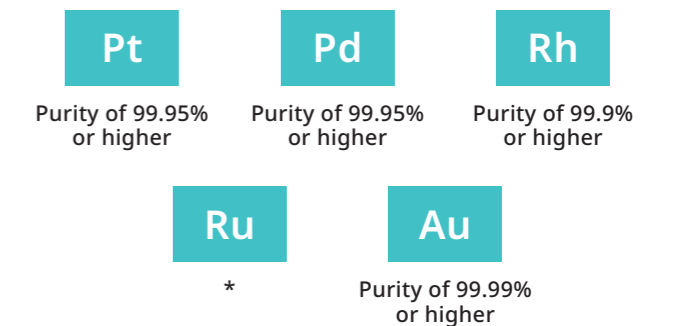


### Effective Resource Use

#### Precious Metal Recycling

Platinum (Pt), palladium (Pd), rhodium (Rh), ruthenium (Ru), and other precious metals can be found in spent catalysts. Since they are important resources, N.E. CHEMCAT has its own facilities for recovery and refining of these metals. High-quality precious metals can be separated, recovered, and refined using appropriate technology. This is true even when the post-use precious metal catalyst contains multiple precious metal types, additives, and/or toxic substances that accumulate during use.

Each metal is recovered with a purity of 99.9% or higher purity as shown below.



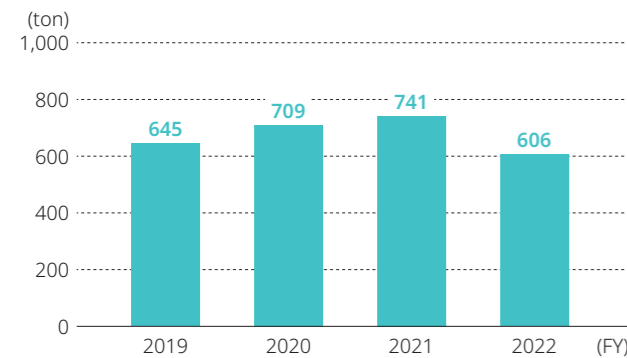
\*Ruthenium is recovered as ruthenium chloride

We are developing new adsorbents and further improving other recovery technology to enable more efficient precious metal recovery.

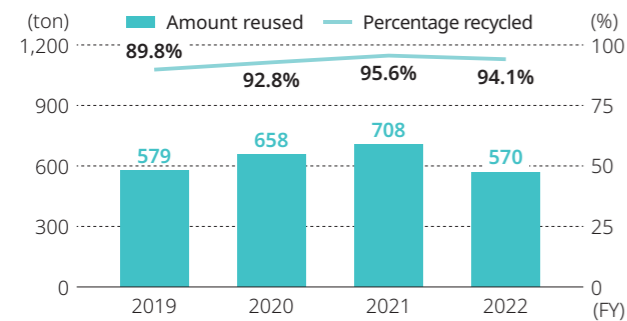
**Waste Reduction**

Wastewater sludge accounts for the largest volume of waste emitted by the company. In order to reduce this waste, we have been enhancing our production processes and updating equipment and machinery.

Annual Industrial Waste Generation



Amount and Percentage of Industrial Waste Reused and Recycled



**Management of Chemical Substances**

Along with managing chemical substances handled internally, we are promoting chemical substance management for all raw materials and products used in our processes from design to manufacturing and delivery.

**Compliance with Chemical Substances Regulations**

N.E. CHEMCAT complies with all relevant laws and regulations including Japan's Act on the Regulation of Manufacture and Evaluation of Chemical Substances (Chemical Control Law), Act on the Assessment of Releases of Specified Chemical Substances in the Environment and the Promotion of Management Improvement (Chemical Management Law), and Industrial Safety and Health Act. The appropriate management procedures are stipulated in our Chemical Substance Management Regulations, and chemicals are being properly managed accordingly.

**Management of Chemical Substances Contained in Products**

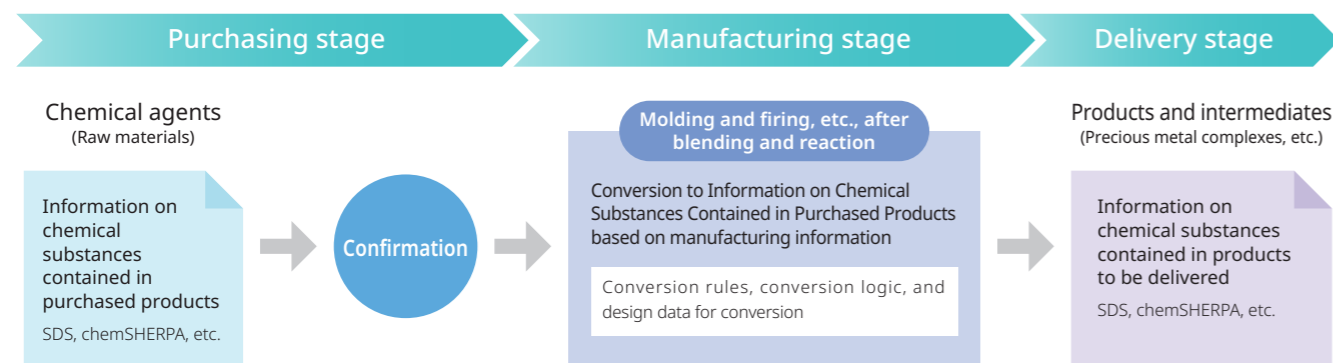
In the product design and development stage, we clarify the management standards for chemical substances contained in products to be applied at each stage, from raw material purchase to product manufacturing and delivery. This allows us to promote appropriate chemical management across the supply chain.

In order to manage chemical substances contained in products throughout the supply chain, the key is to appropriately manage chemical substances contained in intermediates and products that are the result of chemical agent conversion.

At N.E. CHEMCAT, we not only manage the amounts of chemical substances found in chemical agents used in intermediates and products; we also manage the amounts of and changes in chemical substances in the manufacturing process. This extends to the prevention of any contamination.

We have begun handling chemical substances according to the JAMA and JAPIA Guidelines for the Management of Chemicals in Products published in December 2022.

Supply Chain and Management of Chemical Substances Contained in Products



N.E. CHEMCAT emphasizes Responsible Care (RC) activities as one of its 16 key drivers for achieving Vision 2030 and is actively practicing them.

**RC Activities**

RC activities are being promoted by chemical industry associations in more than 70 countries worldwide. RC is a voluntary initiative for members of the chemical industry to implement and improve their environmental safety measures. Participating companies pledge to ensure environmental protection, health and safety throughout the life cycle of their chemical products, from development, manufacturing, and distribution, to use, final consumption and disposal. Since fiscal 2020, we have been participating in meetings of the Responsible Care Committee established by the Japan Chemical Industry Association (JCIA). Our participation involves presentation of activity results and engaging in dialogue with other members, and the aim is to earn the further confidence of society.



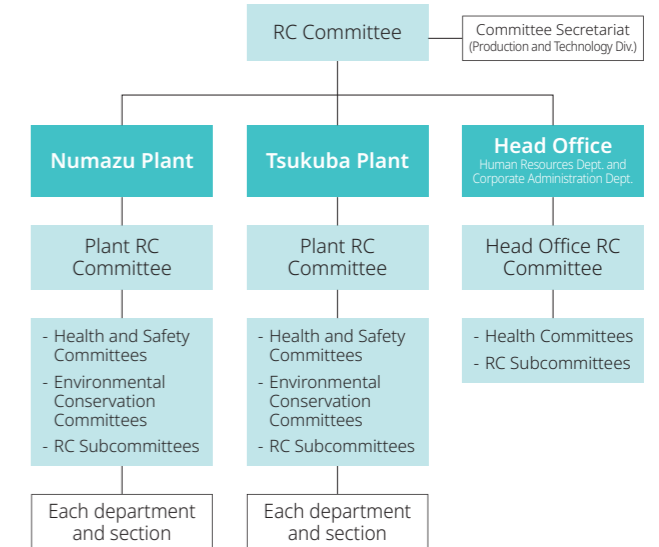
**Responsible Care Policy**

We regard environment protection, safety and health as the highest-priority issues, and we engage in the following voluntary and ongoing Responsible Care activities.

1. We strive to reduce environmental impact and protect the environment throughout the entire life cycles of our products, from development to disposal.
2. Based on the principle of "safety first," we aim for zero accidents and occupational injuries, and we ensure the safety of all onsite personnel and local community members.
3. We verify the safety of chemical substances found in the raw materials, intermediate products, and final products that we handle and will take into consideration the health of everyone connected to our business activities, including employees, logistics personnel, and customers.

We publicly release the results of the above activities and maintain appropriate communication with stakeholders.

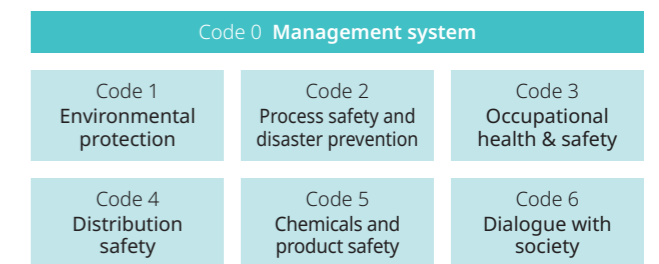
RC Promotion System



**RC Management System**

N.E. CHEMCAT has adopted the Responsible Care Management System (RCMS) to promote the company's RC activities. The RCMS satisfies the requirements of ISO 14001 and OSHMS (ISO 45001), and activities have been clarified for each management practice code.

RC Activities (Six Management Practice Codes)



**RC Promotion System**

We have established an RC Committee to promote Responsible Care activities as well as safety and environmental protection activities.

Based on the priority points of the Responsible Care Policy, the committee manages execution of the action plans established by each plant for achieving their targets.

Activities in FY2022 were implemented in accordance with the Responsible Care Manual produced in the previous year. RC verification by JCIA is scheduled at the Tsukuba Plant in FY2023.

**RC Audit System**

Based on the RCMS, RC audits are conducted annually at each plant.

Since its founding, N.E. CHEMCAT has provided high-quality products and services that earn the confidence of customers and meet their expectations. We strive to improve our quality on a daily basis so that we can work with customers to provide them with optimal solutions.

## Quality Assurance Activities

### Quality Policy

In order to ensure our customers receive high-quality products, we have implemented a Quality Policy and are always striving to further improve quality.

#### Quality Policy

##### 1. This is our quality policy:

- (1) We provide quality that satisfies customers and earns their confidence.
- (2) Through the efforts of all employees, we aim for continuous quality improvement.

##### 2. In order to fulfill this quality policy, we implement the following measures:

- (1) Create a quality management system that is ISO 9001 compliant, and strive for continual system improvement.
- (2) Ensure that each department sets and implements its own quality targets, monitors their progress, and reviews them regularly.
- (3) Review the appropriateness of our quality policy during management review activities.
- (4) Inform all members of the organization of our quality policy and enhance their understanding.

### Quality Management System

At N.E. CHEMCAT, the General Manager of the Production & Technology Div. is ultimately responsible for service quality assurance and product liability, and oversees the company's quality assurance activities.

Our quality management system has been certified under the ISO 9001 and IATF 16949 programs, and we provide a stable supply of high-quality products.

#### Business Sites That Have Acquired Quality Management System Certification

ISO 9001:2015	Numazu Plant
IATF 16949:2016 (Auto exhaust catalysts)	Head office, Numazu Plant, and Tsukuba Plant

### Quality Audits

Based on our quality management system, each plant conducts external and internal quality audits once a year.

### Continuous Quality Improvement

N.E. CHEMCAT makes the following efforts to continuously improve quality.

#### Internal Bodies for Quality Improvement

The company has established the following bodies for quality improvement, and has established a system enabling departments to cooperate for enhancing quality.

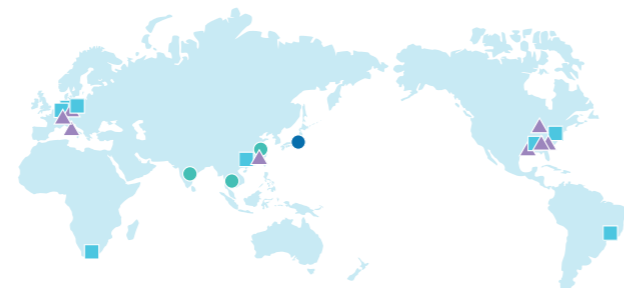
- Audit Reporting Committee
- Quality Committee
- Quality Manufacturing Liaison Committee
- Quality Defect Reporting Committee
- Quality Patrol

#### Global Cooperation System

Our technology transfer system has been created to enable manufacturing of auto exhaust and other catalysts developed in Japan at overseas production plants without any loss of product performance.

We also regularly share technical information with the BASF Group and adopt the latest technology to further enhance quality.

#### Global System of Cooperation with the BASF Group



- N.E. CHEMCAT
- Joint ventures of BASF and N.E. CHEMCAT (exhaust catalysts)
- BASF production and R&D sites (exhaust catalysts)
- ▲ BASF production sites (process catalysts)

### Customer Satisfaction Surveys

We often work closely with our customers, from catalyst development to scale-up. In order to further improve customer satisfaction and quality, we conduct an annual Customer Satisfaction Survey. The results are used for our continual quality improvement.

#### Quality Awards Received in FY2022

Daihatsu Motor	Quality Excellence Award	May 2022
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### Quality Control Training

N.E. CHEMCAT actively conducts quality control training to improve the abilities of human resources involved in quality control. This includes Quality Management System (QMS) basic training, IATF tool training, and internal quality auditor training.

#### Main Quality Control Training in FY2022

Training programs	Plants
Fundamentals of manufacturing	Numazu / Tsukuba
Introduction to IATF for new process owners / scopes due to organizational change	Numazu / Head office
IATF process approach	Tsukuba
IATF standards study group	Numazu
IATF core tools	Head office
Corrective action review using QMS-style cause investigation diagram and Naze-naze Analysis	Numazu
Supplier Audit Approach	Numazu
Measurement system analysis (MSA)	Tsukuba
Measurement instrument and apparatus management	Tsukuba
CP and P-FMEA preparation	Numazu / Tsukuba

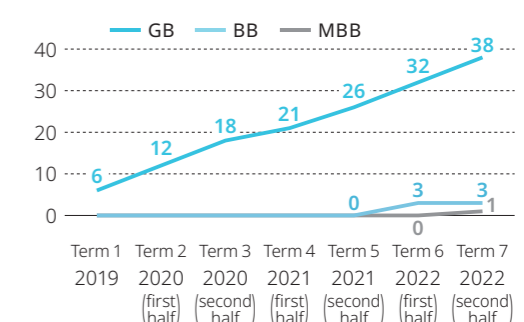
## Lean Six Sigma Activities

Lean Six Sigma (LSS) is a globally recognized management approach for quantitative improvement of processes and quality. In addition to being a means for operational improvement, LSS activities are also helping us to develop the human resources who will be the leaders of tomorrow. Our employees are able to comprehensively develop the four skills required for Green Belt (GB<sup>\*1</sup>), Black Belt (BB<sup>\*2</sup>), and Master Black Belt (MBB<sup>\*3</sup>). We have expanded the scope of activities every year since beginning these activities in 2019. During the 7th term in 2022, we began GB development in the head office and in Development, in addition to Manufacturing. We have also embarked on MBB development further enhance LSS activities and certified the first MBB in the company during the 7th term.



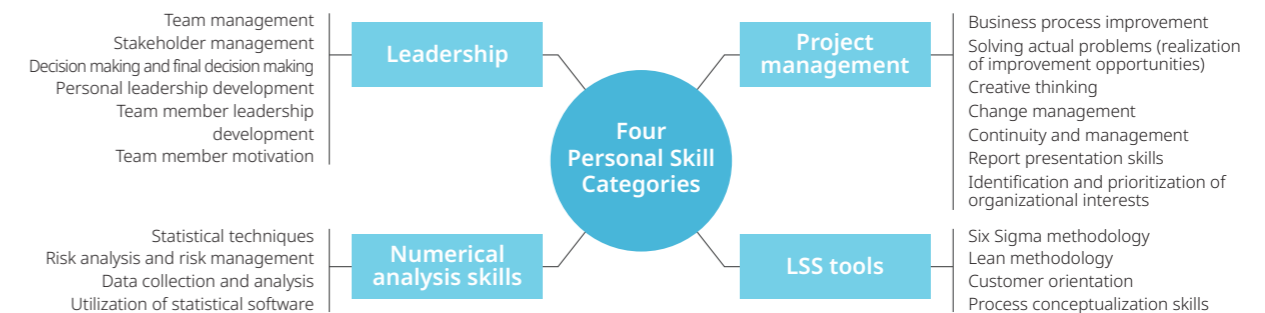
LSS activities

#### Number of GB/BB/MBB Certified Personnel



\*The numbers for 2021 (first and second half) were changed due to revision of the aggregation method.

#### Four Personal Skill Categories Fostered by LSS



- \*1 **Green Belt (GB)** This is the first level of LSS qualification. Leads an LSS project within the scope of normal business activities.
- \*2 **Black Belt (BB)** This is one level higher than GB. Provides guidance and advice to GBs and leads an LSS project that spans multiple areas. Qualified to assume responsibility for development and establishment of company-wide LSS activities as routine practices.
- \*3 **Master Black Belt (MBB)** An MBB manages LSS projects, formulates medium- and long-term plans for LSS activities, supports management, conducts training, coaches projects, and improves the level of recognition of such projects in the company.

In order to address CSR throughout its supply chain, N.E. CHEMCAT shares its procurement policy and CSR procurement guidelines with its suppliers and works with them to resolve social issues.

## CSR Procurement

### Procurement Policy

N.E. CHEMCAT practices CSR procurement based on its Corporate Philosophy. We established a new procurement policy in April 2022, and have shared it with our suppliers and other stakeholders.

We completely avoid the use of conflict minerals and engage in environmentally friendly green procurement.

#### Procurement Policy

- 1) We will comply with all laws and regulations, and conduct procurement activities based on social ethics.
- 2) We will select our suppliers with fairness and equity, conduct transactions in good faith, and strive to strengthen and develop mutual understanding and trust.
- 3) We will eliminate conflict minerals and will not procure articles that may be associated with human rights violations.
- 4) We will give attention to conserving the global environment and strive to reduce environmental impacts through our procurement activities.

### Management Structure

The company practices CSR procurement under the lead of the Corporate Administration Dept., which cooperates with the purchasing sections of plants in this effort.

### Establishment of CSR Procurement Guidelines

In order to practice CSR activities throughout the supply chain, we established CSR Procurement Guidelines in April 2022 to define our approach to CSR procurement including environmental, human rights, and legal compliance.

### CSR Surveys

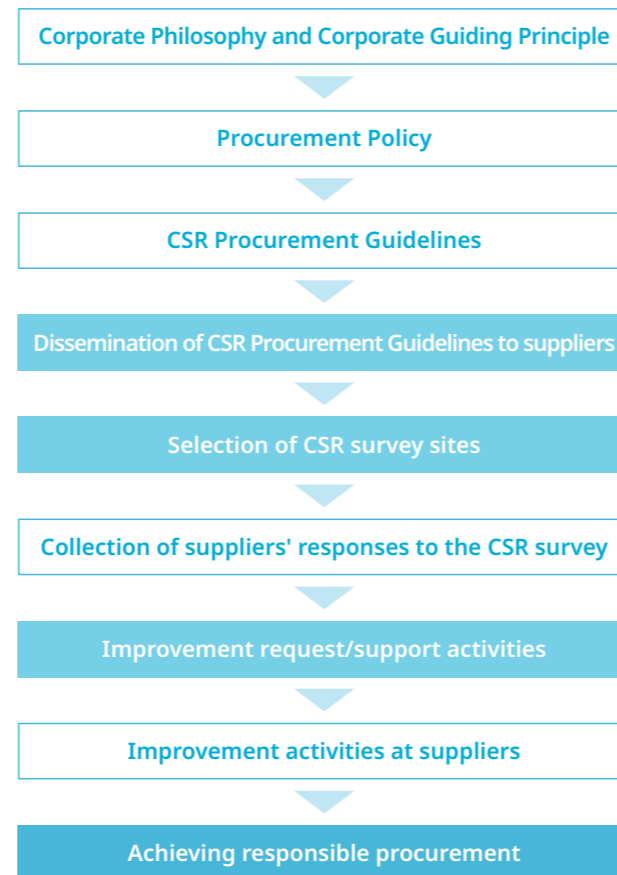
N.E. CHEMCAT began conducting CSR surveys in FY2022, using the CSR/Sustainable Procurement Self-assessment Questionnaire developed by Global Compact Network Japan (GCNJ).

In the first fiscal year, we asked 19 of our main suppliers to complete the questionnaire and obtained responses from 15 suppliers (a response rate of 78.9%). The average score for responding companies exceeded 90%. However, one supplier only scored 50%. We shared the results with

this supplier and will work with them to formulate and implement measures to achieve improvement.

We will continue to conduct an annual CSR survey and work to ensure responsible procurement.

#### CSR Survey Process



### Conflict Minerals

Trade in minerals such as tin, tantalum, tungsten, gold, and cobalt mined in the Democratic Republic of Congo and adjoining countries in Africa has been identified as a source of funding for armed groups.

N.E. CHEMCAT manufactures products using gold and tungsten, and its CSR Procurement Guidelines stipulate that the company avoids the use of conflict minerals.

The guidelines also stipulate that the company does not procure minerals that may be involved in human rights abuses such as child labor, forced labor, and environmental destruction, which are problems not only in the region but also for the international community.

#### CSR Procurement Guidelines

##### 1. Environment

- (1) Environmental Management System  
Our suppliers establish and operate a general management system for implementing environmental activities.
- (2) Greenhouse Gas Reduction  
Our suppliers undertake activities to reduce greenhouse gas emissions generated by their business activities.
- (3) Environmental Impact Reduction  
Our suppliers comply with the laws and regulations concerning the prevention of air, water, and soil pollution in each country and region in which they operate, and they continuously work to reduce environmentally hazardous substances.
- (4) Resource Conservation and Waste Reduction  
Our suppliers comply with the laws and regulations concerning the proper disposal and recycling of waste in each country and region in which they operate, and they ensure that resources are effectively utilized.
- (5) Chemical Substance Management  
Our suppliers comply with the laws and regulations concerning chemical substances in each country and region in which they operate. Our suppliers strictly control chemical substances throughout the product life cycle to prevent environmental pollution and adverse effects on the human body.

##### 2. Quality

- (1) Quality Assurance Management System  
Our suppliers maintain a quality assurance management system to ensure product quality and safety and conduct continuous quality improvement activities.
- (2) Product Safety  
In the event a defective product is discovered, our suppliers take all appropriate measures to ensure safety, including sharing information in a timely manner, investigating the cause, and thoroughly implementing measures to prevent recurrence.

##### 3. Human Rights

- (1) Prohibition of Discrimination  
Our suppliers do not discriminate in recruitment, hiring, or treatment on the basis of race, creed, gender, social status, family origin, sexual orientation, gender identity, or disability.
- (2) Prohibition of Inhumane Treatment  
Our suppliers respect the human rights of their employees and do not tolerate sexual harassment, power harassment, bullying, or any other conduct that may degrade the work environment.
- (3) Prohibition of Forced and Child Labor  
Our suppliers hire only employees who work of their own free will, ensuring that they are not forced to work and are free to leave their jobs as desired. Our suppliers do not use the labor of children who have not reached the legal working age under the laws and regulations of each country and region.
- (4) Compliance with Work Hours and Wage Payment  
Our suppliers comply with the maximum working hours set by the laws and regulations of each country and region, as well as with those regarding salaries and wages, including minimum wage, overtime pay, and piece-rate wages.

##### (5) Freedom of Association

Our suppliers recognize the right of employees to freely associate with, and choose not to associate with, groups of their choice in accordance with the laws and regulations of each country and region in which they operate.

##### (6) Safe and Healthy Working Environment

Our suppliers ensure health and safety in the workplace and strive to prevent accident and injury.

##### 4. Raw Material Procurement

###### (1) Conflict Minerals

Our suppliers do not procure minerals that may be associated with child labor, forced labor, or other violations of human rights, or that may cause environmental destruction, or that may provide a source of funding for armed groups.

###### (2) Raw Materials Associated with Human Rights Violations

Our suppliers do not conduct business with companies suspected of committing human rights abuses such as forced labor (or those with business ties to such companies).

##### 5. Legal Compliance

###### (1) Legal Compliance System

Our suppliers comply with the laws and regulations of each country and region in which they operate and maintain a system to promote compliance.

###### (2) Compliance with Competition Laws

Our suppliers comply with the competition laws of each country and region in which they operate and do not engage in unfair restraint of trade (cartels, bid rigging, or other practices), unfair trade practices, or abuse of superior bargaining position.

###### (3) Prevention of Corruption

Any political contributions and donations our suppliers make are made in accordance with the laws and regulations of each country and region in which they operate, and they maintain fair relationships with political parties and governments. Our suppliers do not provide entertainment, present gifts, or give money to, or receive money from, business partners for the purpose of obtaining or maintaining unfair advantage or preferential treatment.

###### (4) Respect for Intellectual Property

Our suppliers protect intellectual property rights owned by or belonging to their company and do not infringe on intellectual property rights owned by third parties.

###### (5) Confidential Information Management and Protection

Our suppliers maintain a system for managing the confidential and personal information of customers and third parties in accordance with the laws and regulations of each country and region in which they operate. Our suppliers do not illegally acquire, use, or leak this information.

###### (6) Exclude Antisocial Forces

Our suppliers do not maintain relationships with such antisocial forces as organized crime groups or corporate blackmailers, or make payments to these groups, under any circumstances.

###### (7) Export Transaction Management

Our suppliers follow appropriate export procedures and controls for the export of technology and goods as regulated by the laws and regulations of each country and region in which they operate.

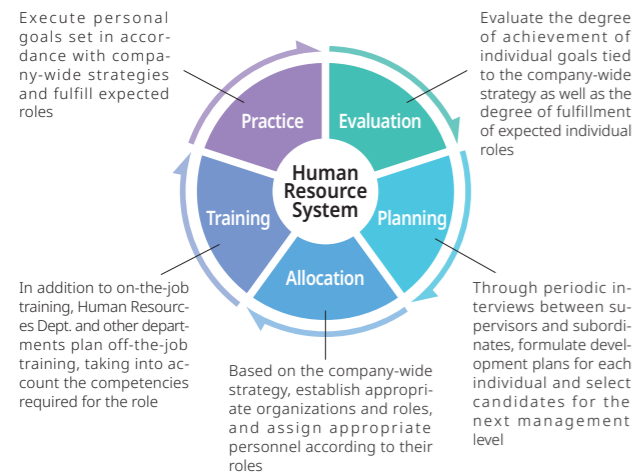
N.E. CHEMCAT encourages employees to be proactive about taking on challenges and strives to promote diversity to “build an environment and structure that allows employees to share the joy of working for N.E. CHEMCAT and constantly breed innovation,” as stated in Vision 2030.

### Human Resource Development

#### Human Resource System That Encourages Employees to Be Proactive about Taking On Challenges

To create the infrastructure for encouraging employees to take on challenges, we introduced and are operating a human resource system. The system is designed so that each employee can recognize clear roles and goals, take

#### Five Components of the Human Resource System



on challenging and rewarding work, and have it evaluated appropriately.

In FY2023, we introduced a new internal recruitment system for new posts and a special bonus system for employees who have demonstrated outstanding performance.

#### Human Resource Management Promotion System

N.E. CHEMCAT formulates and implements various human resource policies based on the human resource strategy in its medium-term management plan.

Personnel evaluations and changes in role grades, personnel transfers and annual hiring plans, succession plans for key posts, and the selection of candidates for the next management level are discussed by the Personnel Committee, which is chaired by the president. This ensures a medium- to long-term perspective in the management of human resources.

#### Human Resource Development

Our human resource development is mainly based on on-the-job training, which involves communication with supervisors and senior employees in daily work as well as guidance and advice provided via regular interviews.

We also provide training for new employees and coaching training, as well as off-the-job training for each employee grade. The goal is to help them acquire the skills required to fulfill their roles and to develop and improve their competencies.

N.E. CHEMCAT actively supports independent learning for each employee, including support for obtaining a doctoral degree and English language training, and e-learning courses that can be selected at will by interested employees.

#### Promoting Diverse Work Styles

##### Flexible Work Styles

N.E. CHEMCAT operates systems that allows employees to work flexibly. Such systems include the flex systems and the telecommuting system.

We also strive to maintain a balance between work and life through appropriate management aimed at preventing long working hours and encouraging employees to take annual paid leave.

##### Support System for Childcare and Nursing Care, etc.

To support the activities of employees with childbirth, childcare, and nursing care needs, the company has introduced a variety of support systems that exceed legal standards. In FY2022, 100% of female employees who are eligible for childcare leave took it. The percentage of eligible males that took childcare leave exceeded 50% at 57%. This achieved one of the goals set in the General Business Owner Action Plan under the Act on the Promotion of Women's Active Engagement in Professional Life.

We also began providing a new nursing care seminar in FY2022 to provide appropriate support to employees when they face the need to provide nursing care.

**Creating a Positive Workplace That Is Easy to Work in**  
N.E. CHEMCAT strives to improve the workplace environment based on stress checks and suggestions and recommendation from the labor union.

We also provide insurance coverage for illness and injury and a group life insurance program so our employees can work with peace of mind.

#### Diversity and Inclusion

Believing that acceptance of diversity leads to the creation of innovation and enhancement of corporate value, the company is working to create a work environment in which the individuality of employees and the abilities of diverse human resources can be fully realized.

In FY2022, the mid-career employee employment rate exceeded 70% and the employment rate for people with disabilities was 2.6%, exceeding the legally mandated level.

#### Women in Management Positions

Of the approximately 700 employees at the company, approximately 11.0% are women. The percentage of women in management positions has been increasing in recent years and was 4.9% in FY2022.

	FY2019	FY2020	FY2021	FY2022
Percentage of regular employees who are women	10.0	10.9	10.8	11.0
Percentage of women in management positions	3.3	4.6	4.3	4.9

#### Human Resource Development System

	OJT	OFF-JT				Self-development support																
		Position-based training	Knowledge & skills training	Selected training (training for potential managers)	Function-specific training (conducted by each organization category)	Dispatch to outside the company	Individual learning															
Officers		Off-site meetings																				
Managers	M3	Assignments/guidance through regular meetings with supervisors																				
	M2																					
	M1		Middle management program New manager training	Coaching training	Evaluator training																	
Employees	S4	Training for new employees Instructor system English training for new employees Followership training																				
	S3		New supervisor training																			
	S2																					
	S1																					
			Mid-career employee training	English training outside the company	Basic skills training (logical thinking, facilitation, anger management, precious metals management, etc.)	Compliance training (legal compliance, human rights, harassment)	Diversity training (life planning, career design, nursing care)	Pre-assignment training for overseas assignment	Performance Improvement Support Training	Practical placement and guidance	Senior Management Program	Education related to health, safety, environment, and quality	Education related to Responsible Care (RC) activities	Training related to Lean Six Sigma (LSS) activities	Training necessary for the execution of operations (in-house training, dispatch to external seminars)	Support for obtaining a doctoral degree	Support for acquisition of a bachelor's degree in liberal arts from the Open University of Japan	Dispatch of external seminars	Support for acquisition of qualifications	Support for taking various correspondence courses	Provision of e-learning (management, technical skills, health management, languages, PC, etc.)	Support for online English training

Childcare Leave	Extension to 2 years old is possible depending on the situation of the childcare center. (The rate of employees who have returned to work after taking childcare leave is 100%.)
Shortened Work Hours for Childcare	Available until the child graduates from elementary school
Nursing Care Leave	Can be taken up to three times for a period of up to 93 days for a family member in need of nursing care
Family Support Leave	Available for up to 40 days per year for nursing care of family members who are injured or ill or in need of nursing care *Can be taken even if not in need of nursing care
Job Return System	Employees who have left the company due to marriage, childbirth, childcare, nursing care, or a spouse's transfer are eligible to return to work if they so desire.

#### General Business Owner Action Plan based on the Act on Advancement of Measures to Support Raising Next-Generation Children

We have established and are implementing the following goals in order to create an environment in which all employees can balance work and child-rearing and in which all employees can work comfortably so that they can fully demonstrate their abilities.

1. Encouraging employees to take annual paid leave by informing their supervisors of the status of their use of annual paid leave.
2. Using the intranet to inform employees about childcare leave based on the Child Care and Family Care Leave Law and various systems based on the Unemployment Insurance Law.
3. Appropriately managing the transition of employees' overtime work and striving to reduce working hours.



N.E. CHEMCAT strives to create a workplace environment in which employees can work safely and in health.

## Occupational Health & Safety

### Seven Safety Action Rules

Under the safety policy that safety takes precedence over everything else, N.E. CHEMCAT has established Seven Safety Action Rules to ensure safety and health.

#### Seven Safety Action Rules

- Follow the rules**  
All company employees shall comply with laws, regulations, and other internal rules.
- Implement thorough safety precaution**  
In order to prevent injury, supervisors shall give due consideration to safety (pre-screening, education and training) before utilizing new employees or introducing new equipment, new substances, or new tasks.
- Standardize operational procedures**  
Workplace supervisors shall standardize operational procedures in order to ensure safety.
- Wear protective gear**  
Personnel working on site shall wear appropriate protective gear.
- Patrol the workplace**  
Supervisors shall patrol the workplace in a timely manner to identify any on-site issues. Identified problems shall be corrected in a timely manner without leaving dangerous locations or dangerous tasks unattended.
- Report obligations**  
If an accident, injury, or emergency should occur, work shall be stopped immediately, and the situation shall be reported to a supervisor as quickly as possible.
- Prevent recurrence thoroughness**  
Following an accident or injury, all workplace employees shall reflect seriously on the circumstances, determine the cause, and take steps to prevent recurrence.

### Health & Safety Promotion System

N.E. CHEMCAT has established health & safety committees at each of its plants. These committees include safety managers, health managers, industrial physicians, and work supervisors, and a system is in place to reflect the opinions of employees at workplace and safety meetings. The initiatives reported to the committee are reported to the company-wide RC Committee, which oversees the progress of the initiatives.

### Health & Safety Management System

We have obtained OSHMS certification for our health and safety management system, which is qualified by the JISHA method.

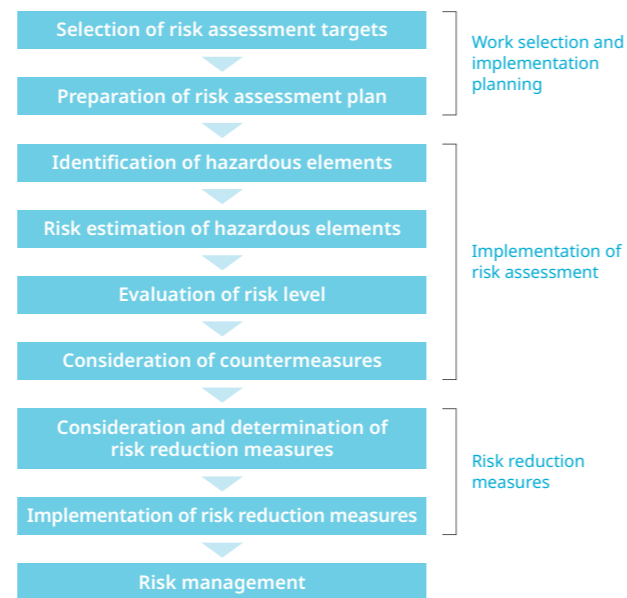
#### Plants with Certified Health and Safety Management Systems

JISHA-qualified OSHMS	Numazu Plant, Tsukuba Plant
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### Implementation of Risk Assessment

We support the mental and physical health of employees by conducting risk assessments that place the highest priority on preventing serious accidents and implement essential safety measures such as the maintenance and management of necessary equipment. In addition, we are working to improve work that involves heavy labor or working in hot weather to create a workplace that is easy to work in, even for elderly workers.

#### Risk Assessment Procedures



### Safety Targets

With the aim of achieving zero lost-worktime injuries and injuries without lost worktime, we are working to create a safe and healthy work environment for all employees. In FY2022, two lost-worktime injuries occurred.

Occupational Accidents	(Number of accidents)			
	FY2019	FY2020	FY2021	FY2022
Lost-worktime injuries	1	1	2	2
Accidents without lost worktime	2	2	0	0
Fatal accidents	0	0	0	0

### Safety Training

We conduct safety-related education and training and make educational materials available on our safety and health bulletin board.

#### Safety Training (Examples)

- Safety principles
- Disaster preparedness education (BCP for major earthquakes/wind, flood, and earthquake disaster prevention)
- Education on chemical substance management
- Training for employees who work with chemical substances
- Education on management system of chemical substances in products
- Education on basic knowledge of protective equipment (for new and mid-career employees)
- Education on prevention of exposure to liquids (chemical hazards)
- Education on full body harness fall arrest equipment
- Training for high-pressure gas handlers
- Education on compliance with relevant laws and regulations
- Traffic safety training
- Heatstroke prevention education
- Risk assessment of chemical substances

In FY2022, we conducted off-site hazard simulation training provided by the Sumitomo Metal Mining Group. The five N.E. CHEMCAT employees who took the course serve as on-site trainers. They take the initiative on and serve as role models in safety activities, urge other employees to practice safety, and work to sustain zero accidents and injuries at each plant.



Hazard simulation training course

### Workplace Accident Prevention Activities

To prevent occupational accidents, we conduct regular facility safety inspections and health and safety patrols, as well as workplace patrols by management, and shareholder audits.

## Health

### Supporting Employees' Mental and Physical Health

**Employee Health Management through Health Checkups**  
Regular health checkups are conducted once a year to maintain and promote employees' health. We also help to maintain the health of employees by providing thorough physical examinations.

Specific health checkups	Specific health checkups are conducted for all insured employees and dependents between the ages of 40 and 65. For those who are selected for "motivational support" or "active support" in the specified health checkup, an action plan is prepared under the guidance of a doctor, public health nurse, etc., and health guidance is provided to improve lifestyle.
Thorough physical examination	Insured persons and their dependents can undergo physical examinations without age limitation.

#### Mental Health

The company conducts annual stress checks to not only address mental health issues but also promote mental health in a broader sense, including the revitalization of workplace communication.

In fiscal 2022, 98.6% of employees underwent stress checks. We are following up with high-stress individuals through interviews.

#### Health Consultations

N.E. CHEMCAT partnered with an outside organization and introduced a system to provide mental and physical health consultations 24 hours a day. In addition to daily health counseling, we also provide services such as referrals to medical institutions where consultations are available during the year-end and New Year holidays.

Employees who request health counseling meet with an industrial physician or receive health counseling from a healthcare provider at least once a month at our head office and plants.

We seek to achieve sustainable growth and a prosperous society through stronger relationships with stakeholders by providing them with appropriate information and engaging them in dialogue, and by creating new technologies and value in collaboration with stakeholders.

**Communication with Stakeholders**

To share our philosophy and objective of promoting sustainability management, we place immense importance on opportunities for diverse dialogue with stakeholders.

Through dialogue, we seek to build relationships of mutual cooperation between the company and its stakeholders and among stakeholders, and to grow and develop together.

Communication to Deepen Connections among Stakeholders



**Opportunities for Dialogue with Stakeholders**

Stakeholders	Objectives	Main communication
Customers	<ul style="list-style-type: none"> <li>- Collaborating to solve social issues through business</li> <li>- Improving customer satisfaction by maintaining the supply of high-quality products</li> <li>- Building and strengthening relationships of trust through appropriate disclosure of sustainability and other initiatives</li> </ul>	Sales and technical support, customer satisfaction surveys, acceptance of plant inspections, CSR survey responses, information disclosure on website, sustainability reports
Shareholders (Sumitomo Metal Mining and BASF)	<ul style="list-style-type: none"> <li>- Be accountable to shareholders for business strategies and performance, and strengthen Group cooperation</li> </ul>	General shareholders' meeting, acceptance of audits, and technical exchanges
Suppliers	<ul style="list-style-type: none"> <li>- Maintaining sound business relationships through fair and equitable transactions</li> <li>- Sharing procurement policies and CSR procurement guidelines, and promoting CSR procurement throughout the supply chain</li> </ul>	Communication through purchasing activities and conduct CSR surveys
Business Partners	<ul style="list-style-type: none"> <li>- Strengthening collaboration with various companies to develop products and new technologies that contribute to a sustainable society</li> </ul>	Communication through projects, cooperative research
Employees	<ul style="list-style-type: none"> <li>- Creating opportunities for direct dialogue between officers and employees</li> <li>- Strengthening mutual trust through labor-management dialogue</li> <li>- Strengthening employee engagement</li> <li>- Fostering a lively work environment</li> </ul>	Employee Forum (held twice a year), labor-management council, executive blog, intranet
Schools (Universities)	<ul style="list-style-type: none"> <li>- Creating new technologies and values that support a sustainable society</li> </ul>	Acceptance of internships, cooperative research
Industry Groups	<ul style="list-style-type: none"> <li>- Exchanging views and sharing information with chemical and catalyst-related industry groups, and with organizations working to solve social issues</li> </ul>	Membership in industry groups (JCIA, Catalyst Manufacturers Association JAPAN, Japan Hydrogen Association, and others.)
Local Communities	<ul style="list-style-type: none"> <li>- Contributing to local development through youth development, local environmental protection, and other social activities</li> <li>- Coexisting and co-prospering with local communities</li> </ul>	Providing extracurricular classes at technical colleges and high schools, regularly engaging in dialogue with resident associations and landowners, participating in community cleanup activities, in regional chambers of commerce and environment-related councils, and in district sports competitions, and supporting AED advertising for local government community facilities

**Local Contribution Activities**

**Kano River Water Quality Conservation Activities**

N.E. CHEMCAT has a plant in the city of Numazu. We promote the conservation of water quality in the Kano River, participate in the Kano River Water Quality Conservation Council, and engage in environmental conservation activities.

We also participate in the environmental protection programs Clean Numazu in Numazu City, Shizuoka Prefecture and Clean Bando in Bando City, Ibaraki Prefecture.



Kano River water quality conservation activities

**Support for AED Installation in Public Facilities**

N.E. CHEMCAT sponsors AED advertising to support efforts to install automatic external defibrillators (AEDs) in public facilities in Bando City, Ibaraki Prefecture.

In FY2022, we supported the installation of AEDs in five locations in four facilities: Bando City Hall, Iwai Wellness Center, Bando General Gymnasium, and Bando Civic Concert Hall.

**Support of Culture and Sports**

N.E. CHEMCAT sponsors local marathons and other sports activities as part of its efforts to support sports in local communities.

In FY2022, we sponsored the Shizuoka Ekiden, a long-distance relay road race for municipalities in Shizuoka Prefecture, donated towels to cheer on the team from Numazu where our plant is located, and deepened engagement with local residents.

Our Tsukuba Plant also participated in the Bando City Masakado Half Marathon, which was held for the first time in three years.



The Numazu Team holding up the towels we donated to cheer them on

**Support for Local Education**

N.E. CHEMCAT supports the production of elementary school newsletters and the participation of high school and

technical high school students in extracurricular courses as part of its activities to support the education of students who will be responsible for their communities in the future.

**Elementary Schools**

- Support for producing newsletters  
Bando municipal Kamiomi Elementary School, Numazu municipal Hara Elementary School

**High Schools/Technical High Schools**

- Future Shizuoka\*  
Support for extracurricular courses at National Institute of Technology (KOSEN), Numazu College

\*Future Shizuoka: A project run by Shizuoka Shimbun (newspaper) that communicates the appeal of living in the community by having high school students work in local companies.



Extracurricular course at National Institute of Technology (KOSEN), Numazu College

**International Technology Exchange**

**Welcoming a Science and Technology Mission Group from South Africa for a Tour**

In October 2022, the Numazu Plant welcomed a science and technology mission group from South Africa for a technology tour. This visit was hosted by National Institute of Technology (KOSEN), Numazu College, the representative institution for the Development of New Ammonia Synthesis System using Renewable Energy and Hydrogen\* research theme involving Japan and South Africa. They accompanied the South African science and technology mission group on the tour. We gave the mission group a tour of our latest precious metal catalyst technology and engaged in an international exchange with the mission group.

\*A research theme adopted by the Science and Technology Research Partnership for Sustainable Development (SATREPS) program



South African science and technology mission group that toured our Numazu Plant

N.E. CHEMCAT is working to build a transparent and sound governance system and strengthening internal controls in order to increase stakeholder trust and enhance corporate value. We have also positioned compliance as our top priority in corporate activities.

**Governance System**

To conduct transparent and sound corporate management, we need to establish corporate governance that is in line with the true state of the company. The company has put in place a general shareholders' meeting, a board of directors, corporate auditors, and accounting auditor to ensure appropriate corporate governance.

**Activities of the Board of Directors and Corporate Auditors**

In accordance with the Companies Act and internal regulations, we held eight board of directors' meetings (three of which were held in writing) in FY2022 to discuss important matters and report on the state of business execution.

Corporate auditors also attended the general shareholders meeting, the board of directors' meetings, and other important meetings to monitor and verify whether resolutions and reports have been made in accordance with laws, the Articles of Incorporation, and internal regulations, and whether appropriate business judgment was exercised in making decisions.

**Overview of Directors and Corporate Auditors**

Number of directors	6
Number of corporate auditors	3
Number of board of directors' meetings held	8
Number of corporate auditors liaison meetings held	7

**Internal Controls**

The company has formulated the Policy on Internal Controls as an effort to establish a system necessary to ensure the appropriateness of business operations as stipulated in the Companies Act. Based on this policy, the company has established a system for appropriate operational controls in terms of business processes, risk management, and compliance.

The company also conducts internal audits on business processes and compliance. Regarding internal audits, the Internal Audit Committee reviews and evaluates the status of the system's development and operation in terms of the appropriateness of the company's important business processes and compliance status.

When conducting internal audits, the company cooperates with external organizations as appropriate, and reports the existence of deficiencies and their causes to the Internal Audit Committee. If deficiencies are found, an issue log is released, and the General Manager of the Corporate Administration Dept. investigates and confirms the implementation of improvements in a timely manner and releases the summarized report to the Internal Audit Committee.

**Compliance**

We believe that compliance must be addressed to fulfill our required social responsibilities and achieve sustainable growth.

Based on this belief, the company has established the Corporate Guiding Principle and the Code of Conduct to show its commitment to rigorous compliance as a company, and to clarify the items that must be observed by employees, which they must put into practice in their daily work.

In FY2022, there were two incidents involving compliance violations. Each incident was handled appropriately, according to internal rules.

To prevent recurrence, we are also making everyone in the company aware of these incidents and are posting educational activities on the intranet.

**Internal Reporting System**

The company has established an internal reporting system to promptly collect information on any violation of laws or regulations and to respond to that information as quickly as possible. The division in charge investigates reports and determines whether the report content qualifies as a legal violation or violation of other rules. It then reports the results to the Representative Directors and full-time auditor for determination of the appropriate steps to take.

One report was made through the internal reporting system in FY2022. We continue to inform everyone about the role of the internal reporting system and how to use it, along with the importance of compliance, and promote use of the system.

**Internal Reporting Contact**

General Manager of the Corporate Administration Dept.

**External Reporting Contacts**

An affiliated law firm

**In-House Training**

We conduct compliance training company-wide, focusing on the importance of compliance, the company's compliance system, and the prevention of harassment.

In FY2022, the company regularly published the Compliance Newsletter to raise awareness about harassment, safety and environmental laws and regulations, and the internal reporting system.

**Corporate Guiding Principle**

**Basic attitude towards business activities**

We conduct active R&D based on a long-term perspective, establish systems to supply safe and quality products consistently, develop existing businesses and create new businesses in order to resolve social issues.

**Environmental initiatives**

We position the preservation of global environment as an important mission, and provide products that help resolve environmental issues, as well as take actions to reduce environmental impact throughout our corporate activities.

**Enforce safety**

We make sure that safety is given first priority throughout the company. We allocate management resources necessary to ensure safety, and strive to create an accident-free, disaster-free environment by enforcing training upon all persons engaged in our corporate business activities.

**Quality improvement**

We provide the quality that is satisfactory to our customers, engage the entire company in the quality control systems and conduct continuous quality improvement activities to gain customer trust.

**Relationship with stakeholders**

We value the dialogues with all stakeholders around us, and aim to be trusted as member of society through achieving accountability and appropriate information disclosure.

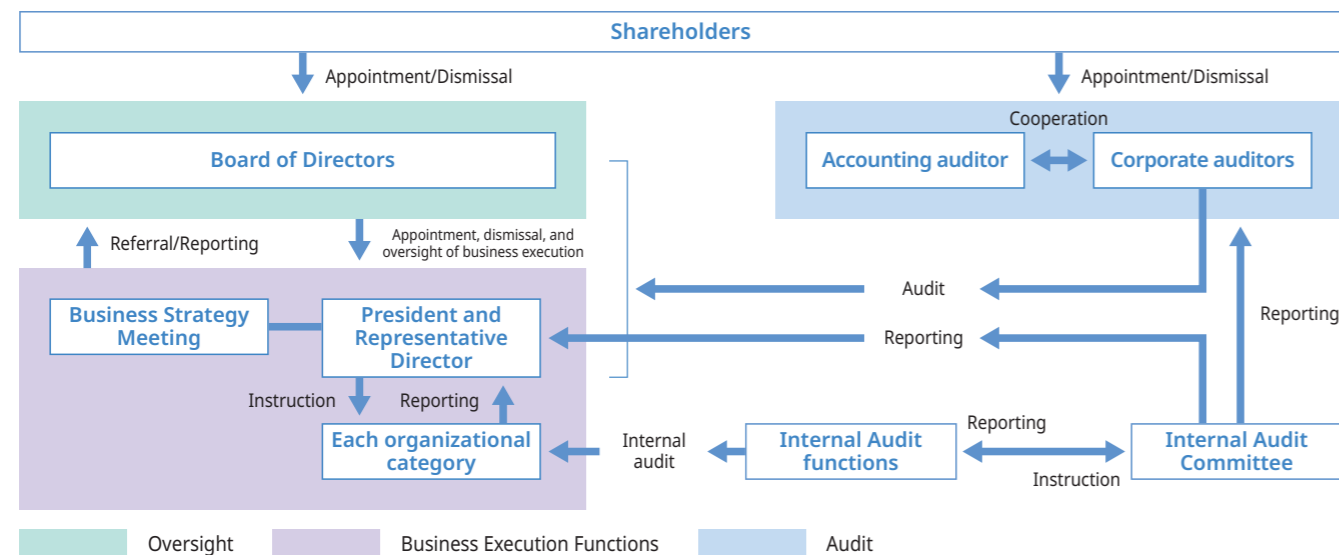
**Compliance, internal controls**

We enforce legal compliance, provide appropriate internal training, and take rigorous attitude against illegal and violating acts, as well as establish an internal controls system with emphasis on the management risks associated with our business activities.

**Vibrant working environment**

We respect the human rights of our employees and encourage open exchange of opinions and proactive challenges, and create a cheerful working environment that will enable employees to express their characters and diverse human resources to reach their potential.

**Corporate Governance System Chart**



N.E. CHEMCAT promotes risk management under the supervision of top management so that it can respond appropriately and promptly to increasingly diverse and complex risks.

**Human Rights Policy**

The company has established a human rights policy that respects the Universal Declaration of Human Rights and other international norms and prohibits all forms of workplace discrimination. The policy also clearly states that we will cooperate with relevant parties and not be complicit in any human rights violations, even indirectly.

**Human Rights Policy**

- 1) We will respect the Universal Declaration of Human Rights and other international norms, comply with laws and regulations, and promote initiatives towards respecting human rights.
- 2) We will not allow discrimination, harassment, or other acts of human rights abuse in the workplace. We will respect the diversity of our employees and will foster a lively workplace environment.
- 3) We will encourage supply chain partners and other stakeholders to take the initiative on respecting human rights, and will not take part in any human rights violations.
- 4) We will identify the adverse human rights impacts in our business activities and strive to prevent and mitigate such impacts, and to address such impacts when they occur.
- 5) We will carry out awareness-raising activities for officers and employees to embed the Policy throughout the Company.

**Harassment Prevention**

The company will in no way tolerate any violation of human rights, including discrimination, harassment, or any other forms of harassment in the workplace for any reason. In FY2022, there were four incidents of harassment that led to disciplinary action. When someone reports harassment, we first take sufficient steps to protect the privacy of the reporter, the perpetrator, and others involved, and then swiftly and accurately verify the facts. The necessary measures are then promptly implemented after the facts have been verified.

To prevent harassment in the workplace, we have established internal and external contacts for consultation and reporting and a system for handling the process from receiving a report to the response. We make everyone in the company aware of this system, in addition to conducting training on harassment.

**Internal audit**

N.E. CHEMCAT conducts internal audits based on the internal audit rules to help ensure appropriate, efficient audits of its business.

In FY2022, we audited compliance with the Act against Delay in Payment of Subcontract Proceeds, etc. to Subcontractors (Subcontractor Payment Delay Prevention Act).

**Risk Management**

We believe that identifying and strengthening our response to management risks not only fulfills our corporate responsibility but also leads to our sustainable growth, and we are working to strengthen our risk management system.

The risk management policy stipulates that the company shall establish a high-precision crisis management system. The policy also stipulates that in the event of an emergency, we should prioritize respect for human life and seek rapid recovery.

**Risk Management Policy**

- 1) Ensure the safety of company employees and preserve company resources.
- 2) Conduct risk management to continuously improve risk response capabilities.
- 3) Develop risk sensitivity and share risk-related information.
- 4) In the event of an emergency, prioritize respect for human life, responding promptly and quickly restoring operations.
- 5) Maintain a high-precision crisis management system with the aims of not only quickly restoring operations in the case of an emergency, but also contributing to society and enhancing our corporate image.

**Risk Management System**

The company has established the Risk Management Committee, chaired by the president, as a body that oversees risk management.

The Risk Management Committee is responsible for identifying and assessing various management risks and implementing risk mitigation measures, as well as planning and conducting disaster prevention-related education and training.

We have established and maintain a disaster response system that makes it possible to ensure the physical safety of people and protect lives, prevent and/or mitigate the expansion of corporate and stakeholder losses, and rapidly restore important business and business operations.

In the event of a serious disaster that could disrupt business continuity, the officer in charge of crisis management has the discretion to activate a crisis response headquarters and mount a company-wide response when a crisis occurs.

**Business Continuity Management (BCM)**

N.E. CHEMCAT has formulated a business continuity plan (BCP) for earthquakes, wind and water damage, infectious diseases, and other envisioned events.

We also take action to improve the crisis management system and response measures by operating the PDCA cycle to enhance our ability to respond when a crisis occurs.

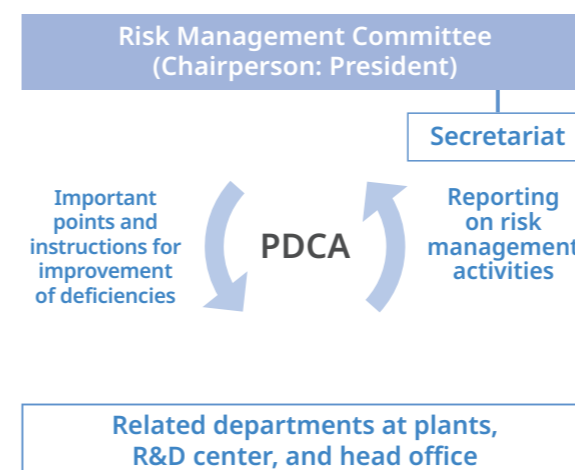
**Disaster Prevention Training and Drills**

We conduct various kinds of training and drills for all employees as part of our business continuity management. Once a year, we conduct training and drills for all employees on disaster prevention measures during normal times and response procedures during emergencies.

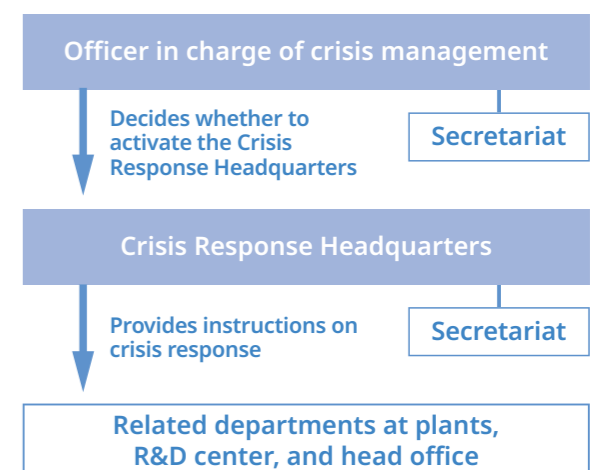
Safety verification drills	Response drills for all employees using the safety verification and response system	Twice a year
Comprehensive disaster drills (Numazu and Tsukuba)	Training for evacuation, roll call, reporting, firefighting, and inspection based on the assumption of a large-scale earthquake, fire, chemical leak, and injuries (we also assumed a tsunami for the Numazu Plant)	Once per year for each type of work
Self-defense firefighting drills (Head office)	Drills for evacuation, fire extinguishing, and reporting in case of a fire	Twice a year
BCP training and drills	Training and drills on internal information sharing, determining the response, and response procedures to maintain and quickly restore continuity of important operations in the event of a disaster	Once a year

**Risk Management System**

During normal times



During a crisis



Environment-Related Data

	Unit	2019	2020	2021	2022	
Energy / GHG	Energy consumption (crude oil equivalent)	kl	16,640	15,929	16,238	17,151
	Purchased electricity	kwh	34,873,000	33,391,000	33,094,000	34,774,000
	Gasoline	kl	1,064	1,057	1,108	1,100
	Light oil	kl	197	170	96	113
	Liquefied natural gas (LNG)	Ton	2,477	2,343	2,591	2,909
	City gas	Thousand m <sup>3</sup>	2,820	2,715	2,761	2,811
	GHG emissions	Ton	32,246	30,554	30,830	32,925
	GHG emission intensity (index with FY2013 as 1)		0.733	0.705	0.678	0.639
Water	Water usage (total)	Thousand m <sup>3</sup>	912	813	623	661
	Tap water	Thousand m <sup>3</sup>	12	9	10	14
	Groundwater	Thousand m <sup>3</sup>	885	790	599	632
	Industrial water	Thousand m <sup>3</sup>	15	14	14	16
	Industrial wastewater	Thousand m <sup>3</sup>	868	773	821	788
Waste	Amount of industrial waste (general/special management)	Ton	645	709	741	606
	Amount of industrial waste reused	Ton	579	658	708	570
	Recycling rate	%	89.8	92.8	95.6	94.1
Chemical substances	Emissions of PRTR substances (amount transferred to the environment)	kg	886* <sup>1</sup>	901* <sup>1</sup>	2,021	2,581
Atmospheric emissions	NOx emissions (Tsukuba Plant)	Ton	6.68* <sup>1</sup>	5.70* <sup>1</sup>	4.76* <sup>1</sup>	4.99
	SOx emissions	Ton	0	0	0	0
Others	Number of serious environmental accidents	Cases	0	0	0	0

Social Data

	Unit	2019	2020	2021	2022	
Employment	Number of employees (regular employees)	People	642* <sup>1</sup>	667* <sup>1</sup>	676	671
	Male	People	578* <sup>1</sup>	594* <sup>1</sup>	603	597
	Female	People	64* <sup>1</sup>	73	73	74
	Number of new hires	People	42	39	44	29
	New graduates	People	21	21	15	8
	Mid-career	People	21	18	29	21
	Percentage of women among new graduate hires	%	23.8	19.0	13.3	12.5
	Average years of service (male)	Years	17.3* <sup>1</sup>	17.2* <sup>1</sup>	17.0	16.8
	Average years of service (female)	Years	14.8	13.9* <sup>1</sup>	14.3* <sup>1</sup>	14.6
	Average age	Years	42.9	42.8	43.0	43.0
	Numbers of employees by age (up to 29 years old)	People	105	113	107	95
	30-39 years old	People	134	149	162	175
	40-49 years old	People	180	175	172	169
	50-59 years old	People	202	196	192	191
	60 years old and above	People	21	34	43	41
Percentage of paid annual leave taken	%	75.0	65.7	69.2	72.8	
Average hours of monthly overtime	Hours	18.4	19.3	20.4	20.3	
Diversity	Percentage of women in management positions	%	3.3	4.6* <sup>1</sup>	4.3* <sup>1</sup>	4.9
	Percentage of employees with disabilities	%	2.3	2.2	2.9	2.6
	Number of employees aged 60 and over	People	37	52	63	69
Childcare, nursing care, and nursing	Number of employees taking childcare leave	People	5	8	7	9
	Percentage of childcare leave taken (male)	%	9.1	16.6	30.7	57.1
	Percentage of childcare leave taken (female)	%	100	100	100	100
	Percentage of employees returning to work after childcare leave* <sup>2</sup>	%	100	100	100	100
	Number of employees using family support leave	People	0	2	1	2
Occupational Health & Safety	Number of accidents resulting in lost worktime	Cases	1	1	2	2
	Number of accidents without lost worktime	Cases	2	2	0	0
	Number of fatal accidents	Cases	0	0	0	0
	Percentage of employees undergoing stress checks	%	98.8	97.8	97.3	98.6

Governance-Related Data

	Unit	2019	2020	2021	2022	
Directors and corporate auditors	Number of directors	People	6	6	6	6
	Number of corporate auditors	People	3	3	3	3
	Number of board of directors' meetings held	Times	7	7	7	8
	Number of corporate auditors liaison meetings held	Times	4	4	6	7

\*1 Figures disclosed last year were corrected after review of scope.

\*2 Percentage of employees returning to work after childcare leave: Number of employees who returned to work in the same year divided by the number of employees scheduled to return to work in the same year x 100

Company Data

Company name	N.E. CHEMCAT CORPORATION	Founding date	April 9, 1964
Capital	3,423.5 million yen	Representative director	President: Susumu Endo