

# Tokuyama Corporation

1-1, Mikage-cho, Shunan-shi, Yamaguchi 745-8648, Japan  
Tel: +81-834-34-2000 Fax: +81-834-33-3790  
<http://www.tokuyama.co.jp/eng/>

## Corporate Social Responsibility Division

Tel: +81-834-34-2008 Fax: +81-834-34-2061



# CSR Report 2018



The photos showing the people and facilities of Tokuyama today are arranged to spell "TOKUYAMA." The Tokuyama Factory, which has been in operation for a century now, is shown in the backdrop of the page. The cover page design illustrates the strong steps Tokuyama has taken and its determination to build a new foundation.

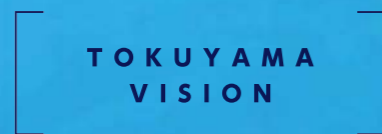


Published in September 2018



# Harnessing the Potential of Chemistry to Shape the Next Century

Since its founding in 1918, the Tokuyama Group has overcome many obstacles on its quest to deliver products and services that truly benefit people's lives. From the production of soda ash in Japan to cement and diverse chemicals, Tokuyama makes the most of its technology and experience to serve a wide range of sectors including electronics, ICT, healthcare, environment, and energy. As it embarks on another 100 years in business, Tokuyama will keep striving to create innovative products and services to deliver on its mission: "Centered on the field of chemistry, the Tokuyama Group will continue to create value that enhances people's lives."



## Mission

Centered on the field of chemistry, the Tokuyama Group will continue to create value that enhances people's lives

## Aspirations

Shift from a focus on quantity to quality

<FY2025>

Global leader in advanced materials  
Leader in its traditional businesses in Japan

## Values

Customer satisfaction is the source of profits

A higher and broader perspective

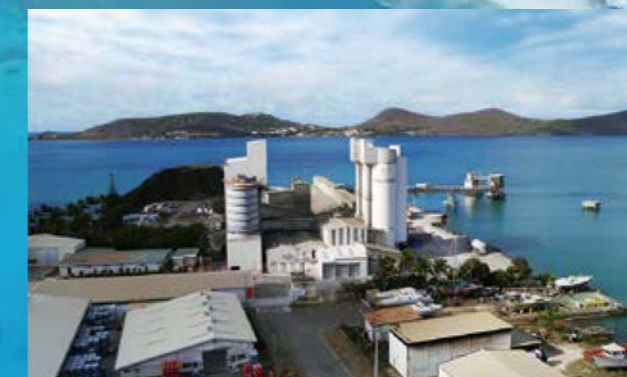
Personnel who consistently surpass their predecessors

Integrity, perseverance, and a sense of fun

Photo: Seascape of New Caledonia

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Tokuyama Nouvelle Calédonie S.A.



*Hiroshi Yokota*  
 Hiroshi Yokota  
 President

## Creating Value That Benefits People's Lives through Chemistry

Tokuyama's reason for existence is described in our mission: "Centered on the field of chemistry, the Tokuyama Group will continue to create value that enhances people's lives." Our clients know that sincerity and integrity are Tokuyama values. Since we integrate corporate social responsibility (CSR) into our management, they trust that we will continue to tackle key social issues with integrity.

### Strengthening Corporate Governance

Since becoming a company with an audit and supervisory committee, in the practice of corporate governance we have been making time to brief outside directors on proposals and management issues to facilitate more profound deliberations. In addition, we regularly hold open discussions and reflect the results in our management, and we are bolstering monitoring capacities in order to strengthen the supervisory function. A previous evaluation of the effectiveness of governance resulted in the suggestion to foster future board members, and we are including that, too, in our measures to reinforce governance.

### Responsible Care

In the area of Responsible Care, we are addressing increasingly demanding legal requirements both in and outside Japan. Along with the Group's overseas expansion, we are working hard to ensure a full response to each country's chemical product regulations. In particular, problems are on the rise with the treatment and disposal of chemical substances in developing nations, and stringent rules are being made. We are putting human resources with scientific knowledge in place to address these trends. Tokuyama is serious about providing solutions for water and air issues that leverage our strengths as a chemical manufacturer. We see this as a business opportunity and a chance to make valuable contributions.

### Comprehensive Safety and Accident Prevention

We are determined to ensure safety. By utilizing fast-developing ICT and big data, we implement ample safety

and accident prevention measures that are advanced and efficient. Building on our experience, we are also creating an invulnerable safety system that includes improving processes that further utilize accumulated data.

### Reducing Environmental Impact

One of Tokuyama's advantages is our private power generation capacity. We constantly work on the two key issues of reducing CO<sub>2</sub> emissions and using energy effectively.

We are committed to doing more than ever to provide products and operate businesses that are environmentally friendly. The ion exchange membrane featured in Close-up 2 is a good example. This product aims to capitalize on stricter environmental regulations in China and elsewhere to grow our business. We also offer PVC windows that curb CO<sub>2</sub> emissions by saving more energy in homes. These sashes are an important part of the zero-energy house, and with this new trend we are receiving many inquiries from home manufacturers. The entire Tokuyama Group is focused on ensuring that our technologies and products help resolve environmental issues.

### Resolving Social Issues

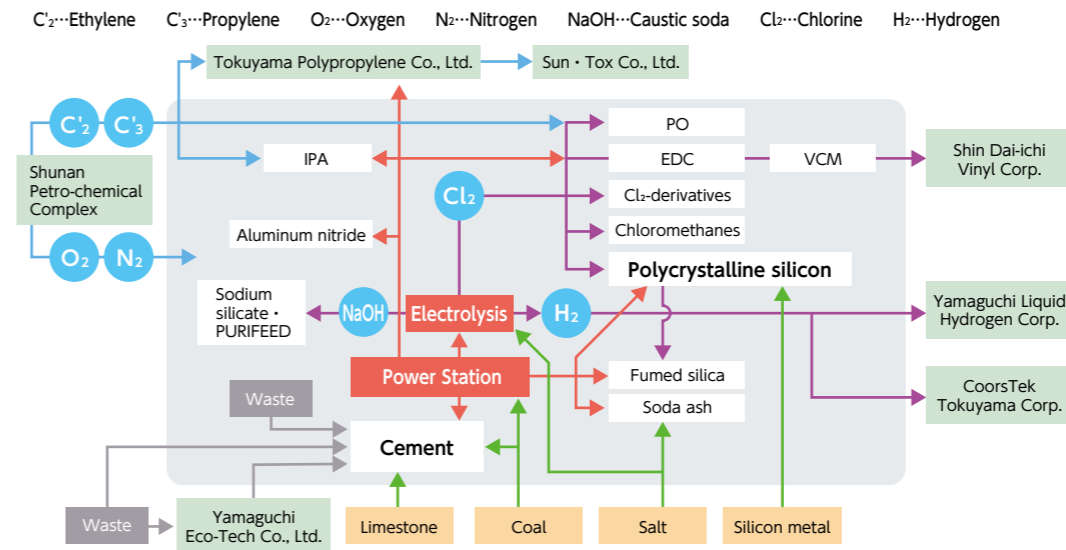
We are currently working to specify the materiality of the Tokuyama Group's businesses with a view to resolving social issues. This includes linking products and businesses with the Sustainable Development Goals (SDGs), clarifying how our businesses contribute to resolving social issues, and sharing this information group-wide. A look at the Group as a whole reveals many products and businesses with a positive social impact. We will organize and publicize these contributions, making them easier to understand for both employees and the broader society.

Meanwhile, we are also working to refresh our corporate culture. We are promoting women's empowerment in the workplace, encouraging greater awareness to create a comfortable, dynamic culture where everyone can demonstrate their skills—regardless of gender and age—and make the most of their individuality.

## Close-up 1: Leveraging Tokuyama's Business to Contribute to Society

# A Century of Meeting Social and Industrial Needs: The Power of Chemistry to Create Diverse Solutions

The history of the Tokuyama Corp. began in 1918 with the founding of Nihon Soda Kogyo Co., Ltd. in Tokuyama-cho, Yamaguchi Prefecture (present day Shunan City) by importer Katsujiro Iwai. The Company bypassed imports by introducing Japanese manufacture of soda ash (sodium carbonate)—a raw material that is essential to producing glass and therefore indispensable in industrial development—laying the foundation for growth over its first century in business. Tokuyama is determined to deliver products and services that offer solutions to social issues for another 100 years.



Open Integration at Tokuyama Factory

Over the past century, the Tokuyama Factory has expanded its business by effectively utilizing energy and industrial by-products to deliver products that society needs. By integrating energy, materials, and technologies used in all of its businesses, the Tokuyama Factory pursues "open integration" that reaches beyond to include neighboring companies and the local community, as well.

Established to manufacture soda ash 1918-1944	Expanded inorganic chemicals and cement businesses 1945-1960	Entered petrochemical business 1961-1974	Expanded specialty and processing businesses 1975-1989	Strengthened and restructured core businesses 1990-2004	Focused on raising corporate value 2005-2015	Building a new foundation 2016-
●1920 ●1930 ●1940	●1950	●1960 ●1970	●1980	●1990 ●2000	●2010	●2020

Established domestic production of soda ash to resolve difficulty in securing imports during WWI

Used by-products from production of soda ash as raw materials for cement

**1918** Established Nihon Soda Kogyo Co., Ltd. (currently Tokuyama Corp.) to produce soda ash in Tokuyama, Yamaguchi Prefecture (currently Shunan City)



- 1924** First shipment of caustic soda
- 1927** First shipment of soda ash
- 1938** Completed construction of captive central power station  
Commenced production of cement
- 1940** Commenced production of calcium chloride

Met increased demand for cement during period of strong economic growth

Produced ammonium chloride as agricultural fertilizer to help increase postwar food production

**1952** Commenced electrolytic chlor-alkali business

**1960** Commenced production of precipitated silica  
Completed construction of Nanyo cement plant to expand cement business



**1961** Commenced ready-mixed concrete business

Launched petrochemical business to help develop infrastructure and improve people's lives

Strengthened environmental measures as society moved to address intensifying pollution

**1964** Commenced petrochemical business

**1966** Commenced polyvinyl chloride business



**1967** Commenced ion exchange membrane business  
Completed construction of Higashi plant to expand petrochemical business

**1970** Commenced production of polypropylene (PP)

**1971** Commenced construction materials business  
Established Tokuyama Fiberglass Corp. (currently Tokuyama Mtech Corp.)

**1972** Commenced production of isopropyl alcohol (IPA)



**1973** Closed chlor-alkali plant using mercury cells process

**1975** Commenced chlor-alkali production using diaphragm cell process

Promoted Company-wide energy conservation in response to global energy crisis

Entered value-added sectors such as electronic materials and fine chemicals

**1976** Commenced polyolefin film business  
Commenced PVC window business

**1978** Commenced dental materials and equipment business

**1982** Commenced consumer products business  
Commenced fine chemicals business

**1983** Commenced high-purity chemicals business for electronics industry  
Commenced medical diagnosis systems business



**1984** Commenced polycrystalline silicon business



**1985** Commenced aluminum nitride business  
Commenced gas sensor business by means of equity participation in Figaro Engineering Inc.  
Completed construction of Kashima Factory



**1988** Established A&T Corp. and commenced medical diagnosis system and equipment business

**1989** Completed construction of the Tsukuba Research Laboratory

Responded to new markets created by the IT revolution

Strengthened competitiveness by integrating and spinning off businesses

**1992** Established Sun-Tox Co., Ltd. as a joint venture of polyolefin film business

**1995** Established Shin Dai-ichi Vinyl Corp. as a joint venture of PVC business

**1996** Established Taiwan Tokuyama Corp. and Tokuyama Electronic Chemicals Pte. Ltd. in Singapore for high-purity chemicals business

**1999** Established Sun Arrow Kasei Co., Ltd. for PVC compound business

**2000** Established Yamaguchi Eco-Tech Co., Ltd. as a joint venture in recycling waste incinerator ash



Established Excel Shanon Corp. as a company of PVC window business

**2001** Established Tokuyama Polypropylene Co., Ltd. as a joint venture in polypropylene business  
Established Tokuyama Dental Corp. for dental materials and equipment business

**2002** Established Shanghai Tokuyama Plastics Co., Ltd. in Shanghai, China for polyolefin microporous film business

**2004** Established ASTOM Corp. for ion exchange membranes and systems (⇒ P.10)

Pursued zero emissions and resource recycling with increasing demand for building a recycling-oriented society

Took on challenges of global business development and new environmental businesses

**2005** Established Tokuyama Chemicals (Zhejiang) Co., Ltd. in China for fumed silica business

**2009** Established Tokuyama Malaysia Sdn. Bhd. for PV polycrystalline silicon business (sold off in 2017)

**2011** Established Tianjin Tokuyama Plastics Co., Ltd. in China for polyolefin microporous film business

**2013** Established Yamaguchi Liquid Hydrogen Corp. for liquid-hydrogen business



Established Tokuyama Nouvelle Calédonie S.A. in New Caledonia, for cement business

Established Tokuyama Chiyoda Gypsum Co., Ltd. for recycling of waste gypsum boards

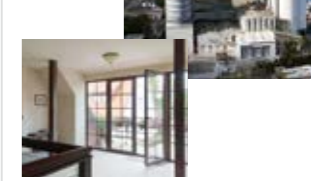


**2014** Established TOKUYAMA & CENTRAL SODA Inc. (currently Tokuyama Soda Trading Co., Ltd.) for soda ash and calcium chloride business

**2015** Established Tokuyama METEL Corp. as a joint venture for industrial detergent business

Strengthen initiatives and create new businesses in ICT, environment, and healthcare

**2018** 100th anniversary of foundation



Supporting innovation  
ICT

Creating a low-carbon, recycling-oriented society  
Environment

Contributing to health and longevity  
Healthcare

## Leveraging Tokuyama's Business to Contribute to Society: Tackling the SDGs

# Offering Products and Services That Support Innovation, Help Build a Recycling-Oriented Society, and Promote Health

Tokuyama has always developed unique technologies that are useful to customers and spur social progress. With a strategic focus on ICT, the environment, and healthcare, the Company helps make people's lives even more convenient, comfortable, and safe. Tokuyama's business activities address the Sustainable Development Goals (SDGs), true to the Company's commitment to sustainable development and being essential to society.

### How Tokuyama's Business Activities Address the SDGs

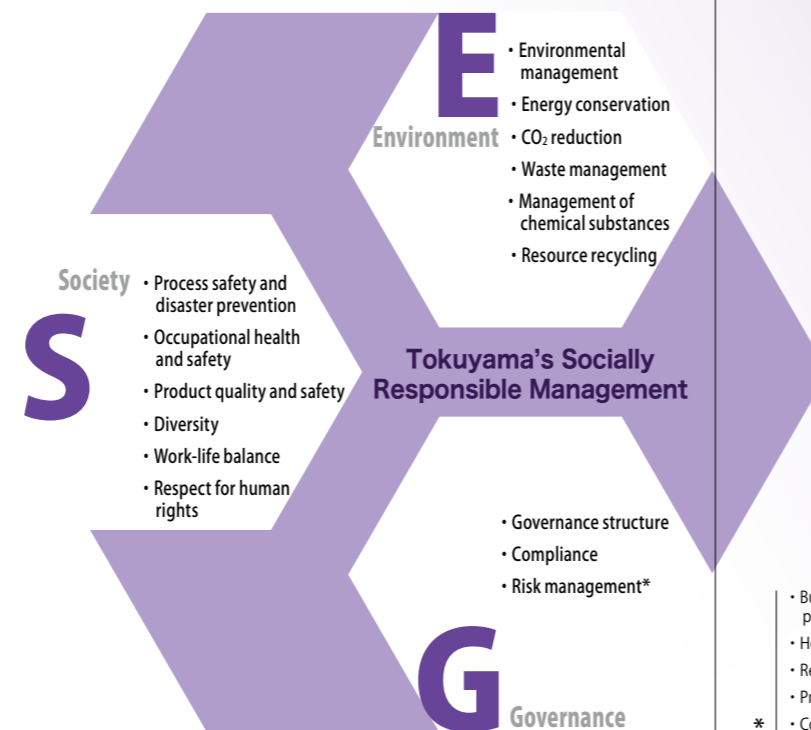
Tokuyama is committed to delivering products that provide the solutions needed to meet changing social needs, while assessing its corporate activities in terms of environmental impact, social impact, and governance.

Determined to do its part on the SDGs adopted at the United Nations Sustainable Development Summit in September 2015, the Company is also assessing the relationship between the goals and its products and businesses and identifying materiality in order to build a more sustainable world.

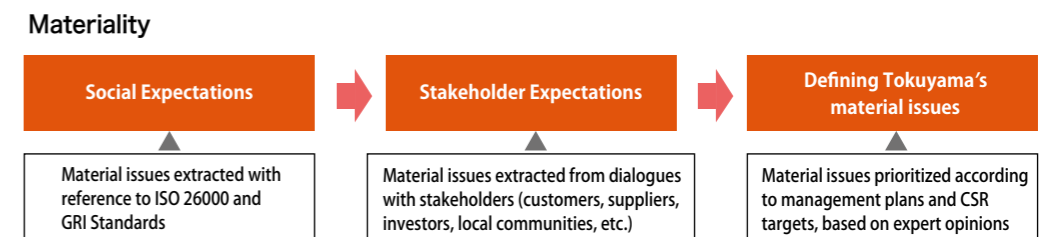
Moving forward, the Company is focused on the key areas of ICT, healthcare, and the environment. The Tokuyama Group aims to use its proprietary technologies to provide solutions to social issues, thereby remaining essential to society and being the choice of customers for another 100 years.



Adopted by the United Nations, the SDGs address issues facing all of humanity. Meeting these goals by the target year of 2030 will require global-scale cooperation.



- Materiality**
- Business continuity management and planning (BCM, BCP)
  - Helpline (Whistle-blowing)
  - Refusal to associate with antisocial forces
  - Prohibition of bribery
  - Compliance with competition laws
  - Compliance with export control laws



## Close-up 2: Tokuyama's Environmental Technologies

# Ion Exchange Technology: Protecting the Water of Life



Research and development on ion exchange membranes began 80 years ago. Since then, the technology has supported the lives of people through production of table salt and desalination/refining of drinking water, foods, and medical intermediates. In addition, it helps preserve the earth's environment through applications including waste liquid processing and recovery of valuables.

### The History of Developing Ion Exchange Membranes

Tokuyama was established to manufacture soda ash and calcium chloride from salt as a raw material. The Company relied on imports for industrial salt, and it was a challenge to secure a stable supply at a reasonable price. To overcome this, Tokuyama invented a patented process to produce brine by concentrating seawater with ion exchange membranes. Tokuyama began research on ion exchange membranes around 1938 and, in 1961, became the first in the world to successfully manufacture an ion exchange membrane. The technology to concentrate inorganic electrolyte solution using this membrane was highly praised by industry and academia.

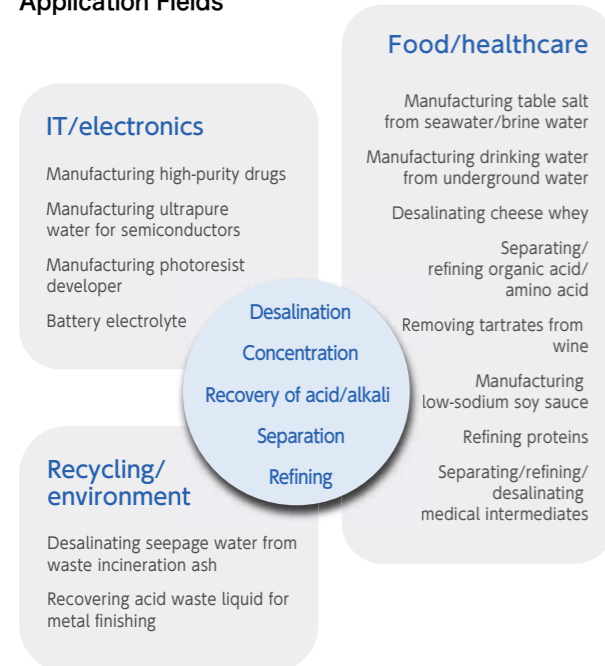
Manufacturing technology for ion exchange membranes originated in the field of organic synthesis, an area where Tokuyama had little experience. After conquering many obstacles in developing the membrane, Tokuyama established a process to prepare brine using ion exchange membranes, then later commercialized it as a salt manufacturing method. The efforts of many researchers and engineers came together in the development of these membranes, which built the foundation for Tokuyama's subsequent growth.

### NEOSEPTA ion exchange membrane

Ion exchange membranes have ionic permselectivity. A cation-exchange membrane allows only cations (Na<sup>+</sup>) to pass through, while an anion-exchange membrane allows only anions (Cl<sup>-</sup>) to pass through. Utilization of this principle enables the desalination of water and concentration of salt.



### Ion Exchange Technology Application Fields



## Building an Exciting Company by Developing New Membranes Technologies

### Tokio Okoshi

President  
ASTOM Corp.



As a provider of electro dialysis systems using hydrocarbon-based ion exchange membranes, ASTOM is focusing our energies beyond Japan. We are moving forward with several projects such as the installation and pilot operation of test equipment for new applications on production

lines in China, South Korea and Southeast Asia. We also help customers to reduce environmental impact by enabling them to cut down on and reuse plant wastewater. In addition, ASTOM aims to be a global leader in ion exchange technology by proactively developing new membranes.

Company Outline	Established: May 1, 1995	President: Tokio Okoshi
	Location: 6-2, Nishi-shinbashi 2-chome, Minato-ku, Tokyo 105-0003, Japan	Main businesses: Manufacture and sale of ion exchange membranes and systems
	Capital: 450 million yen	
	Shareholders: Tokuyama Corp. 55%, Asahi Kasei Corp. 45%	

### Contributing to Safe, Healthy Living

Today, the ion exchange membrane business is carried out by the group company, ASTOM Corporation. Ion exchange membranes are utilized in processes including manufacture, waste liquid processing, and recycling of various substances by leveraging effects such as desalination, concentration, recovery, separation and refining.

### A New Production Process for Table Salt: Ion Exchange Membranes

For many years table salt in Japan was made by drying salt in the sun, but since 1972 productivity has increased dramatically with the application of electro dialysis using ion exchange membranes.

### Producing Safe Drinking Water from Underground Water

Ion exchange membranes are also useful in production of drinking water, which, along with salt, is essential to life. On remote islands and in other regions reliant on underground water, often salinity exceeds the standards for tap water. ASTOM supplies drinking water that fulfills tap water standards by effectively desalinating water using electro dialysis reversal.

### Products and Technologies Compatible with Strict Environmental Regulations

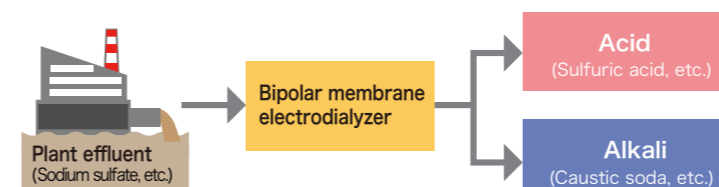
#### Recovering Valuables from Plant Effluent

Ion exchange membranes are also utilized in the recovery of valuables from plant effluent. The bipolar membrane electro dialyzer from ASTOM recovers acid and alkali from saline effluent and also achieves volume reduction. Examples include the recovery and recycling of valuables from potassium fluoride waste from semiconductor and liquid crystal plants.

### Global Growth in China, India and Other Countries

In rapidly industrializing China and India, reducing the volume of industrial wastewater is becoming a major issue, and the demand for zero liquid discharge is growing. Particularly in China, more inland plants, including coal-chemical plants and thermal power generation plants, are adopting technologies to meet the country's tightening effluent regulations. This includes ASTOM's electro dialysis, which enables further concentration of wastewater and reduces the volume of concentrated wastewater. The products' high functionality and maintenance-saving durability will help drive ASTOM's business growth and foster a recycling-oriented society.

### Recovering Valuables from Plant Effluent



### Apparatus to Reduce the Volume of Plant Wastewater



## The Tokuyama Group's CSR

# Resolving Social Issues with Chemistry and Co-Creating a Sustainable Future with Society



Tokuyama practices corporate social responsibility (CSR) in management, leveraging the chemical technology it has amassed to create and keep providing new value in order to bring joy to people and contribute to social progress.

### Tokuyama's Approach to CSR

Tokuyama works to build positive relations with stakeholders in accordance with its mandate to practice CSR. Under Japan's Corporate Governance Code, companies are directed to "achieve sustainable growth and increase corporate value over the mid- to long-term." Tokuyama believes that achieving these aims will help to ensure its social responsibilities are met. It also implements internal controls to anchor its CSR initiatives, focusing on risk management and compliance. As a chemical manufacturer, Tokuyama gives utmost priority to exercising Responsible Care through the consistent operation and enhancement of management systems for safety, the environment, and quality.

### Tokuyama Group Code of Conduct and Action Guidelines

To achieve sustainable growth while earning public trust and being the consistent choice of customers, the Tokuyama Group ensures that all employees and officers understand and adhere to the Group Code of Conduct and Five Conscience Clauses. Group companies also formulate their own action guidelines to guide their relations with various stakeholders.

#### Basic Philosophy of Tokuyama's CSR-Oriented Management

Tokuyama approaches its CSR activities in accordance with a basic philosophy of continuously working with society to build a sustainable future by contributing to the resolution of social issues and earning greater trust from various stakeholders with the aim of improving corporate value.



Tokuyama has created this symbol for CSR promotion. Depicting a sunflower, the symbol is intended to convey the Company's active, healthy and honest stance toward CSR. Under this symbol, the Tokuyama Group will not only pursue compliance and efficiency in its business operations, but will also work to develop into a vibrant, sound corporate entity that is socially and environmentally beneficial and is trusted by all stakeholders.

### Tokuyama Group's CSR Framework



### Making Sure Our Business Contributes to Sustainable Development

Takeshi Nakahara

Director, Managing Executive Officer,  
General Manager, Corporate Social Responsibility Division



Creating value that enhances people's lives through chemistry is the keystone to Tokuyama's existence and has been our core heritage for a century in business. Our approach of resolving social issues through corporate activities is precisely how we practice corporate social responsibility in management.

To continue being a corporate group trusted by society, we are striving to implement thorough compliance and risk management. We are also working to increase stakeholder trust by improving management efficiency, for instance, by reassessing our corporate

governance system and strengthening internal controls. Moreover, safety is at the heart of any successful business, so we are putting in place even more advanced process safety and disaster prevention initiatives, focusing on on-site activities and senior management leadership.

Befitting our status as a chemicals business, we practice responsible care in product safety and quality and strive to reduce environmental impact. We are also building the SDGs into our management to focus our efforts to build a sustainable future.

### Tokuyama Group Code of Conduct

All Tokuyama Group members commit to the following essential principles to ensure the Group operates in a way that meets social expectations and delivers sustained growth by earning the continued support of customers and the trust of society. (Established: May 12, 2009)

#### 1. Compliance

We act with good corporate ethics and common sense, based on the understanding that compliance with laws and corporate rules is the most important requirement in all business activities.

#### 2. Fair Business Activities

- We aim to be moderate and reasonable in our business and practice fair, free, and transparent competition.
- We maintain fair and reasonable relationships with political and governmental organizations.

#### 3. Responsible Care

- We develop, manufacture and supply products and services that have value to society, with a constant focus on safety requirements, to ensure that we can satisfy our customers and consumers and earn their trust.

- We voluntarily and proactively address environmental issues based on an understanding of their significance to all people and their importance to the continuation of business activities.

#### 4. Respect for Human Rights and Individuality

- We respect the basic rights of people in our business and do not discriminate on the basis of race, sexuality, creed, nationality or religion.
- We value diversity in the workplace and provide a safe and comfortable work environment to ensure satisfaction and opportunity for each employee.

#### 5. Communications

We make fair and positive public disclosure of information about our Group including its business activities and financial reports to maintain good communication with society.

#### 6. Social Contributions

- We actively seek to contribute to society as a good corporate citizen.
- We contribute to the development of local regions in our international business activities, respecting not only international rules, local laws, and regulations, but also local cultures and customs.

#### 7. Exclusion of Antisocial Forces

We do not enter into any business arrangement with antisocial forces that threaten public order and safety.

### Tokuyama Group Guidelines for Business Activities

(Preface) These Guidelines set out the essential principles that govern the ongoing business activities of the Tokuyama Group (hereinafter referred to as the "Group"), which aims to realize a sustainable future in tandem with society and to gain the trust and appreciation of individual stakeholders.

#### I. Basic Principle

The Group will not only comply with laws, regulations and its corporate rules, but also adhere to strict corporate ethics and conduct its business activities with decency.

#### II. Relationship with Society

- Contribution to Society
- Environmental Conservation and Protection
- Establishment of Systems for Ensuring Safety

In the course of the research, development and manufacture of its products as well as in the storage and transportation of its products and goods, including those manufactured by other companies, and in the provision of its services, the Group will comply with safety-related laws and regulations. At the same time, the Group will continually strive to increase the sophistication of its systems for ensuring safety.

#### 4. Security and Export Control

To fulfill its responsibility to help maintain international peace and safety, the Group will comply with laws and regulations that control the export of cargo and technologies.

#### 5. Nurturing Sound Relationships with Political and Governmental Organizations

The Group will nurture highly transparent relationships with political and governmental organizations, avoid behavior that can be alleged to constitute misconduct, and cultivate fair and sound relationships with such organizations.

#### 6. Severing Ties with Antisocial Forces

The Group will take a firm stand against antisocial forces that pose a threat to public order and safety, and will thoroughly separate itself from any relationship with such forces.

#### III. Relationships with Customers and Trading Partners

##### 1. Reliability of Products and Services

With a constant focus on safety requirements, the Group will develop and manufacture products and services that have value to society. In doing so, the Group will strive to implement a higher level of quality assurance in order to meet the quality requirements of its customers and consumers and earn their trust.

- Fair, Free and Transparent Competition and Reasonable Trade
- Entertainment and Gift Giving
- Other Companies' Trade Secrets

#### IV. Relationship with Shareholders and Investors

##### 1. Timely, Appropriate and Easy-to-Understand Information Disclosure

The Group will endeavor to disclose not only information on its business management and financial status, but non-financial information, including data on the products and services that it provides to society as well as on the environmental and social aspects of its business operations. In addition to its shareholders and investors, the Group will publicly disclose such information for the benefit of society and strive to make such disclosure timely, appropriate and easy-to-understand.

##### 2. Prevention of Insider Trading

The Group will strive to prevent any person in its employ from exploiting non-public information pertaining to matters inside or outside the Group that he/she has come to know of in the course of his/her duties for the purpose of selling or buying securities, including stocks, for his/her own gain and, further, to prevent such persons from exploiting non-public information to provide benefits or favors to a third party.

#### V. Relationship with Executives and Employees

- Respect for Human Rights and Prohibition of Discrimination
- Respect for Privacy

The Group will respect the privacy of the persons in its employ and properly manage their personal information.

##### 3. Compliance with Labor-Related Laws and Regulations

The Group will comply with labor-related laws and regulations and strive to maintain a comfortable working atmosphere.

##### 4. Workplace Safety and the Promotion of Health

#### VI. Our Handling of Group Assets and Financial Reporting

##### 1. Appropriate Use of Group Assets

The Group will efficiently utilize its tangible and intangible assets, protect such assets against impairment and theft, prohibit any personal use of such assets and ensure that such assets are appropriately administered.

##### 2. Reliable Financial Reporting

##### 3. Management of Confidential Information

The Group will appropriately use and administer its in-house information systems in accordance with its corporate rules.

##### 5. Protection and Use of Intellectual Property Rights

## Corporate Governance

# Strengthening Governance to Ensure Fast and Appropriate Business Execution



Tokuyama recognizes that corporate governance is a critical management issue. The Company is strengthening its corporate governance in order to build a trusting relationship with stakeholders, improve medium-to-long-term corporate value, and deliver continued growth.

### Corporate Governance at Tokuyama

#### Strengthening Corporate Governance

In keeping with Japan's Corporate Governance Code, Tokuyama respects the rights and equality of stakeholders and is strengthening the monitoring functions and independence of the Board of Directors. At the same time, Tokuyama is encouraging faster decision making and clarifying the responsibilities for business execution, while endeavoring to practice suitable information disclosure, achieve transparency, and engage in constructive dialogue with shareholders.

In 2017, Tokuyama made the transition to a "company with an audit and supervisory committee" structure. This

was done to increase the quality of governance and further clarify supervisory functions and management execution. The new structure promotes faster business execution and also makes business policy discussions at the Board of Directors more substantial, thereby strengthening the Board's supervisory functions and ability to ensure proper business execution.

### Corporate Governance Structure

#### Board of Directors

Tokuyama's Board of Directors deliberates and makes decisions on important matters concerning the execution of the Company's business while supervising business operations. The Company has appointed three outside directors to the Board to strengthen its supervisory function.

#### Audit and Supervisory Committee

The Audit and Supervisory Committee is comprised of five directors, including three outside committee members. They attend Board of Directors meetings and other important meetings to monitor the business execution by executive officers.

#### Human Resources Committee

Comprised of representative directors and outside directors, the Human Resources Committee holds discussions on such matters as remuneration for directors and executive officers and the selection of candidates for director and executive officer positions.

#### Executive Committee and Strategy Committee

The Executive Committee, comprised of executive officers selected by the president, meets twice a month to discuss and finalize key strategies adopted by the Board of Directors. The Strategy Committee discusses important matters such as the pros and cons of pursuing certain businesses and the manner in which they should be executed, to assist the president in determining the direction of business objectives.

#### CSR Promotion Council

Chaired by the president, the membership of the CSR Promotion Council is composed of all executive officers. The Council sets CSR related policies and goals, and deliberates on important matters concerning internal control systems, which constitute the basis for CSR activities.

#### Risk Management and Compliance Committee

Operating under the CSR Promotion Council, the Risk Management and Compliance Committee is chaired by the director responsible for the Corporate Social Responsibility Division. The committee takes the initiative in promoting risk management and compliance, which are both core elements of the internal control system.

#### Seven Committees

Tokuyama operates committees focused on risk management and compliance in seven critical and specialized areas, separately from the Risk Management and Compliance Committee. The committees operate under the CSR Promotion Council, overseeing the following areas: financial reporting, fair trade and competition, security trade, information security, environment, safety, and product safety and quality assurance.

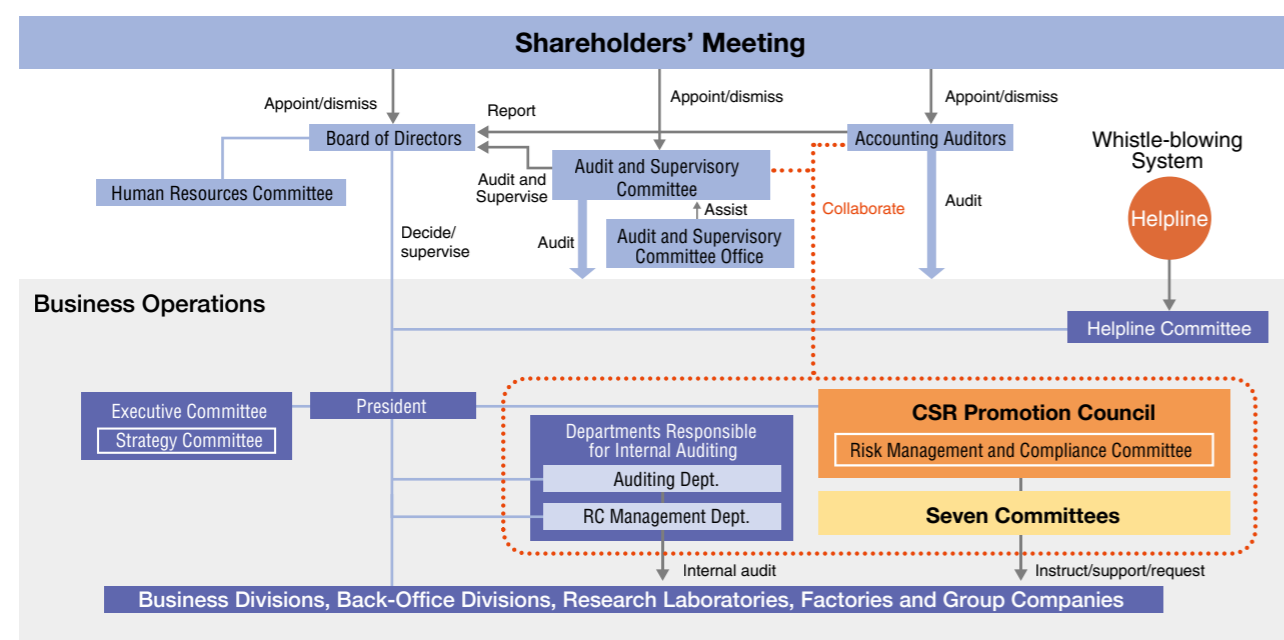
#### Helpline Committee

The Helpline Committee was set up as a whistleblowing channel to enable internal reporting of legally questionable actions and behavior.

#### Departments Responsible for Internal Auditing

Tokuyama has established the Auditing Department and the Responsible Care Management Department and tasked them with responsibility for internal auditing.

Corporate Governance Structure





## Risk Management and Compliance

# Building a Sound, Sustainable Corporate Group Using the Business Practices Society Expects



Tokuyama has established risk management and compliance as the foundation of its business activities. Determined to promote CSR and carry out sound, sustainable business activities, Tokuyama is implementing various initiatives to strengthen risk management and conduct through compliance.

### Risk Management

Tokuyama manages risk through the Risk Management and Compliance Committee, which operates under the CSR Promotion Council. It also has expert committees focused on risk management and compliance in seven critical and specialized areas to ensure management through the deliberation of key issues. The Company has designated a unit responsible for regulations concerning management of the risk of loss and conducts activities based on the management regulations. It also works to mitigate compliance risk by establishing management systems for understanding important laws and regulations that are relevant to business execution and keeping track of trends in amendments to these laws and regulations. The Company also has established a business continuity plan (BCP) and other measures in order to ensure an appropriate response for the type and severity of any crisis.

### Risk Management Framework



Tokuyama Group Code of Conduct handbook

Tokuyama Group's Five Conscience Clauses (on the back of the employee ID)

### Compliance

Tokuyama understands "compliance" to have a broad meaning, including not only compliance with laws and internal rules but also behaving sensibly in a manner that conforms with corporate ethics and meets social expectations. To communicate and spread awareness of compliance throughout the Group, the Company has put together a handbook presenting the Tokuyama Group Code of Conduct, the responsibilities of Senior Management under the Tokuyama Group Code of Conduct, and the Tokuyama Group's Five Conscience Clauses. It is distributed to all Group employees.

### Compliance Education & Training

Training on legal obligations is held for new directors and auditors to reduce compliance risk. In fiscal 2017, a variety of compliance training programs were also held for employees, on 45 occasions. Tokuyama also implements e-learning programs on: compliance; prevention of abuse of power, sexual harassment, and maternity harassment; protection of personal information; the Social Security and



Compliance training

Using the e-learning program

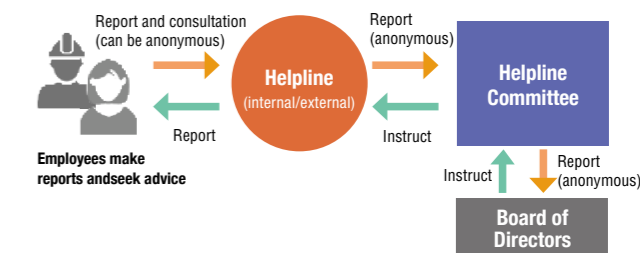


Tokuyama's e-learning materials

Tax Number System; copyrights; management of trade secrets; and insider trading regulations.

### Whistle-Blowing System

An internal helpline has been established to enable safe, anonymous reporting and consultation regarding compliance violations involving the Tokuyama Group (including potential violations) without fear of unfavorable treatment. There is also an established external contact point (attorney) to whom an employee can make an anonymous report without the Company being notified of the employee's name and position, for his or her protection.



### Promoting Information Security

Tokuyama implements the following security measures in order to reinforce security of information assets, such as client information. In fiscal 2017, no major incidents concerning information security occurred.

#### Security Measures with New ICT Technology

- (1) We prepare systems and rules that enable flexible installation, confirmation and central control of security for individual ICT technologies.
- (2) We clarify what requires protection as well as risks, and carry out appropriate measures.
- (3) We have a computer security incident response team (CSIRT\*) which works to prevent incidents, and also to minimize damage in the event an incident does occur.

(1) Promoting management of trade secrets	Prepared regulations in accordance with the fiscal 2015 revision of Japan's Unfair Competition Prevention Act, and verified tools for implementing advanced document management.
(2) Strengthening personal information management	In accordance with the Revised Act on the Protection of Personal Information, explained the revisions to the five major divisions, received reports on their management of personal information, and made recommendations.
(3) Responding to new rules on protecting personal information in the EU General Data Protection Regulation (GDPR)	Confirmed status of the three relevant group companies and presented measures.
(4) Implementing educational training	Held three group training sessions on information security and protection of personal information for new employees and implemented training on targeted email attacks at two group companies.
(5) Other	Two employees participated in cybersecurity seminars for control systems organized by METI.

\* The CSIRT prevents the occurrence of security incidents, and in the event that one occurs, contributes to the achievement of safety and security with an immediate response. The establishment of a CSIRT is encouraged in the Cybersecurity Management Guidelines published by Japan's Ministry of Economy, Trade and Industry (METI).

## Responsible Care

# Protecting the Environment, Ensuring Safety, and Promoting Good Health for People and Local Communities



Responsible Care activities are an essential component of Tokuyama's corporate social responsibility. Tokuyama has put in place company-wide infrastructure for promoting Responsible Care, and is incorporating this initiative in each of its management systems as it strives to continuously improve its environmental, safety, and quality systems.

### What Is Responsible Care?

Responsible Care is a voluntary management initiative through which companies that manufacture and handle chemical substances undertake measures for protecting the environment and ensuring the safety and health of society. It covers all operations, from the development of chemical substances to their manufacturing, distribution, usage, final consumption and disposal. Responsible Care also encourages the public disclosure of these activities along with dialogue and communication with members of society. The Responsible Care initiative originated in Canada in 1985, and

is currently used in 52 countries around the world. In Japan, a Responsible Care Committee has been set up under the Japan Chemical Industry Association (JCIA). As of April 1, 2018 the committee had 113 corporate members. As one of the original members of the organization, Tokuyama has been actively implementing Responsible Care activities since the committee's founding in 1995.

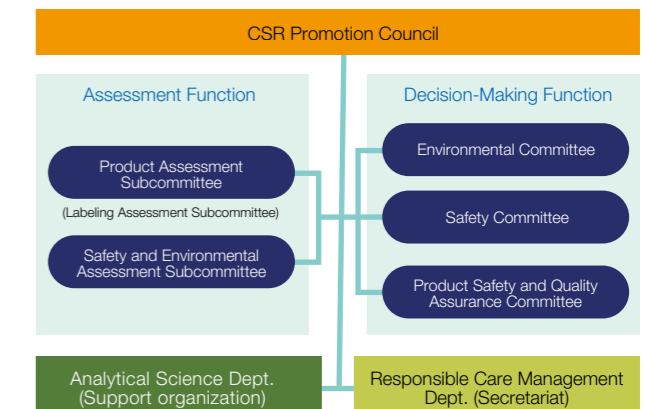
### Framework for Promoting Responsible Care

Tokuyama has established a number of organizations that pursue concrete initiatives under its CSR Promotion Council, which is chaired by the Company president. Specifically, it sets up the Environmental Committee, Safety Committee, and Product Safety and Quality Assurance Committee as decision-making bodies, and the Product Assessment Subcommittee and several other subcommittees as assessment organizations.

### Responsible Care Initiatives

Tokuyama continually improves its Responsible Care initiatives by implementing plan-do-check-act (PDCA) cycles focusing on environmental conservation, process safety, disaster prevention, occupational health and safety, and chemicals and product safety.

### Responsible Care Promotion Structure



This laboratory carries out environmental measurements, working environment measurements and ultra-trace analysis of substances under regulation and chemical pollutants.

This department promotes RC activities throughout the Group, covering the areas of the environment, safety and quality.

### Medium-term Responsible Care Activities: "Plan" Phase

Working on the basis of its medium-term plan for Responsible Care activities, Tokuyama sets policies and goals for each fiscal year. Individual departments then create and carry out specific plans based on these policies and goals. The results of initiatives are evaluated at the end of each fiscal year and incorporated in plans for the following fiscal year.

### Basic Philosophy of Responsible Care

#### Basic Policy

As a member of the Japan Responsible Care Committee, Tokuyama Corporation carries out Responsible Care activities that protect the environment and preserve safety and health throughout the entire chemical substance life cycle, from development and manufacturing to distribution, use, final consumption and disposal.

Our social mission is to aggressively tackle and systematically solve environmental issues in particular, which, in turn, will lead to sustainable corporate and social development. Based on this recognition, we promote Environmental Management, a management policy that emphasizes the environment, in all of our business activities, including development, manufacturing and sales.

#### Action Objectives

##### 1. Promote environmental protection

- Implement an ISO 14001-based Environmental Management System and reduce environmental impact

##### 2. Observe the laws and regulations

- Observe international rules, domestic laws and regulations and industrial standards
- Thoroughly implement export management rules on materials under control

##### 3. Promote energy conservation and curb global warming

- Achieve top-class unit energy consumption in the industry for each product

##### 4. Promote resource recycling and work toward reduction and the proper management of waste materials

- Promote the material recycling and thermal recycling of resources
- Work toward achieving a paperless office

##### 5. Promote process safety, disaster prevention and occupational health and safety

- Aim for zero accidents and disasters based on the principles of self-responsibility and the self-management of safety
- Achieve a comfortable working environment and protect people's safety and health

##### 6. Ensure strict product safety standards

- Offer environmentally friendly products that can be used with safety
- Provide proper information on how to use products and what precautions to take

##### 7. Deepen the relationship of trust with society

- Publicly disclose information on the Company's activities concerning environmental protection, process safety and disaster prevention, occupational health and safety, and chemical product safety
- Actively engage in dialogue with the local communities

#### Evaluation and improvement

Publication of performance data and social dialogue

Responsible Care Community Dialogue

Preparation of CSR Report

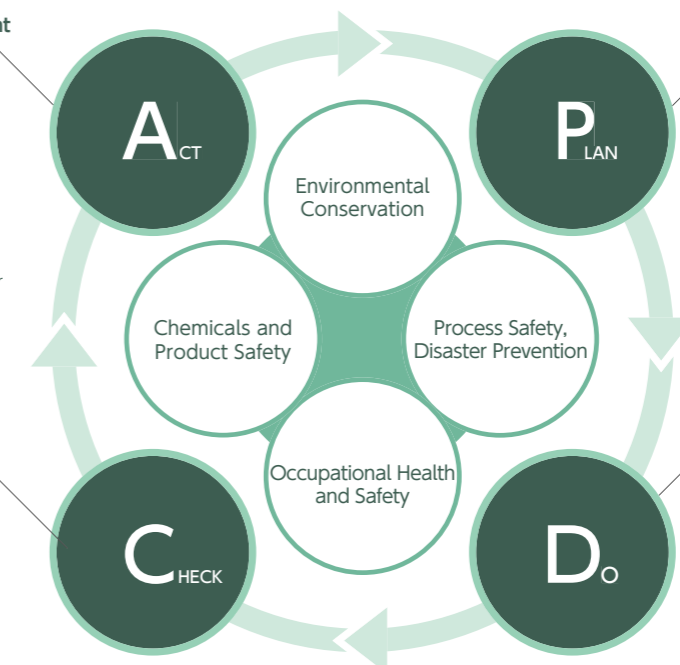
Initiatives for next fiscal year plan

#### Assessment and audit system

External and internal audits

Safety and environmental assessments

Product assessments



#### Fiscal year targets and plan

Formulate fiscal year plan and targets for Responsible Care initiatives

#### Implement activities through operation of management systems

Address priority issues

## Operation of Management Systems: “Do” Phase

The Company’s Tokuyama Factory and Kashima Factory have acquired ISO 14001 certification. Each factory sets an environmental policy and goals in line with Tokuyama’s company-wide environmental policy, and undertakes related activities intended to alleviate environmental impact, conserve energy, reduce waste, and recycle resources. Tokuyama’s head office, branch offices and research laboratories also set policies and goals, and pursue such activities as energy conservation, resource recycling, and waste reduction.

Tokuyama has acquired ISO 9001 certification for its quality management system, which has been operating since fiscal 2002 as a company-wide system encompassing sales, development and all other operations.

In accordance with the New Occupational Health and Safety Guidelines issued by JCIA, Tokuyama operates occupational health and safety management systems at each of its workplaces. In fiscal 2005, the Tokuyama Factory expanded its safety management system by incorporating a broader range of safety-related activities.

## Assessment and Audit System: “Check” Phase

Tokuyama has set up several assessment systems in an effort to reduce environmental- and safety-related risks.

### ■ Safety and Environmental Assessments

Tokuyama conducts safety and environmental assessments before newly installing, expanding or modifying any of its facilities. These assessments review basic plans and design, examining whether facilities are designed for safety and environmental considerations. In addition, pre-operation

assessments confirm whether facilities are completed as designed and operational preparations are complete.

### ■ Product and Labeling Assessments

Tokuyama confirms product safety at each stage of operations, from the initial research and development stage through to market release. The assessments confirm compliance with legal requirements and evaluate the level of various risks, including the safety of chemical substances used in the product, their potential impact on the environment, and their effect on human health. The Company also checks all labeling in documents such as product catalogs, safe handling manuals, and safety data sheets\* in order to ensure that instructions and warnings are complete and accurate.

\* A safety data sheet is a document for recording information related to the risks and toxicity of chemical substances. It is prepared to facilitate the safe handling of such substances, and includes the names of the substances, safety measures, and procedures for responding to emergencies.

### ■ Safety and Environmental Audits

Tokuyama conducts safety and environmental audits on an annual basis in order to verify the applicability of its environmental conservation management and accident and disaster-prevention measures.

Auditing teams inspect each workplace, including the Logistics Group, Health Management Center, and all organizations subject to inspection under Japan’s High Pressure Gas Safety Act.

### ■ Audits by Third Parties

After latest transition assessments by a registered certifying body, the Company has successfully moved to ISO9001:

2015 and ISO14001: 2015, the latest version of standards. The audit for the ISO 9001 held in February 2018 identified seven issues (opportunities for improvement), and the Company is dealing with each accordingly. The audit for the ISO 14001 held in October/November 2017 identified six issues (one minor defect; five opportunities for improvement), such as an incomplete record. These issues are being corrected.

## Improvement and Assessment through Audits: “Act” Phase

Audits are used to verify that business sites are suitably carrying out activities in line with corporate policies. Audit results are reported to the relevant departments as well as the president, and continuous improvements are sought.

The results for the fiscal year are shared with stakeholders through Responsible Care Community Dialogue sessions and the CSR Report.

## Priority Tasks and Results of Responsible Care Activities in Fiscal 2017

Degree of target achievement:  
Achieved (A) Not achieved (B)

Category	Priority tasks	Results	Degree of target achievement
Environmental Conservation	<ul style="list-style-type: none"> <li>● Comply with legal requirements and other regulations</li> <li>● Achieve zero environmental accidents</li> <li>● Achieve targets for reducing environmental impact</li> </ul>	● Strictly complied with legal requirements 2 incidents exceeding limits set by the local government	B
		● No environmental accidents	A
		● Reduced or maintained levels of emissions of substances of concern	A
		● Reduced per-unit energy consumption	A
Safety and Accident Prevention	<ul style="list-style-type: none"> <li>● Achieve zero legal violations</li> <li>● Ensure no accidents or disasters occur</li> </ul>	● No legal violations	A
		● 2 accidents (leaks)	B
		● Employees: 4 accidents not requiring work absence Contractors: 2 accidents requiring work absence, 4 accidents not requiring work absence	B
		● Reduce rate of work absences	B
Occupational Health and Safety	<ul style="list-style-type: none"> <li>● Reduce rate of work absences</li> </ul>	● Improved safety management level	A
		● Promoted risk and hazard management	A
		● Promote physical and mental health	A
		● Conducted inspections of products and labeling	A
Chemical Product Safety	<ul style="list-style-type: none"> <li>● Ensure the safety of products</li> </ul>	● Upgraded safety data sheet (SDS) management	A
		● Actively participated in the JIPS*	A
		● Addressed regulations on chemicals in countries outside Japan	A
		● Participate in community events	A
Build Relations of Trust with Local Communities and Society	<ul style="list-style-type: none"> <li>● Establish a good reputation in society</li> </ul>	● Held dialogues with the community on Responsible Care	A
		● Held factory tours	A
		● Expand the scope of Responsible Care activities	A
Promote Responsible Care at Group Companies	<ul style="list-style-type: none"> <li>● Expand the scope of Responsible Care activities</li> </ul>	● Conducted safety, environment, and quality audits	A
		● Shared information related to Responsible Care via an online newsletter, etc.	A
		● Addressed regulations on chemicals in countries outside Japan	A

\* JIPS: The Japan Initiative of Product Stewardship is an initiative spearheaded by the Japan Chemical Industry Association with the aim of facilitating the independent management of chemicals. Its members collect and analyze information on the hazardous properties of chemical substances and products in order to carry out risk assessments incorporating data on their usage and applications, comparing levels of exposure and safety. The risk assessment results provide a basis for proper chemical substance management aimed at ensuring workers’ occupational safety, protecting consumers, and reducing environmental impact. The outcomes of such management activities are then disclosed to the general public and suppliers across the supply chain.



Safety and environmental audit at Kashima Factory



Floor patrol

## Accident Prevention and Occupational Health and Safety

# Forging Strong Ties with Local Communities while Building a Positive, Safe, Accident-Free Workplace



General disaster preparedness drill at the beginning of year

Recognizing that safety is the basis for its business activities, Tokuyama practices safety as the first step to maintaining good relations with the communities in which it operates. Based on this approach, the Company carries out stringent accident prevention measures and occupational health and safety initiatives in its efforts to create a positive and safe work environment that is free of accidents.

### Comprehensive Safety and Accident-Prevention Measures

Tokuyama has adopted three principles for ensuring safety: fulfill the obligations of a good corporate citizen, give safety priority over all business activities, and ensure that everyone is aware of their responsibilities and acts accordingly. Based on the safety management system of the Tokuyama Factory, the Company works to identify and eliminate hazards by assessing risks in work, facilities and processes. Tokuyama also strives to stop unsafe behavior by conducting studies into behavioral characteristics. As part of occupational

health and safety activities, worksites carry out basic safety activities, including safety patrol, *kiken yochi* hazard prediction, and near-miss activities.

### Disaster Preparedness Drills

Tokuyama has carried out various training activities. These include disaster drills for pipe leaks and fires caused by an earthquake, emergency drills at individual company divisions, joint drills involving affiliated companies and contractors, and workplace safety competitions. The Company has also conducted drills for initiating its business continuity plan (BCP) in the scenario of a Tokyo inland earthquake by designating the Tokyo Head Office as the disaster response headquarters and the Tokuyama Factory as the crisis response headquarters.

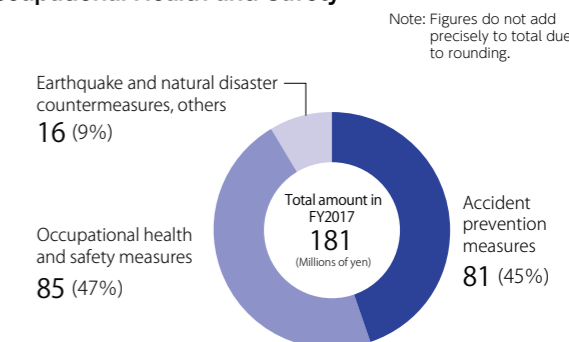
### Helping Contractors Promote Health and Safety

Tokuyama and its contractors carry out the following initiatives to promote health and safety: (1) joint safety meetings for safety education and information sharing on situations on the production floor; (2) safety patrols to ensure safe construction work and to improve unsafe situations; (3) supervisory skills training, and hazard simulation training to improve risk handling techniques; and (4) checking of operating procedures, and implementation of *kiken yochi* hazard prediction activities.

### Promoting Sound Physical and Mental Health

To raise health awareness among employees, Tokuyama has its employees take part in a Smart Life Program activity, which involves monthly establishment, self-management and assessment of weight goals, etc. Tokuyama is also working to reduce the rate of work absences by offering counseling for improving health based on medical checkups. As for mental health, the Company is practicing early intervention, including diagnostic surveys of work-related stress for all employees and better measures such as consultation services available outside the Company.

### Expenditures for Accident Prevention and Occupational Health and Safety



### Fiscal 2018 Company-Wide Safety Management Policy

Tokuyama operates a safety management policy and actively implements safety initiatives as a good corporate citizen.

- Implement safety initiatives involving all employees, under the leadership of upper management.
- Comply with laws, regulations, and internal rules.
- Foster and enhance a culture of safety, for the safety of people, facilities, and the public.
- Create comfortable workplaces to ensure the mental and physical health of the people who work there.

Fiscal 2018 Tokuyama Safety Management Objectives and Key Action Items

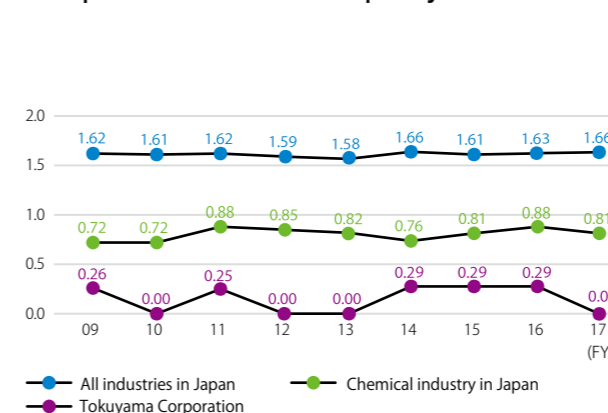
#### Policy Objectives

- No compliance violations
- No accidents or disasters
- Reduce the rate of work absences

#### Key Action Items

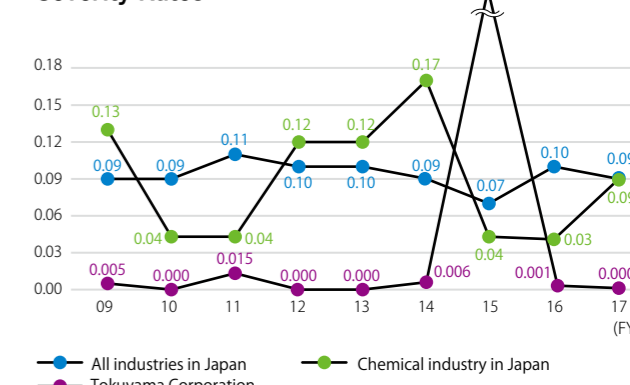
- Improve safety management**  
Raise hazard awareness, improve change management, enhance hazard prediction (*kiken yochi*) activities, encourage use of IoT and big data
- Identify sources of risks and resolve**  
Conduct risk assessments for irregular operations, respond to risk assessments for chemical substances and implement improvements
- Make progress in risk management and hazard management**  
Prepare for response to a potential major earthquake
- Promote facilities management**  
Enhance management of older facilities, expand efforts to identify facilities risks
- Promote physical and mental health**

### Comparison of Accident Frequency Rates\*1



\* 1 As an indicator of the frequency of industrial accidents, the accident frequency rate is calculated as the number of workers forced to miss work due to an industrial accident per one million cumulative working hours.

### Comparison of Accident Severity Rates\*2



\* 2 As an indicator of the magnitude of industrial accidents that have occurred, the accident severity rate is calculated as the number of lost work days due to industrial accidents per 1,000 cumulative working hours.

## Tokuyama's Environmental Management

# Implementing Environmental Management to Reduce Environmental Impact

For Tokuyama, the pursuit of proactive initiatives to protect the earth's environment is an important part of its corporate social responsibilities. Accordingly, the Company practices environmental management that takes into account the natural environment in all business activities.

### Performance in Fiscal 2017

#### Flow of Materials in Business Activities

Tokuyama works to accurately determine the input and output of materials for production, and regularly sets new targets aimed at reducing environmental impact. In fiscal 2017, Tokuyama achieved its per-unit energy consumption, waste recycling and zero emissions targets.

Regarding other performance data, Tokuyama has set a separate numerical management target for each department to maintain the current low-impact situation.

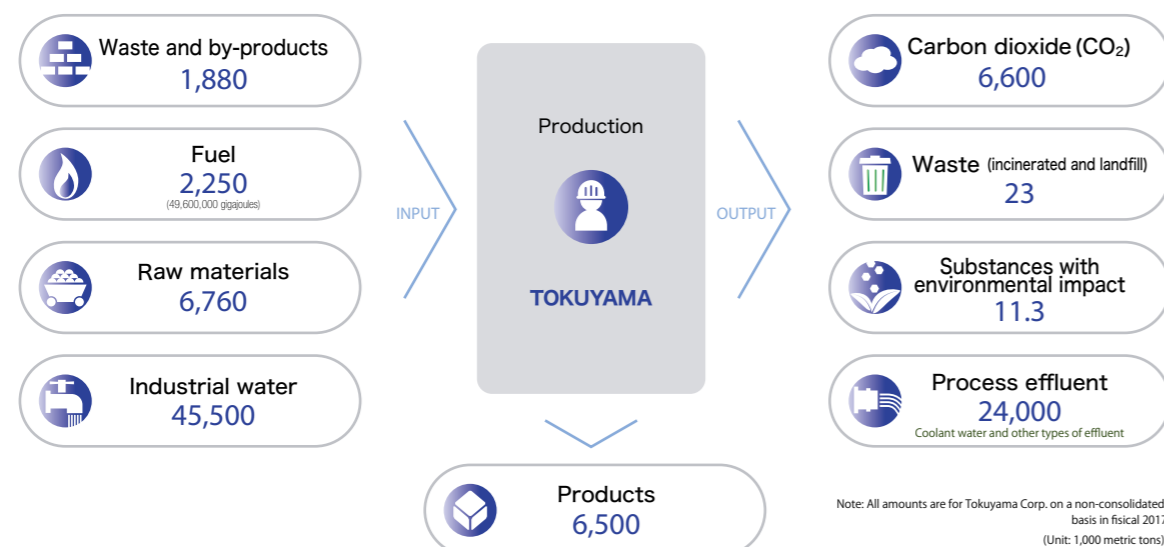
#### Environmental Accounting

Tokuyama has been carrying out environmental accounting since fiscal 2000 in order to accurately determine and analyze the investment amounts and costs associated with its environmental conservation activities, thereby providing a sound basis for making environmental investments.



In December 2017, Tokuyama received the Development Bank of Japan (DBJ) Environmentally Rated Loan, rated as having "advanced environmental initiatives."

#### Flow of Materials in Business Activities



### Company-Wide Environmental Management Policy

Medium-Term Basic Policy	Focus Items in Fiscal 2018
Tokuyama actively undertakes environmental preservation and strives to help build a sustainable society, based on its Basic Philosophy of Responsible Care and the following policies. <ul style="list-style-type: none"> <li>• Thorough compliance with laws and regulations</li> <li>• Zero environmental accidents</li> <li>• Reduction of environmental impact</li> <li>• Combatting climate change</li> <li>• Continuous improvements to environmental management systems</li> <li>• Improved relationship of trust with stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>• Strictly comply with legal requirements, etc.</li> <li>• Continue zero environmental accidents</li> <li>• Reduce environmental impact                             <ul style="list-style-type: none"> <li>Maintain or reduce emission levels of environmentally hazardous substances</li> <li>Promote zero waste emissions</li> </ul> </li> <li>• Combat climate change                             <ul style="list-style-type: none"> <li>Promote energy-saving and conservation of electricity</li> <li>Review GHG medium-term reduction goals</li> </ul> </li> <li>• Expand communication with stakeholders</li> </ul>

### Results of Environmental Protection Initiatives by the Tokuyama Factory in Fiscal 2017

Symbols: ○ Goal achieved, × Goal not achieved

Category	Items	FY2017 Target	FY2017 Result	Rating	FY2018 Target	
Environmental Impact Reduction	Atmosphere	Soot	+ 22%	×	Maintain the current low-impact situation	
	Water Quality	COD (⇒ P.27)	+ 4%	×		
		Nitrogen	+ 19%	×		
		Phosphorus	± 0%	×		
PRTR	PRTR (⇒ P.27)	- 3%	×			
Global Environment Conservation	Energy Conservation	Energy consumption on a per-unit basis	3% reduction of per-unit energy consumption by fiscal 2020 compared to fiscal 2005	- 9.5%	○	Improved per-unit energy consumption
Waste Reduction	Recycling	Effective utilization rate	Maintain at 92%	93.8%	○	Maintain at 92%
	Zero emissions	"Zero emissions" rate	Maintain at 99.9%	99.9%	○	Maintain at 99.9%

\* Regarding performance data, Tokuyama has set a separate numerical management target for each department to maintain the current low-impact situation. The table above does not include specific numerical targets on atmosphere, water quality and PRTR for Tokuyama as a whole. Instead, the year-on-year difference from FY2015 results is shown.

### Fiscal 2017 Environmental Preservation Costs

Category	Major Activities	Amount Invested (million yen)	Costs (million yen)	
Costs in Business Areas	Pollution Control	Comprehensive drainage measures, updated control panels/rectifiers for equipment to counter soot and smoke, etc.	423	4,016
	Global Environmental Conservation	Adoption of a fuel reduction system, installation and upgrade of pretreatment equipment for raw materials to reduce CO <sub>2</sub> , improvements to equipment to reduce hydrogen steam, etc.	276	385
	Resource Recycling	Installation of waste storehouses, partial upgrade of incineration equipment, PCB waste disposal costs, etc.	212	1,210
Upstream and Downstream Costs		0	1	
Management Activity Costs	Installation of environmental analysis equipment	69	240	
Research and Development Costs		0	0	
Social Activity Costs	Greenification and beautification measures Production of CSR report	0	68	
Costs for Environmental Damage	Imposition, management of a former mining site	0	105	
Total		980	6,025	

### Environmental Costs

Major environmental investment projects in fiscal 2017 included comprehensive drainage measures and establishment of waste storehouses.

### Economic Benefits of Environmental Management

In fiscal 2017, the economic benefits remained flat year on year, at approximately 1.5 billion yen.

### Economic Benefits in Fiscal 2017

Category	Material Benefit (1,000 metric tons)	Economic Benefit (million yen)
Gains on Reduction in Energy Consumption	-	194
Gains on Sale of Valuable Waste	88	206
Gains on Reduction in Waste Disposal Costs through Waste Recycling	247	642
Gains on Reduction in Raw Material and Fuel Costs through Waste Recycling	248	448
Total	-	1,490

\* Learn about Tokuyama's business activities and their impact on biodiversity at: <http://www.tokuyama.co.jp/eng/csr/>

## Measures to Help Combat Global Warming

Tokuyama participates in Keidanren's Voluntary Action Plan on the Environment, as a member of one of the industries covered by the Action Plan. It is via this Action Plan that Tokuyama is working to achieve its 2020 emissions reduction target. Tokuyama is making steady progress in conserving energy throughout its business activities, and supporting efforts by employees to save energy at home.

## Promoting Energy Conservation

Tokuyama consumes a vast amount of energy to manufacture its core products such as caustic soda, cement, and polycrystalline silicon. It also emits carbon dioxide (CO<sub>2</sub>), one of the greenhouse gases, primarily in its burning of fossil fuels and decarboxylation of limestone, which is used as a raw material for cement production.

The Company is working to reduce CO<sub>2</sub> emissions by implementing energy conservation measures, including upgrading to more energy-efficient equipment. The Tokuyama Factory accounts for more than 99% of the Company's total

energy consumption, and it has a target of reducing its per-unit energy consumption by 3.0% by fiscal 2020, from 2005 levels. The factory has also launched a project to improve per-unit energy consumption, in order to reduce CO<sub>2</sub> emissions even further. In fiscal 2017, the factory's per-unit energy consumption came in at 9.5% below the 2005 level thanks to steady energy-saving efforts, robust production, changing trends in the heating value of coal, and utilization of biomass fuels.

## Reducing Water and Air Pollutants

Since early on, Tokuyama has worked hard to preserve the environment. The Company has a variety of ongoing measures in place to reduce emissions of air and water pollutants.

## Amounts of Atmospheric Emissions

In order to reduce emissions of sulfur oxides (SOx), nitrogen oxides (NOx), and soot into the atmosphere, Tokuyama equips its boilers, cement kilns, and other facilities that generate these substances with emission control systems,

including flue gas desulfurizers, denitration equipment, low-NOx burners, and high-performance dust collectors. In fiscal 2017, emissions of SOx, NOx and soot increased in accordance with higher operating rates for emitting facilities.

## Emissions of Pollutant Release and Transfer Register (PRTR\*) Substances

Emissions in fiscal 2017 were about on par with the average of recent years past.

\* The PRTR system collects and publishes data on the sources of designated harmful chemical substances and the amounts of these substances discharged in the environment or transported from production sites as part of waste matter.

## Amounts of Hazardous Air Pollutant Emissions

Tokuyama generates chloroethylene and three other substances that are subject to voluntary controls under Japan's Air Pollution Control Act. The Company has formulated a voluntary action plan and carries out ongoing measures for reducing emissions of these substances.

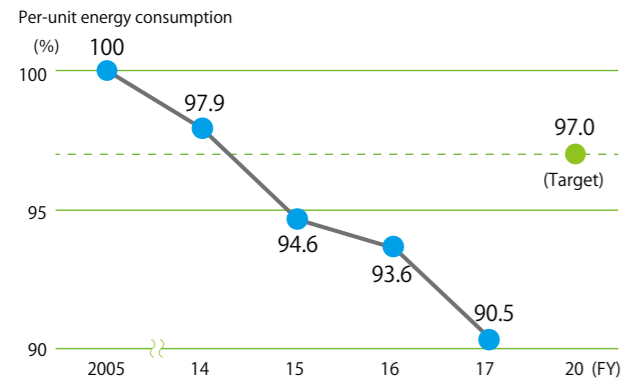
## Amounts of Industrial Effluent and Wastewater

The Tokuyama Factory follows a stringent system for monitoring industrial effluent and purifying wastewater using treatment equipment in order to comply with regulatory standards and limits set by the local government, as well as the Company's own standards, which are even stricter. The factory also employs activated sludge treatment facilities for reducing the discharge of nitrogen and phosphorous and meeting chemical oxygen demand (COD)\* regulations for overall water quality.

In fiscal 2017, COD and phosphorus emissions remained level year on year. Nitrogen emissions increased due to malfunctioning of wastewater treatment equipment.

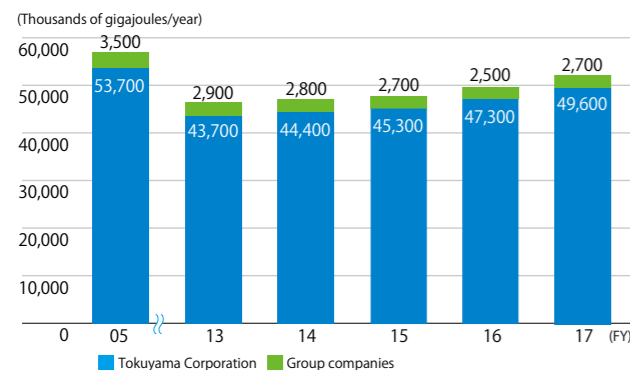
\* Chemical oxygen demand is an indicator used to measure water quality, and refers to the amount of oxygen required to oxidize organic compounds in water.

## Unit Energy Consumption Index\* (Tokuyama Factory)



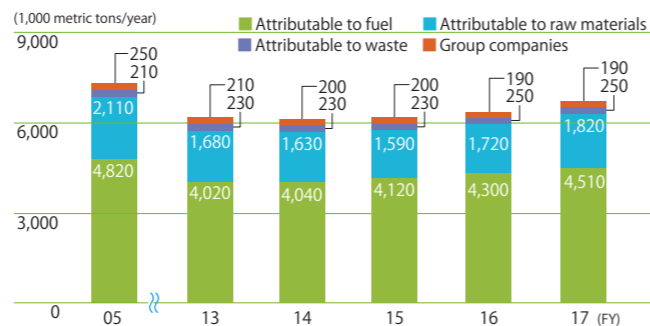
\* The unit energy consumption index is calculated using a method recommended by the Japan Chemical Industry Association (JCIA).

## Energy Consumption

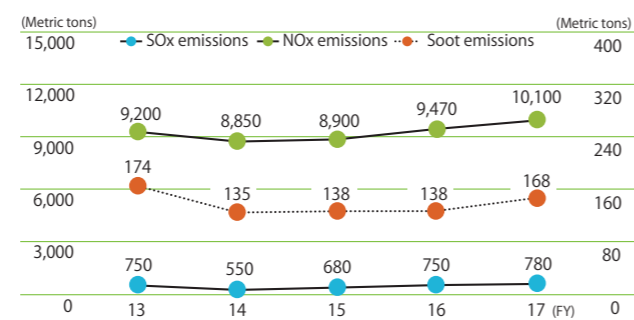


\* The scope of data for Group companies was increased to 22 companies in fiscal 2017, and figures for previous years in the table have also been recalculated accompanying this change.

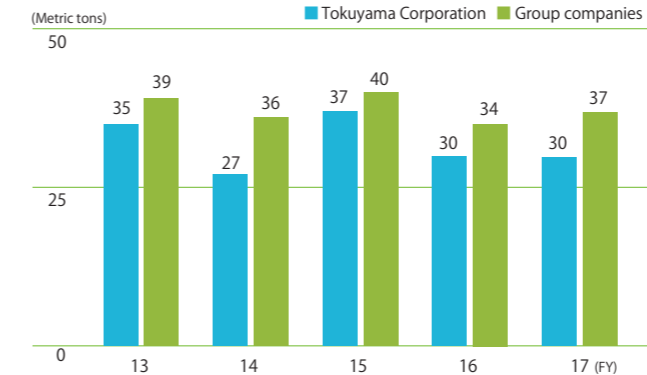
## CO<sub>2</sub> Emissions



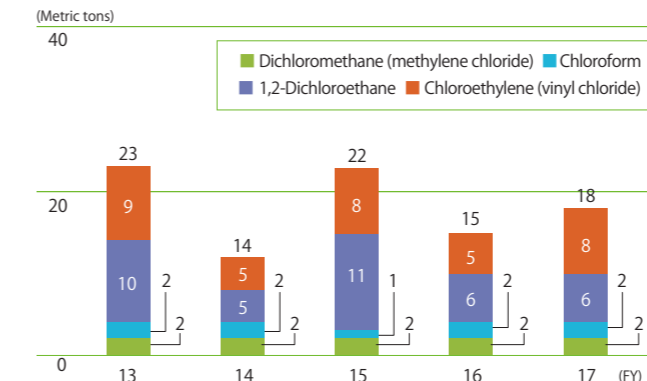
## SOx, NOx and Soot Emissions



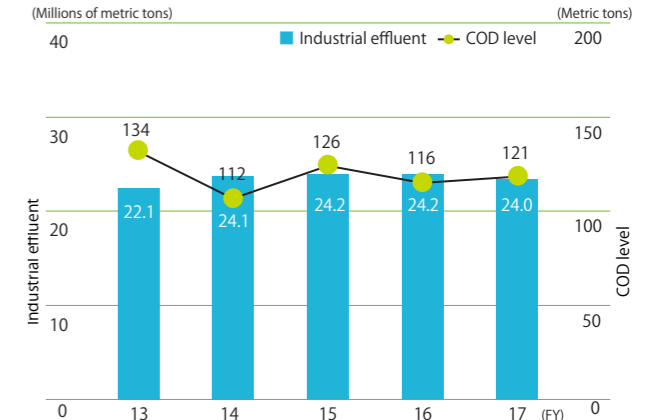
## PRTR Substance Emissions



## Hazardous Air Pollutant Emissions

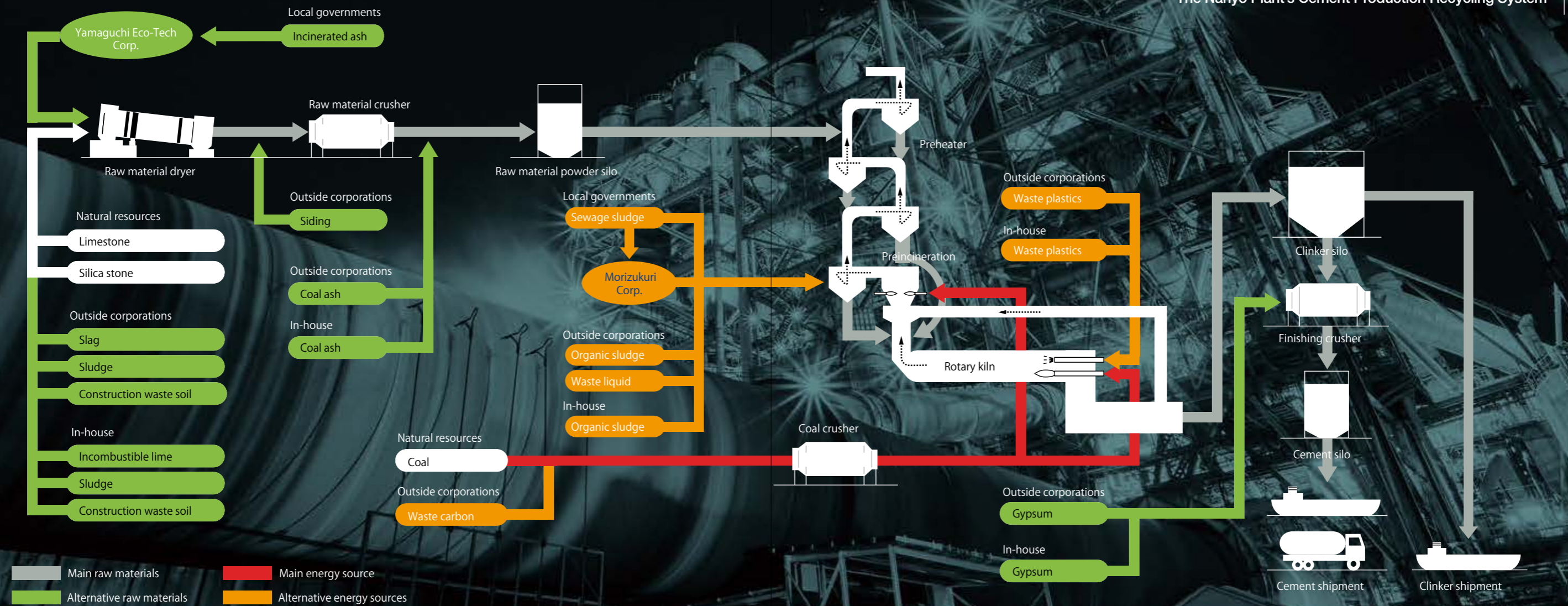


## Industrial Effluent Amounts and COD Levels



## Nitrogen and Phosphorus Emissions

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
Nitrogen	70	89	92	145	173
Phosphorus	2.4	2.6	2.2	2.1	2.1



Clinker: A compound mass made by firing raw materials at high temperatures. This is mixed with gypsum and crushed to make cement.

### Recycling Launched in Society

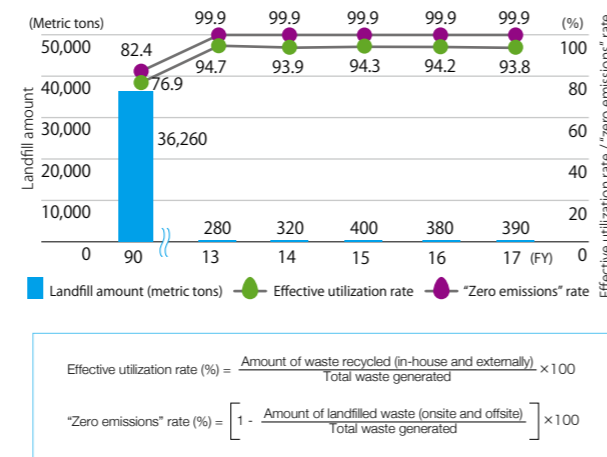
Tokuyama's cement plant effectively uses by-products from soda ash plants and coal cinders from captive power stations as raw materials. It also uses combustible refuse such as waste plastic as fuel. In addition, it accepts and recycles a large volume of waste matter and by-products from other corporations and local communities.

### Waste Management

Tokuyama generated a total of 367,000 metric tons of waste in fiscal 2017. It actively worked to recycle this waste both in and outside the Company, mainly by re-using waste matter as raw materials and fuel for cement at the Tokuyama Factory. Through its diligent efforts to recycle waste as raw material for cement, Tokuyama achieved an effective utilization rate of 93.8%. The Company also made progress with reusing waste and reducing the amount generated, and

achieved its landfill waste "zero emissions" target of 99.9% for the fifth consecutive year.

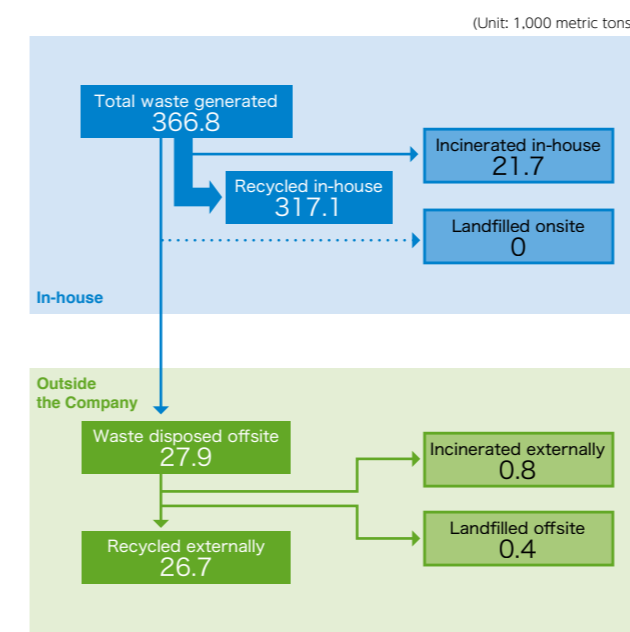
### Amount of Waste Sent to Landfills and Rate of Effective Utilization



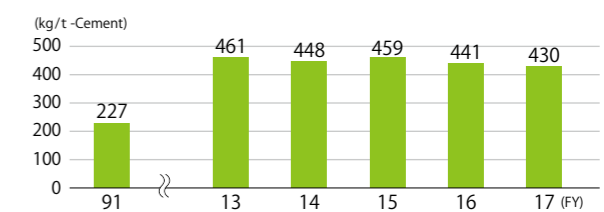
$$\text{Effective utilization rate (\%)} = \frac{\text{Amount of waste recycled (in-house and externally)}}{\text{Total waste generated}} \times 100$$

$$\text{"Zero emissions" rate (\%)} = \left[ 1 - \frac{\text{Amount of landfilled waste (onsite and offsite)}}{\text{Total waste generated}} \right] \times 100$$

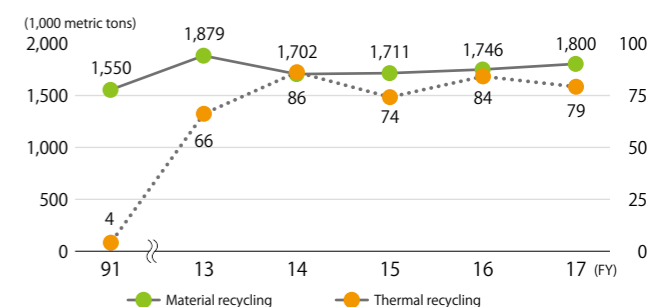
### Flow of Industrial Waste Treatment



### Shifts in Units of Waste Matter/By-Products Used Per Metric Ton of Cement



### Utilization of Waste Matter at Cement Plants (Material Recycling/Thermal Recycling)



## Working with Employees

# Embracing Diversity to Build Workplaces with Equal Opportunities



Tokuyama offers special programs for women and leverages diversity to boost productivity and corporate value. The Company is working to transform work styles and reform its human resource development programs.

### Action Plan to Promote Opportunities for Women

Tokuyama is implementing an action plan to promote equal opportunities for women, working to achieving four specific goals by the end of fiscal 2020.

Of the new university graduates that Tokuyama hired from fiscal 2016 through fiscal 2018, 23% were women. In fiscal 2018, female high school graduates in technical studies were also hired. To improve the percentage of women in senior and management positions, training was held for those who transitioned from non-management track

positions to management track positions and their superiors. In addition to promoting the assignment of women to sales and production divisions, the glass ceiling is being removed, for instance by appointing the first woman to serve as president of a group company.

### Encouraging Change in Employee Awareness

Tokuyama offers various lectures on topics including business content and business skills once a month during lunchtime to foster new awareness among employees by enabling them to encounter diverse knowledge and broad perspectives. In fiscal 2017, 12 lectures were held with a total of 834 participants. A mentor system was also tested in which several mid-career employees were chosen and guidance given by directors of different divisions. Since the system was effective and favorably rated by the mentors and mentees alike, it will be incorporated into human resource development programs.

### Broadening Women's Participation in the Workplace to Create an Open-Minded Corporate Culture



Masahiro Ogata  
Human Resources Group

Tokuyama's diversity and inclusion management (DIM) aims to build a work environment where, regardless of personal attributes, each employee is assessed according to his or her degree of contribution to enhancing the corporate culture—where everyone can carry out their work with satisfaction. We are focusing on women's success in the workplace and endeavoring to expand the scope of work and recruitment activities. Going forward, we will keep taking action to create an open-minded corporate culture by broadening the target areas of our diversity initiatives.

### Tokuyama Corporation Action Plan to Promote Opportunities for Women

Duration: April 1, 2016–March 31, 2020

Target and Strategies	Performance (March 2016)	Performance (April 2018)
① Ensure that women account for no less than 20% of all persons with at least a university undergraduate degree who are hired for career-track positions. (3-year moving average) • Strengthen recruitment of women among university graduates	25% (FY2013 ~ FY2015)	35% (FY2015 ~ FY2017) 23% (FY2016 ~ FY2018)
② Ensure that women account by 2020 for no less than 6% of all assistant managers. • Training for employees that moved to management track positions and their superiors	4.7%	6.0%
③ Ensure that women account by 2020 for no less than 2% of all managers. • Study the adoption of a mentor program	1.2%	1.5%
④ Ensure that women by 2020 hold at least 10 sales positions and 20 positions in manufacturing departments. • Understanding challenges to appointments for women and considering solutions • In-house sharing of information and educational activities on promoting women's participation	Sales positions: 4 employees* All production divisions: 13 employees	Sales positions: 7 employees* All production divisions: 14 employees

\*Sales positions includes persons externally engaged in direct client services, such as technical sales, quality assurance, etc.

### Building an Organization where Both Men and Women Can Demonstrate Their Skills

I work in Legal and Credit Management Dept. and am also a member of a DIM project for human resources. Women make up only 10% of our workforce, which makes the work environment rather closed to different ideas and values. This can make it difficult for the Company to grow amid the fiercely changing business environment and diversifying customer demands. In response, we are taking action to break down internal stereotypes in order to energize the organization.

The DIM project is comprised of an even mix of men and women from both administration and technical divisions. It is based on the principles of open discussion and action. To realize DIM goals, we are moving forward with an "action first" approach, for instance conducting lunchtime lectures and piloting a mentor system. Though some in the Company have voiced doubts, the "action first" approach is one way to break through stereotypes.

### Nobuko Kaneda Legal and Credit Management Dept.



In recent years, many women at Tokuyama continue to work after marrying and having children, taking advantage of systems that support work-life balance (WLB). There are still areas that need improvement. For instance, as the number of households where both parents work increases, men at Tokuyama should also be able to utilize WLB systems without hesitation. If Tokuyama enables employees to work with peace of mind even if a life event occurs, motivation will increase and employees can further demonstrate their skills. Transforming mindsets about the relationship of superiors to subordinates and men to women is no easy task. However, Tokuyama will not grow unless we overcome this challenge. We must all contemplate and take action to succeed.



## Staying in Step with Society

# Ongoing Communication with Local Communities



The Tokuyama Summer Festival heats up the summer in Shunan. In 2017, Tokuyama received the top award from the mayor of Shunan in the parade of portable shrines for an amazing portable shrine and performance.

Through communication with the local community, Tokuyama continues to carry out activities that turn the Company into an entity deemed essential by society. The Company works to promote understanding of its initiatives in areas such as process safety, disaster prevention and environmental preservation.

### Tokuyama Factory Responsible Care Community Dialogue Program

The Tokuyama Factory conducts the annual RC Community Dialogue to help nearby residents better understand its efforts to prevent accidents and protect the environment.

The dialogue held on September 22, 2017 provided information on the environmental initiatives at the factory; 16 Tokuyama Factory employees, including the general manager, met with 44 local residents and 2 officials from Shunan City. The participants were briefed about Shunan City's environment by the city officials and then about the factory's power station and environmental initiatives. Participants then toured the Tokuyama Factory, visiting three plants and the East Power Station. Residents expressed surprise at the large size of the smokestacks and said they gained an understanding of the initiatives. With the understanding and support of local residents, the Tokuyama Factory will keep making sincere efforts on environmental preservation, disaster prevention and safety.



Presentations during Tokuyama Factory Community Dialogue on Responsible Care



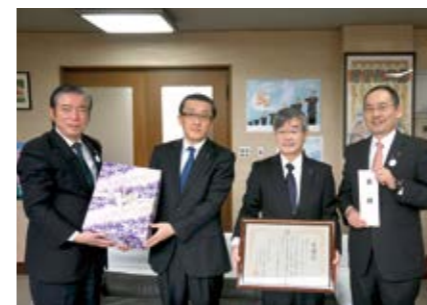
Local residents tour East Power Station

### Donations to Mikage Bunko Book Program

Tokuyama has been donating book gift certificates to schools through the Mikage Bunko Book Program for 41 years. In 2017, the program donated bookshelves and 100,000 yen worth of book gift certificates to each of 41 elementary and junior high schools in Shunan City, bringing the cumulative total donated to date to over 200 million yen. The mayor of Shunan, Kenichiro Kimura expressed appreciation: "The children who grew up reading books from Mikage Bunko are the backbone of society and are grateful for this program."



Bookshelves and purchased books donated to Kisan Elementary School, a Shunan City elementary school



Hideki Adachi, general manager of Tokuyama Factory, presents the catalog of donated books to Mayor Kimura, who offers a letter of appreciation.

### Participating in Volunteer Forestry Activities

On October 22, an event hosted by the Shunan Agriculture and Forestry Office was held at a municipal conservation forest. About 120 Tokuyama employees and their families removed bamboo grass and weeds and thinned the forest. Tokuyama supports preservation of forests—the source of the water that businesses and people cannot live without. This event was part of Yamaguchi Prefecture's forest and water conservation program; Tokuyama has been a participant for 20 years, since the beginning.



Volunteer forestry activities have taken place for 20 straight years.

### Helping TFT to Eradicate Hunger in Developing Countries

Table for Two (TFT) is a non-profit that tackles hunger in developing countries and works to reduce obesity and lifestyle diseases in developed countries. Twenty yen from every boxed lunch purchased from TFT goes toward donations (the price of one school lunch in developing countries), which are used to provide lunches to children in developing countries in Africa and Asia.

The number of participants at Tokuyama has grown every year since it joined the TFT program in 2008. The Company donated 166,540 yen in 2017, equivalent to 8,327 school lunches.



Children in Kenya eat TFT lunches.

©TABLE FOR TWO

# Information Disclosure and Communication



At a briefing for individual investors

**Tokuyama values communication with diverse stakeholders as the key to working with the broader society to build a sustainable future.**

Tokuyama holds briefings for individual investors to provide information on the Company and its business performance, stock and trading volumes, and dividends. In fiscal 2017, there were six briefings in locations such as Tokyo, Kyoto, and Hiroshima. Tokuyama also disclosed information via various media.

## Tokuyama Communication Media

### CSR Report

<http://www.tokuyama.co.jp/eng/csr/report/index.html>



### Tokuyama website

<http://www.tokuyama.co.jp/eng/>



### Annual Report

[http://www.tokuyama.co.jp/eng/ir/finance/annual\\_reports.html](http://www.tokuyama.co.jp/eng/ir/finance/annual_reports.html)



### Corporate Governance Report

(available in Japanese)

[http://www.tokuyama.co.jp/company/governance/pdf/20180625\\_CGHoukokuSyo.pdf](http://www.tokuyama.co.jp/company/governance/pdf/20180625_CGHoukokuSyo.pdf)



In addition to this report, Tokuyama publishes pamphlets and written reports to hand out at community discussions and job fairs or when people visit the Company. Some of these publications are available for viewing or download on the Tokuyama website.

### Company Profile

<http://www.tokuyama.co.jp/eng/company/brochure/index.html>



## Third-Party Review

### A Review of Tokuyama's CSR Report 2018

Eriko Nashioka

Representative Director, Institute for Environmental Management Accounting, Certified Public Accountant and Certified Tax Accountant, and part-time lecturer in environmental accounting and environmental auditing for the Faculty of Commerce, Doshisha University



### The Foundation of CSR Management and Social Value Produced by Tokuyama

Tokuyama is working hard to be socially responsible. Though it has many outstanding and advanced individual programs, further systemization is needed. CSR activities should be organized along global standards and subject to information disclosure.

This report clarifies the relationship between the SDGs and Tokuyama's business. Going forward, I would like to see Tokuyama share information on the kind of social value Tokuyama is creating and the kind of social issues the Company will take on in the future.

### The Significance of 100 Years of History

Since 1918, long before the term "CSR" existed, Tokuyama has been supporting Japanese industry through its business. The Company has worked with local communities to grow its business over a span of a century, always driven by "chemistry." Tokuyama has worked to combat climate change, preserve water resources, and build an even better community life.

In the next 100 years, to further boost corporate value and remain a company that contributes to society, it is vital for Tokuyama once again to assess the value it creates as a company and ensure the entire Group shares this understanding. To realize its vision, Tokuyama must link CSR to the medium-term management plan to create economic and social value.

### The Next Step after Analyzing Materiality

Currently, Tokuyama is working on an analysis of materiality to organize, analyze, and prioritize CSR issues. For stakeholders, it is extremely important that the Company takes into account what society wants from Tokuyama and what Tokuyama can give to society, assign a timeline framework, and determine and clarify important matters. When specifying materiality, I would suggest considering holding stakeholder dialogues to incorporate external opinions. The Company is making progress on its socially responsible management, and I am looking forward to next year's report.

### Response to Third-Party Review

Takeshi Nakahara

Director, Managing Executive Officer Corporate Social Responsibility Division



year journey, which began with the determination to make a social contribution through our business. The report also introduces topics such as how our business can help achieve the SDGs and how our ion exchange technology is fostering a recycling-oriented society.

In addition to conventional monetary value, companies are now assessed as to whether they deliver non-monetary value, including valuing environmental, social, and governance (ESG) factors and contributing to the SDGs. In order to gain even greater recognition from our stakeholders as a company that increases corporate value and contributes to society, we will strive to (1) put a foundation for socially responsible management in place according to global standards (establish and practice materiality); (2) tackle the SDGs; and (3) make the integration of CSR activities into the medium-term management plan a major issue going forward.

## Company Outline

### Business Overview

Tokuyama provides products and services that help society and enrich people's lives in four businesses: Chemicals, Specialty Products, Cement, and Life & Amenity.

#### Chemicals Business Division

##### Soda Ash and Calcium Chloride Business

- ▶ Soda ash ▶ Sodium bicarbonate
- ▶ Calcium Chloride ▶ Sodium silicate cullet

##### Chlor-Alkali and Vinyl Chloride Business

- ▶ Caustic soda
- ▶ Methylene chloride
- ▶ Propylene oxide (PO) ▶ Chloroform
- ▶ Polyvinyl chloride (PVC)

##### New Organic Chemicals Business

- ▶ Isopropyl alcohol (IPA)



#### Specialty Products Business Division

##### Electronic Materials Business

- ▶ High-purity polycrystalline silicon
- ▶ Metallic boron

##### Fumed Silica Business

- ▶ Fumed silica ▶ Silicon tetrachloride

##### Thermal Management Material Business

- ▶ Aluminum nitride

##### IC Chemicals Business and Cleaning System Business

- ▶ Positive-type photoresist developer
- ▶ High-purity chemicals for electronics manufacturing



#### Cement Business Division

##### Cement Business

- ▶ Portland cement
- ▶ Blast furnace slag cement
- ▶ Fly-ash cement
- ▶ Cement-based soil stabilizer
- ▶ Ready-mixed concrete

##### Recycling and Environment Business

- ▶ Utilization of waste plastic for fuel
- ▶ Utilization of incinerated ash as a raw material for cement
- ▶ Recycling of waste gypsum boards



#### Life & Amenity Business Division

##### Fine Chemicals Business

- ▶ Bulk pharmaceuticals
- ▶ Plastic lens-related materials

##### NF Business

- ▶ Microporous film

##### Group Companies

- ▶ Polyolefin film
- ▶ PVC window
- ▶ Dental materials and equipment
- ▶ Medical diagnosis systems
- ▶ Ion exchange membranes and systems

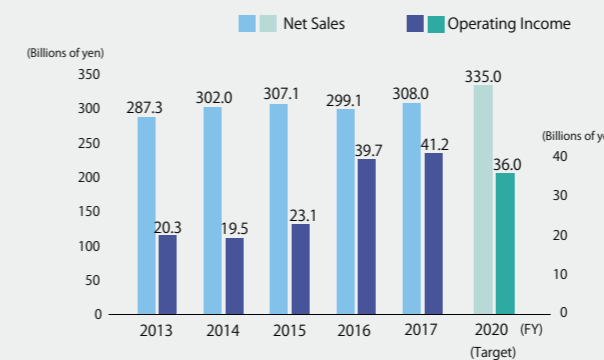


### Financial Highlights

#### Implementing the Medium-Term Management Plan (April 2016–March 2021)

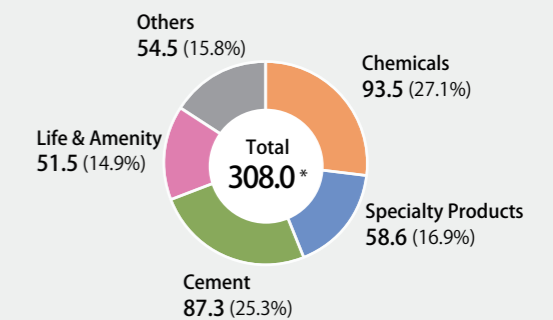
Under a corporate vision to build a new foundation, established in May 2016, Tokuyama drew up a five-year medium-term management plan starting from fiscal 2016 that seeks to: (1) change the organizational culture; (2) rebuild business strategies; (3) strengthen Group management; and (4) improve the Company's financial position. In fiscal 2017, net sales made progress according to plan and operating profit surpassed fiscal 2020 targets. Tokuyama has set its sights on even further expansion.

#### Net Sales and Operating Income



#### Fiscal 2017 Sales by Business Segment

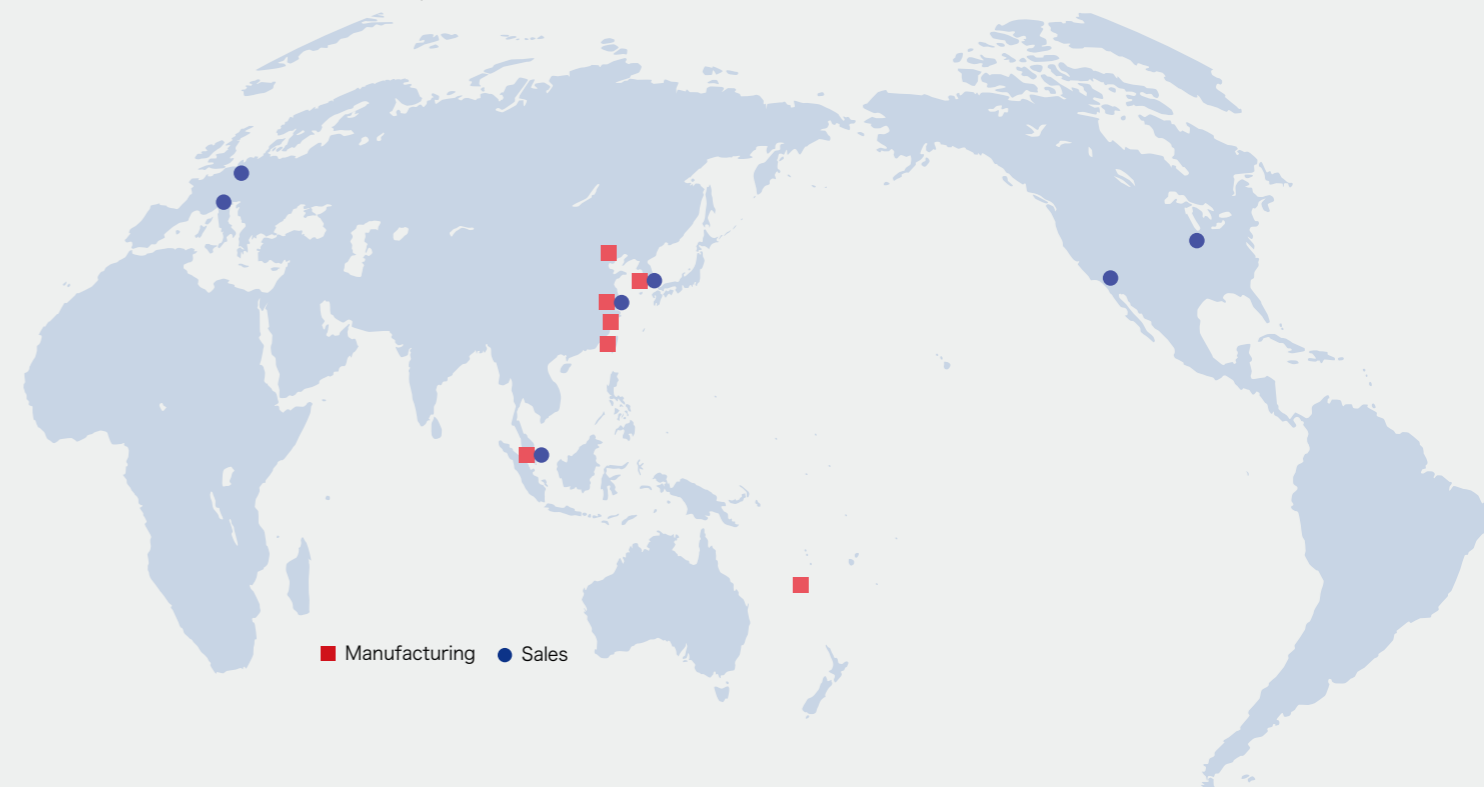
(Unit: billion yen)



Note: Segment sales results include inter-segment sales

### Global Network

Tokuyama has expanded globally, with factories and sales branches now established in eight countries and regions around the world, primarily in Asia.



Site Reports

**Tokuyama Factory**

Location: 1-1, Mikage-cho, Shunan-shi, Yamaguchi 745-8648, Japan  
 Number of employees: 1,583  
 Total site area: 1.91 million m<sup>2</sup>  
 Main products: Cement, inorganic chemical products, organic chemical products, polycrystalline silicon, fumed silica, polyvinyl chloride, and other products



Hideki Adachi  
Tokuyama Factory General Manager

Still situated at the Company's first business site, the Tokuyama Factory is the Group's main manufacturing facility, and its products account for about 90% of non-consolidated sales. The factory operates with the motto, "Go to work healthy and return home happy." Aiming to achieve 6.0 million accident-free hours at the factory and 9.0 million accident-free hours at its contractors, the factory is working hard to keep everyone on site happy and safe at work. In fiscal 2018, the factory's top priorities are: (1) to identify and eliminate risks related to contact with heat and being caught in, on or between equipment; (2) to conduct active dialogue on safety in order to remove the root causes of continued risks on the production floor; (3) to reaffirm the consistency of actual conditions and work standards for contract work and eliminate sources of risk; and (4) to implement safety point-and-call at crosswalks in facilities, conduct hazard prediction training, and use case studies to raise risk awareness.

**Performance Data**

	Unit	FY2013	FY2014	FY2015	FY2016	FY2017
SOx emissions	Metric tons	750	550	680	750	780
NOx emissions	Metric tons	9,200	8,850	8,900	9,500	10,100
Soot emissions	Metric tons	174	135	138	138	168
Industrial water consumption	Million metric tons	42.2	41.7	42.1	44.1	44.5
Effluent discharged	Million metric tons	22.1	23.9	24.2	24.2	24
COD level	Metric tons	132	110	124	114	119
Total nitrogen discharged	Metric tons	70	89	92	145	173
Total phosphorous discharged	Metric tons	2.4	2.6	2.2	2.1	2.1
PRTR-designated substance emissions	Metric tons	33	25	36	29	28
Waste generated	Thousand metric tons	395	354	389	376	366
Waste sent to landfills	Metric tons	277	313	383	368	382
Energy consumption	Thousand gigajoules	43,700	44,200	45,100	47,100	49,500
CO <sub>2</sub> emissions (originating from fossil fuel)	Thousand metric tons	4,020	4,040	4,110	4,290	4,500
Complaints	Cases	1	0	1	0	0



**Emissions and Transfer of Specific PRTR-Designated Substances in Fiscal 2017**

Unit: metric tons (mg-TEQ equivalency for dioxins)

Substance name	Regulatory number	Amount of emissions				Amount transferred
		Atmospheric	Water	Soil	Subtotal	
Chloroethylene (vinyl chloride)	94	7.6	0.0	0.0	7.6	0.0
1,2-Dichloroethane	157	6.3	0.0	0.0	6.3	1.6
Chloromethane (methyl chloride)	128	3.8	0.0	0.0	3.8	0.0
Cresol	86	0.0	2.2	0.0	2.2	0.0
Toluene	300	2.0	0.0	0.0	2.0	84.5
Dichloromethane (methylene chloride)	186	1.3	0.0	0.0	1.3	0.0
Chlorodifluoromethane	104	1.2	0.0	0.0	1.2	0.0
1-Bromopropane	384	1.1	0.0	0.0	1.1	0.3
Chloroform	127	0.9	0.0	0.0	0.9	0.0
Hydrazine	333	0.0	0.0	0.0	0.0	0.0
1,2-Epoxypropane (propylene oxide)	68	0.6	0.0	0.0	0.6	2.6
Water-soluble compounds of zinc	1	0.0	0.6	0.0	0.6	0.0
1,2-Dichloropropane	178	0.4	0.0	0.0	0.4	210.1
Carbon tetrachloride	149	0.1	0.0	0.0	0.1	0.0
Benzene	400	0.0	0.0	0.0	0.0	0.3
2,2-Azobisisobutyronitrile	16	0.0	0.0	0.0	0.0	0.0
Water-soluble copper salt	272	0.0	0.0	0.0	0.0	0.0
Hydrogen fluoride and its water-soluble form	374	0.0	0.0	0.0	0.0	0.0
Boron compounds	405	0.0	0.0	0.0	0.0	0.3
Dioxins	243	2.1	20.5	0.0	22.5	0.0
<b>Total (excluding dioxins)</b>		<b>25.3</b>	<b>2.7</b>	<b>0.0</b>	<b>28.0</b>	<b>299.9</b>

Substances are listed in descending order of emissions levels; substances with no emissions are listed in order of the regulatory number

Water refers to public waters

Amount transferred indicates the sum of the quantity transferred to sewage systems and the quantity subject to intermediate treatment

Total figures have been rounded to the first decimal place

**Kashima Factory**

Location: 26 Sunayama, Kamisu-shi, Ibaraki 314-0255, Japan  
 Number of employees: 77  
 Total site area: 101,000m<sup>2</sup>  
 Main products: **Produced by Tokuyama Corporation**  
 Bulk pharmaceuticals for stomach and duodenal ulcer treatment drugs, and diabetes drugs; optical materials (plastic lens monomer, light modulating materials, and hard coating solutions); raw materials for electronic materials; metal cleaners  
**Produced by Tokuyama Dental Corporation**  
 Dental materials (restorative materials, adhesives, relining materials, impression materials and investment materials)



Yoshiyuki Kitajima  
Kashima Factory General Manager

The Kashima Factory strives to recycle waste matter while complying with environmental laws and regulations and reducing environmental impact. As a result of this approach, the factory recorded a 74% effective utilization rate of waste in fiscal 2017, sent 9 metric tons of waste to landfills for final disposal, and achieved its "zero emissions" goal of 99%. Looking ahead, the Kashima Factory is examining the feasibility of material and thermal recycling as it works to increase its effective utilization rate for all types of waste matter.



**Performance Data**

	Unit	FY2013	FY2014	FY2015	FY2016	FY2017
Industrial water consumption	Thousand metric tons	51	48	43	36	39
Effluent discharged	Thousand metric tons	66	63	54	50	54
COD level	Metric tons	3	3	2	2	2
PRTR-designated substance emissions	Metric tons	2	2	2	2	2
Waste generated	Metric tons	919	1,020	735	775	761
Waste sent to landfills	Metric tons	7	11	20	9	9
Energy consumption	Thousand gigajoules	36	36	33	37	39
CO <sub>2</sub> emissions (originating from fossil fuel)	Metric tons	2,476	2,465	2,246	2,670	2,697
Complaints	Cases	0	0	0	0	0

**Emissions and Transfer of Specific PRTR-Designated Substances in Fiscal 2017**

Unit: metric tons

Substance name	Regulatory number	Amount of emissions				Amount transferred
		Atmospheric	Water	Soil	Subtotal	
Chloroform	127	0.7	0.0	0.0	0.7	20.4
Toluene	300	0.6	0.0	0.0	0.6	33.0
Dichloromethane	186	0.5	0.0	0.0	0.5	21.9
Acetonitrile	13	0.2	0.0	0.0	0.2	5.1
N,N-Dimethylformamide	232	0.0	0.0	0.0	0.0	5.8
N,N-Dimethylacetamide	213	0.0	0.0	0.0	0.0	2.0
2-Vinylpyridine	338	0.0	0.0	0.0	0.0	0.3
Methyl methacrylate	420	0.0	0.0	0.0	0.0	0.0
<b>Total</b>		<b>2.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.0</b>	<b>88.5</b>

All figures are the numerical sum for Tokuyama Corporation and Tokuyama Dental Corporation

Substances are listed in descending order of emissions levels; substances with no emissions are listed in order of the regulatory number

Water refers to public waters

Amount transferred indicates the sum of the quantity transferred to sewage systems and the quantity subject to intermediate treatment

Total figures have been rounded to the first decimal place

## Sun•Tox Co., Ltd.

Established: February 14, 1992  
 Shareholders: Tokuyama Corporation (80%), Rengo Co., Ltd. (20%)  
 Head office: ORIX Ueno1chome Building, 1-1-10 Ueno, Taito-ku, Tokyo, Japan  
 Business activities: Manufacture and sale of biaxial-oriented polypropylene films and cast polypropylene films



**Kazunori Shimada**  
Plant Manager



Location: 3075-18 Shimasu, Itako-shi, Ibaraki, Japan  
 Number of employees: 204  
 Total site area: 89,800m<sup>2</sup>

### ■ Kanto Plant

Sun-Tox's Kanto Plant manufactures biaxial-oriented polypropylene films and cast polypropylene films, which are used for food packaging and other applications. In fiscal 2017, the plant received the Cogeneration Grand Prize for upgrading its gas cogeneration facilities and added another line to its biaxial-oriented polypropylene film manufacturing facility. These high efficiency facilities will help the Kanto Plant to further reduce energy consumption and environmental impacts. The plant also takes part in clean-up activities inside and around the industrial complex to promote harmony with the local community. As it continues to implement three management systems, namely Japan's Occupational Safety and Health Management System (OSHMS), ISO 14001, and ISO 9001, the plant is building on its achievements with the aim to be a community-based factory.

#### Performance Data

	Unit	FY2013	FY2014	FY2015	FY2016	FY2017
Waste generated	Metric tons	15	20	15	23	38
Waste sent to landfills	Metric tons	4	10	5	10	17
Energy consumption	Thousand gigajoules	360	351	356	356	533
CO <sub>2</sub> emissions	Thousand metric tons	20	20	21	21	26
SOx emissions	Metric tons	0.2	0.3	0.3	0.1	—
NOx emissions	Metric tons	0.7	0.6	0.7	0.4	0.3
Soot emissions	Metric tons	0.06	0.05	0.04	0.02	0.07

### ■ Tokuyama Plant

Sun-Tox's Tokuyama Plant manufactures biaxial-oriented polypropylene films, which are mainly used for food and beverage packaging, amounting to about 23,000 metric tons annually. As part of its environmental initiatives, the plant is actively working to reduce per-unit energy consumption and increase recycling rates. With respect to safety, it acquired OSHMS certification in 2013 for all of its departments including R&D departments. Under the slogan, "Strictly following safety procedures, making manufacturing enjoyable, and never compromising quality," the plant aims to keep its facilities operating safely so it can be depended upon by the community, customers and employees.

#### Performance Data

	Unit	FY2013	FY2014	FY2015	FY2016	FY2017
Waste generated	Metric tons	66	76	74	84	68
Waste sent to landfills	Metric tons	2	1	1	1	1
Energy consumption	Thousand gigajoules	463	458	471	463	422
CO <sub>2</sub> emissions	Thousand metric tons	27	27	27	28	25
PRTR-designated substance emissions	Metric tons	0.0	0.0	0.0	0.0	0.0
Complaints	Cases	0	0	0	0	0



**Nobuhiko Nakayama**  
Plant Manager



Location: 7-7, Harumi-cho, Shunan-shi, Yamaguchi, Japan  
 Number of employees: 142  
 Total site area: 24,100m<sup>2</sup>

## Sun Arrow Kasei Co., Ltd.

Established: February 1, 1999  
 Shareholder: Tokuyama Corporation (100%)  
 Head office: 1-2 Harumi-cho, Shunan-shi, Yamaguchi, Japan  
 Business activities: Manufacture and sale of polyvinyl chloride compounds



**Yasuto Yasuzawa**  
Plant Manager



Location: 1-2 Harumi-cho, Shunan-shi, Yamaguchi, Japan  
 Number of employees: 29  
 Total site area: 3,280m<sup>2</sup>

### ■ Tokuyama Plant

Sun Arrow Kasei's Tokuyama Plant manufactures and sells polyvinyl chloride compounds used for pipes, joints, and other items essential for upgrading infrastructure, as well as PVC window, which are highly effective for saving energy. Practicing ISO 14001 environmental management and having all employees take part in safety and accident prevention efforts has helped the plant to maintain an accident- and disaster-free record for all 18 years it has been operating. Since acquiring ISO 9001 certification in fiscal 2017, the plant has further improved customer satisfaction with a focus on the environment, safety and quality control, while strictly enforcing internal controls and carrying out Responsible Care activities.

#### Performance Data

	Unit	FY2013	FY2014	FY2015	FY2016	FY2017
Power consumption	Thousand kilowatt hours	2,562	2,473	2,659	2,490	2,533
Waste plastic produced	Metric tons	125	108	141	135	128
Waste plastic effectively used	Metric tons	124	105	141	135	128
Waste sent to landfills offsite for disposal	Metric tons	7	8	6	0	0
Steam usage	Metric tons	240	240	240	240	240
Industrial water consumption	Thousand metric tons	65	65	65	65	65

## Tokuyama Polypropylene Co., Ltd.

Established: April 2, 2001  
 Shareholders: Tokuyama (50%), Prime Polymer Co., Ltd. (50%)  
 Location: 1-1 Harumi-cho, Shunan-shi, Yamaguchi, Japan  
 Business activities: Manufacture and sale of polypropylene resin and flexible polypropylene resin



**Yuichi Taguchi**  
Plant Manager



Location: 1-1 Harumi-cho, Shunan-shi, Yamaguchi, Japan  
 Number of employees: 62  
 Total site area: 70,997m<sup>2</sup>

### ■ Tokuyama Plant

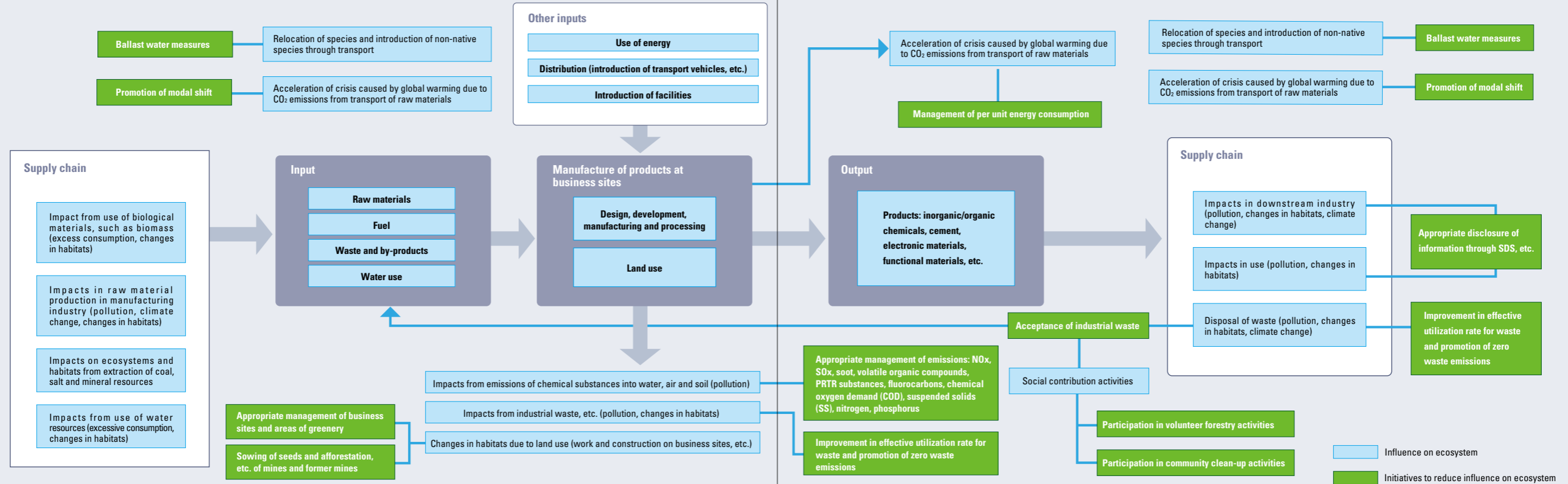
Tokuyama Polypropylene's Tokuyama Plant conducts risk assessments of processes, facilities, and operations, and takes measures to identify near-miss situations and points of concern, in order to enhance the plant's safety culture. The result has been a perfect accident- and disaster-free record since the time it was first established as Tokuyama's polypropylene film business 42 years ago. The plant is scheduled to obtain recertification in 2018 under the High Pressure Gas Safety Act and the Ordinance on Safety of Boilers and Pressure Vessels, and is pursuing Responsible Care activities with the goals of extending its accident- and disaster-free record, reducing its environmental impact, and eliminating customer complaints related to quality.

#### Performance Data

	Unit	FY2013	FY2014	FY2015	FY2016	FY2017
Industrial water consumption	Thousand metric tons	411	308	370	333	378
Waste generated	Metric tons	116	89	35	77	35
Waste sent to landfills	Metric tons	15	2.4*	0	1.8*	0
Unit energy consumption index (fiscal 2002=100)	%	84	76	71	73	69

\* Year with periodic maintenance

## Business Activities and Biodiversity



\*Prepared referencing *Guidelines for Private Sector Engagement in Biodiversity, Second Edition* (Ministry of the Environment, Japan)

### Environmental Data for Tokuyama

Input (Unit: 1,000 metric tons)	FY2013	FY2014	FY2015	FY2016	FY2017	Comparison with the previous fiscal year (%)
Waste and by-products	1,945	1,790	1,780	1,830	1,880	2.7
Fuel	1,760	1,820	1,810	2,050	2,250	9.8
Raw materials	6,080	5,900	5,990	6,020	6,760	12.3
Industrial water	42,200	41,700	42,100	44,100	45,500	3.2
Output (Unit: 1,000 metric tons)	FY2013	FY2014	FY2015	FY2016	FY2017	Comparison with the previous fiscal year (%)
Carbon dioxide	5,930	5,910	6,000	6,300	6,600	4.8
Waste (incinerated and landfill)	21	22	22	21	23	9.5
Substances with environmental impact	10	9.7	9.9	10.6	11.3	6.6
Process effluent	22,100	24,000	24,200	24,200	24,000	-0.8

### Energy Consumed on a Per-Unit Basis\* at the Tokuyama Factory

Unit: %	Base year (FY2005)	FY2014	FY2015	FY2016	FY2017	Target (FY2020)
Per-unit energy consumption	100.0	97.9	94.6	93.6	90.5	97.0

\*The factory has been working to reduce per-unit energy consumption in fiscal 2020 by 3.0% compared to the fiscal 2005 level.

### Energy Consumption

Unit: 1,000 gigajoules	Base year (FY2005)	FY2013	FY2014	FY2015	FY2016	FY2017
Tokuyama Corporation	53,700	43,700	44,400	45,300	47,300	49,600
Group companies	3,500	2,900	2,800	2,700	2,500	2,700

### Emissions of CO<sub>2</sub>

Unit: 1,000 metric tons	Base year (FY2005)	FY2013	FY2014	FY2015	FY2016	FY2017
Originating from fuel	4,820	4,020	4,040	4,120	4,300	4,510
Originating from raw materials	2,110	1,680	1,630	1,590	1,720	1,820
Originating from waste matter	210	230	230	230	250	250
Group companies	250	210	200	200	190	190

### Emissions of SO<sub>x</sub>, NO<sub>x</sub>, and Soot

Unit: Metric tons	FY2013	FY2014	FY2015	FY2016	FY2017	Comparison with the previous fiscal year (%)
SO <sub>x</sub>	750	550	680	750	780	4.0
NO <sub>x</sub>	9,200	8,850	8,900	9,470	10,100	6.7
Soot	174	135	138	138	168	21.7

### Emissions of PRTR-Designated Substances

Unit: Metric tons	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
Tokuyama Corporation	40	35	27	37	30	30
Group companies	41	39	36	40	34	37

### Emissions of Hazardous Air Pollutants

Unit: Metric tons	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
Dichloromethane (methylene chloride)	3	2	1.5	1.7	2.3	1.8
Chloroform	3	2	2.1	1.1	1.7	1.6
1,2-Dichloroethane	10	10	4.9	10.6	6.4	6.3
Chloroethylene (vinyl chloride)	11	9	5	7.7	5.4	7.6

### Discharge of Industrial Effluent and Levels of COD

	FY2013	FY2014	FY2015	FY2016	FY2017	Comparison with the previous fiscal year (%)
Industrial effluent (million metric tons)	22.1	24.1	24.2	24.2	24.0	-0.8
COD (metric tons)	134	112	126	116	121	4.3

### Discharge of Nitrogen and Phosphorous

Unit: Metric tons	FY2013	FY2014	FY2015	FY2016	FY2017	Comparison with the previous fiscal year (%)
Nitrogen	70	89	92	145	173	19.3
Phosphorous	2.4	2.6	2.2	2.1	2.1	0.0

### Landfilled and Recycled Waste

	Base year (1990)	FY2013	FY2014	FY2015	FY2016	FY2017
Landfilled waste (metric tons)	36,260	280	320	400	380	390
Effective utilization rate (%)	76.9	94.7	93.9	94.3	94.2	93.8
"Zero emissions" rate (%)	82.4	99.9	99.9	99.9	99.9	99.9

### Breakdown of Waste Treatment Methods

Unit: 1,000 metric tons	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
Waste recycled in-house	337	350	312	346	332	317
Waste recycled externally	25	24.5	21.9	21.4	23.1	26.7
Incinerated waste	19.7	20.5	21.3	21.9	21.5	22.5
Waste sent to landfills	0.3	0.3	0.3	0.4	0.4	0.4
Total waste generated	382	396	355	389	377	367

### Amount of Waste Matter and By-Products Used to Produce Cement

Unit: Kg per metric ton of cement	Base year (FY1991)	FY2013	FY2014	FY2015	FY2016	FY2017
Amount used	227	461	448	459	441	430

### Material and Thermal Recycling Amounts in Cement Production

Unit: 1,000 metric tons	Base year (FY1991)	FY2013	FY2014	FY2015	FY2016	FY2017
Material recycling	1,550	1,879	1,702	1,711	1,746	1,800
Thermal recycling	4	66	86	74	84	79



## Corporate Data

Company name: Tokuyama Corporation

Location: **Tokyo Head Office**  
FRONT PLACE AKIHABARA, 7-5, Sotokanda 1-chome, Chiyoda-ku,  
Tokyo 101-8618, Japan Tel: +81-3-5207-2500 Fax: +81-3-5207-2580

### Tokuyama Factory

1-1, Mikage-cho, Shunan-shi, Yamaguchi 745-8648,  
Japan (Registered address)

Tel: +81-834-34-2000 Fax: +81-834-33-3790

### Other facilities in Japan

Kashima Factory, Tsukuba Research Laboratory, Osaka Office,  
Takamatsu Branch, Hiroshima Branch, Fukuoka Branch,  
Sendai Branch, Nagoya Branch, Shunan Sales Branch

President: Hiroshi Yokota

Established: February 16, 1918

Capital: 10 billion yen

Number of employees: 4,889 (consolidated basis; including 562 working overseas);  
1,920 (non-consolidated basis) (as of March 31, 2017)

Number of group companies: 85

Main businesses: Manufacture and sale of the following chemicals and products

**Chemicals:** Soda ash, chlor-alkali, vinyl chloride and new organic

**Specialty Products:** Polycrystalline silicon, fumed silica, high-purity chemicals for electronics manufacturing and aluminum nitride

**Cement:** Cement, recycling and environment-related business

**Life & Amenity:** Fine chemicals, microporous films, synthetic resins, ion exchange membranes and dental materials

Securities code: 4043 (First Section of the Tokyo Stock Exchange)

## Editorial Policy

● The *CSR Report 2018* has been compiled for the purpose of providing stakeholders with clearly presented information on the Tokuyama Group's CSR initiatives and overall business activities. The PDF edition, available at the website below, includes Site Reports which could not be included in the print edition due to space limitations.  
<http://www.tokuyama.co.jp/eng/csr/>



● Eriko Nashioka of the Institute for Environmental Management Accounting was invited to offer a third-party opinion on this report.

● The *CSR Report 2018* has been produced based on the Environmental Reporting Guidelines (fiscal 2012 edition) published by the Ministry of the Environment of Japan.

## Scope of the Report

**Period covered:** Performance data is from fiscal 2017 (April 1, 2017 to March 31, 2018); certain activities carried out in fiscal 2018 are also covered.

**Companies covered:** Tokuyama Corporation; environment-related data is for the Company's Tokuyama Factory and Kashima Factory; some performance data includes the sum of the data from 22 manufacturing subsidiaries of the Tokuyama Group in Japan.

**Areas covered:** Activities reported on were mainly carried out in Japan; however, some activities include group subsidiaries outside Japan.

**Date of issue:** September 30, 2018

**Next issue (tentative):** September 2019 (previous issue was in August 2017)

**Photo:** The Tokuyama Factory overlooks the rich waters of the Seto Inland Sea. This location was established 100 years ago in the city of Shunan in Yamaguchi Prefecture and has grown together with the residents of the local community.