JCIA ANNUAL REPORT 2023

Reference Materials

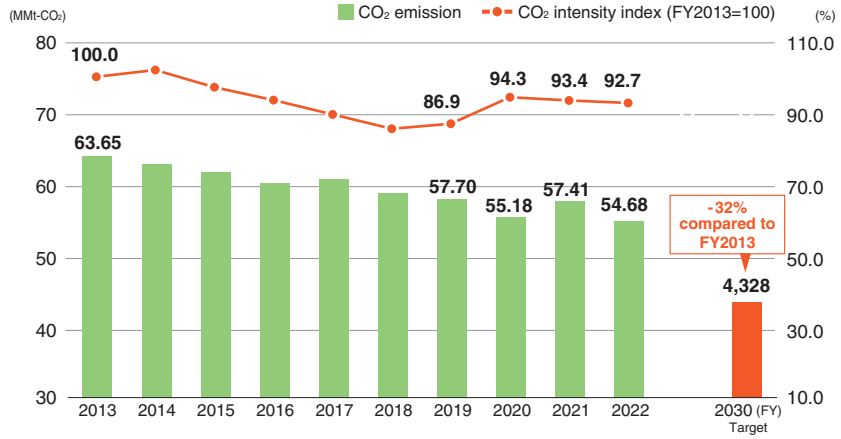
This pamphlet serves as a supplement to the JCIA Annual Report to introduce various data and initiatives relating to the activities of JCIA. It is intended to be read together with JCIA Annual Report 2023.

Japan Chemical Industry Association

CONTENTS

1–1 Environmental Protection (Prevention of Global Warming)

CO_2 emissions and intensity index



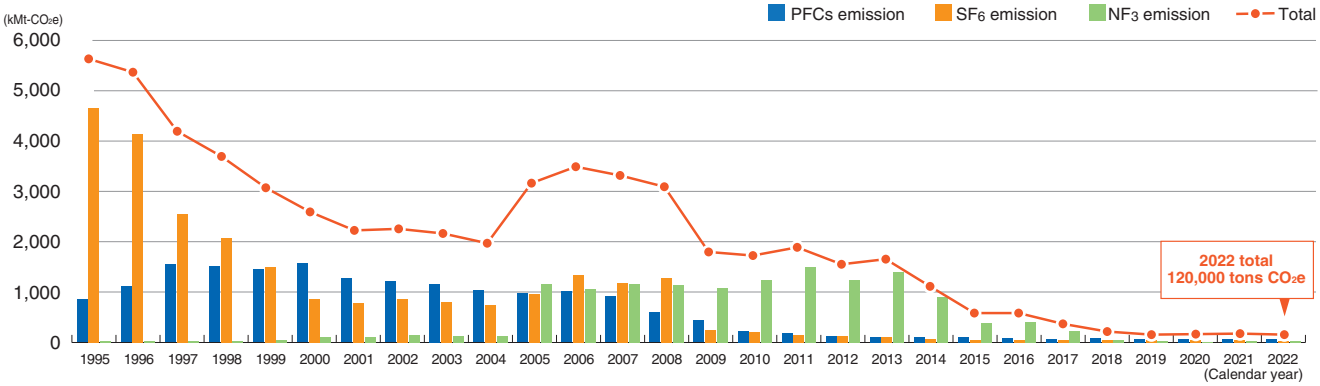
Changes in CO_2 Emissions

In March 2023, the CO_2 reduction target for FY2030 was revised. The new target is a 32% reduction compared to FY2013 (base year). A 8.97 million tons (14.1%) reduction in FY2022 compared to FY2013, 2.73 million tons (4.8%) reduction compared to FY2021 is targeted. 44% progress toward the FY2030 reduction target has been made. CO_2 emission intensity index in FY2022 is 7.3 points higher than that of FY2013 and 0.7 points higher than that of FY2021.

Emissions of Three Alternative Fluorocarbons and Other Gases (PFCs, SF_6, NF_3)

We are working to reduce emissions of the three gases (PFCs, SF_6, and NF_3) during our production, and the amount of emissions (converted to CO_2) of the three gases in 2022 was approximately 120,000 tons. From 2021 onward, the global warming coefficients are based on the IPCC Fifth Report (AR5).

Trends in PFCs, SF_6, and NF_3 emitted during manufacturing processes



1–2 Environmental Protection (Industrial Waste Reduction)

Voluntary Action Plan for Establishing a Sound Material-Cycle Society for FY2021 and Beyond

Since FY2016, JCIA has been working to achieve the target of reducing final disposal volume by about 70% in FY2020 compared to FY2000*1 in accordance with the Keidanren voluntary Action Plan for Establishing a Sound Material-Cycle Society and we have been promoting efforts to achieve this goal. On the other hand, the recycling rate of industrial waste has already reached close to 100%, and some waste is difficult to recycle. As a result, the recycling rate has remained almost flat since 2010. It has also been pointed out that further reduction of the final disposal volume may run counter to the realization of a low-carbon society, for example, by increasing energy consumption. Even under these circumstances, Keidanren will continue its efforts to reduce the volume of final disposal of industrial waste, the most representative indicator for industry in the formation of a Sound Material-Cycle Society, by setting a reduction target for industry as a whole, based on the idea of not increasing the volume of final disposal from the current level.

Therefore, JCIA has set the following new targets for FY2025:

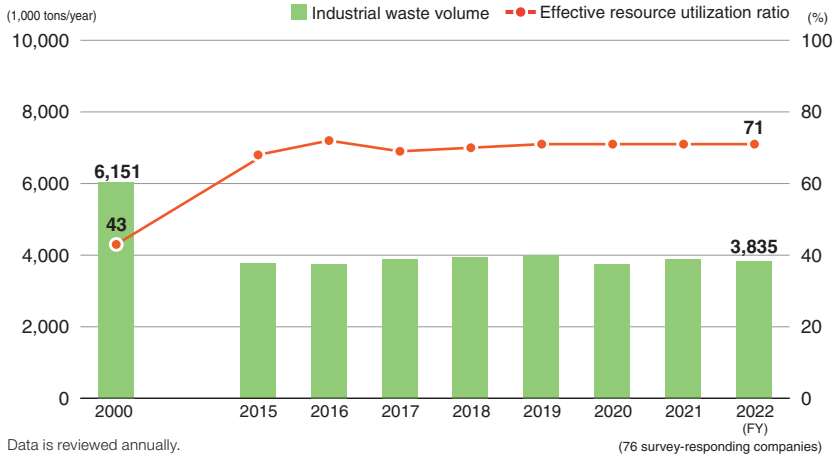
- **Reduce final landfill volume of industrial waste to 170,000 tons/year or less; and**
- **Maintain the recycling rate at 65% or higher,**

and continues to work toward maintaining the current level.

*1 Final disposal amount reduction rate (vs. FY2000):

$$\frac{\text{FY2000 final disposal amount} - \text{FY2020 final disposal amount}}{\text{FY2000 final disposal amount}} \fallingdotseq 70\%$$

Industrial Waste Volume and Effective Resource Utilization Ratio



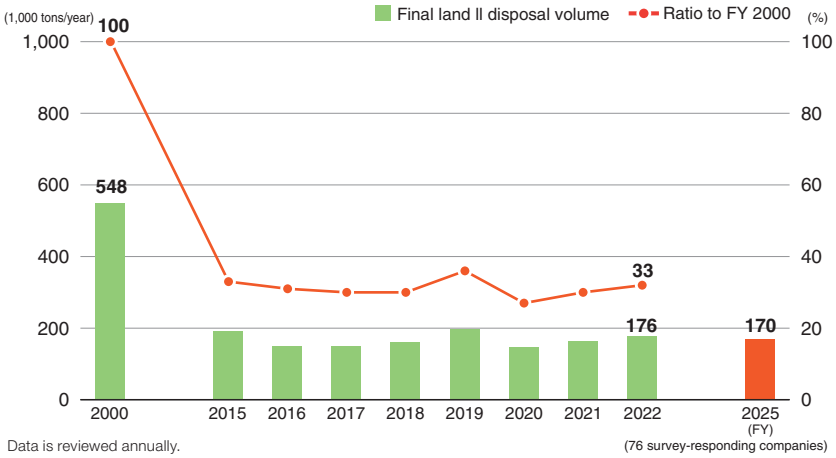
Data is reviewed annually.

(76 survey-responding companies)

*2 Effective utilization rate (including heat recovery):

$$\frac{\text{Effective use of resources in the same FY}}{\text{Amount of industrial waste}} \geqq 65\%$$

Final Landfill Disposal Volume



Data is reviewed annually.

(76 survey-responding companies)

	FY2022 results	
	Relative to FY2000	Relative to FY2020
Industrial waste volume	38% decrease	3% increase
Effective resource utilization ratio	28% increase	marginal change
Final disposal by JCIA members	67% decrease	9% increase

Industrial Waste Volume and Effective Resource Utilization Ratio*2

Industrial waste volume in FY2022 was 3.835 million metric tons, down 38% from the base year of FY2000. We are also making positive efforts to encourage sorting and reuse. In addition, the effective utilization rate of resources including heat recovery, which had been 43% in FY2000, improved to 71% in FY2022 by not only strengthening recycling with thorough sorting of the materials but also aggressively switching from simple incineration to heat recovery for items that are difficult to recycle. As a result, JCIA members achieved a level that greatly exceeds the chemical industry's specific target of increasing the ratio to 65% or more by FY2025*2 in the Keidanren Voluntary Action Plan for Establishing a Sound Material-Cycle Society ahead of schedule.

Final Landfill Disposal Volume

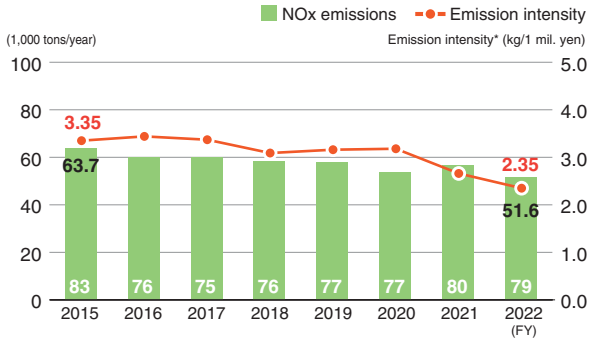
The final landfill disposal of FY2022 was 176,000 tons, which is about an 15,000-ton increase from FY2021, which ended in a 67% reduction from the base year FY2000. The reduction rate decreased by 3 points from the previous fiscal year. The main reason for this is the increase in the volume of transient industrial waste due to corporate mergers, bulk sludge disposal, disposal of construction overburden, and landfill disposal of debris. In FY2019, domestic disposal volume temporarily increased due to import restrictions on waste plastics enforced in Asian countries. In FY2020, there was a significant decrease due to the reduced economic activity caused by COVID-19. After FY2021, the trend returned to flat. In the future, JCIA members will continue to strengthen cooperation with the venous industry. Not only did we achieve the target for the chemical industry, namely reduce final landfill volume of industrial waste to 170,000 tons/year or less by FY2025, as per the Keidanren Voluntary Action Plan for Establishing a Sound Material-Cycle Society, but the reduction also helped lower waste incineration volume. In additioin to reducing the final landfill disposal volume, member companies are strengthening their traceability concerning proper disposal of waste, through confirming the issuance, recovery and verification of industrial waste manifestos, and the regular inspection of final disposal sites of contractors.

1 – 3 Environmental Protection (Prevention of Atmospheric Pollution and Water Pollution)

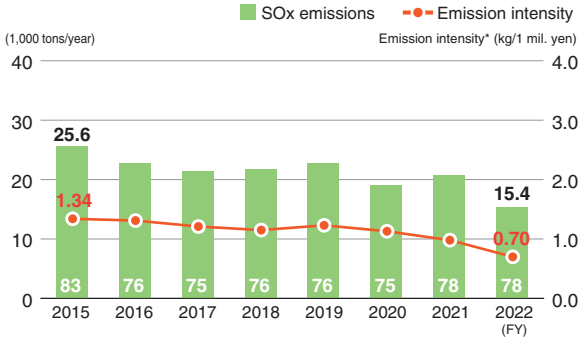
Prevention of Atmospheric Pollution and Water Pollution

JCIA members in Japan have significantly reduced their emissions of air and water pollutants compared to around 2000. In recent years, the rate of emissions reduction has slowed, but emissions intensity has been declining. JCIA members comply both with regulatory standards and agreements with municipalities. They also set their own voluntary management criteria, which are more rigorous than government standards, to intensify their ongoing efforts to reduce emissions.

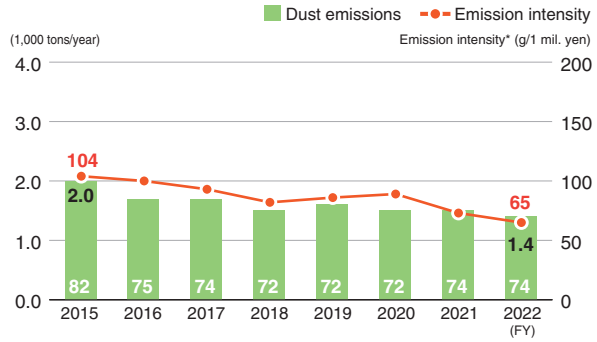
NOx Emissions



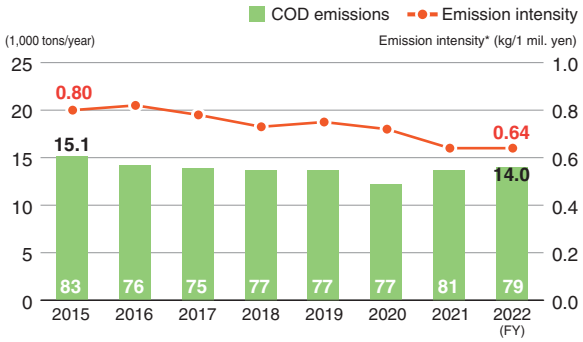
SOx Emissions



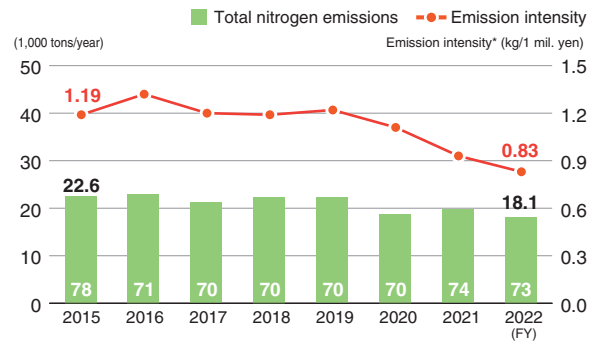
Dust Emissions



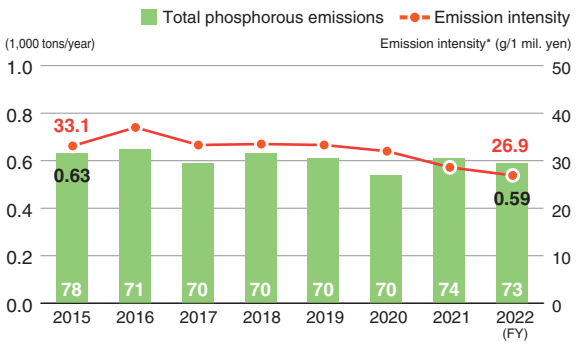
COD Emissions



Total Nitrogen Emissions



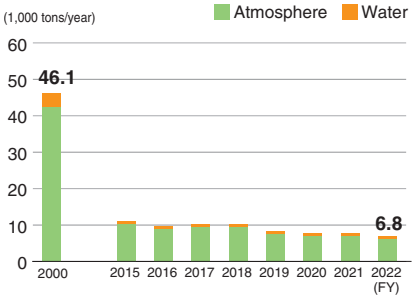
Total Phosphorous Emissions



*Emission intensity: Emissions per ¥1 million sales. The figures in the bars indicate the number of companies that submitted data.

1–4 Environmental Protection (Reduction of Chemical Emissions)

Emissions of PRTR Substances



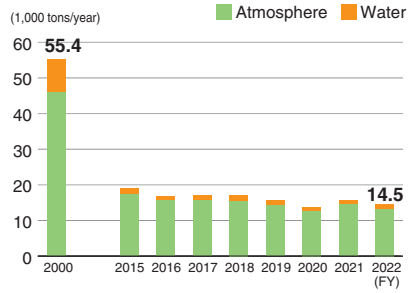
Emissions of PRTR*1 Substances

JCIA members' emissions of PRTR designated substances in FY2022 was 6,800 metric tons, a reduction of approximately 85% compared to FY2000 and 59% compared to FY2010. These emissions have been declining every year since FY2014 and JCIA members achieved their voluntary target*3 for FY2025. The breakdown of emissions is as follows: 91% into the atmosphere, 9% into water, and less than 0.1% into soil.

*1 PRTR (Pollutant Release and Transfer Register): The PRTR system is designed to identify, collect and disseminate data on the amounts and sources of a variety of toxic chemicals released to the environment or transferred outside of facilities in the form of waste.

PRTR Law: Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof

Emissions of Voluntary Surveyed Substances

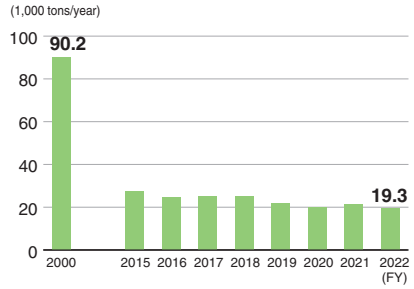


Emissions of Voluntary Surveyed Substances

JCIA has independently established voluntary survey substances(†) and is working to further reduce their emissions. There were 14,500 metric tons of substance emissions surveyed by JCIA voluntarily(†) in 2022, representing a 74% reduction compared to FY2000 and a 41% reduction compared to FY2010. JCIA members have continued to reduce the amount since FY2014 and achieved their voluntary target for FY2025*3. The breakdown of emissions was 91% into the atmosphere and 9% into water. No emissions into the soil were reported.

(†) Change in the number of substances voluntarily surveyed by JCIA:
From FY2000 to 2009: 126 substances
From FY2010 to 2012: 106 substances
From FY2013 to the current: 90 substances

VOC Emissions



VOC*2 Emissions

JCIA members are making tremendous efforts to install equipment and improve the processes for controlling VOC emissions. In FY2022, VOC emissions amounted to 19,300 metric tons, a 79% reduction compared to FY2000 and a 44% reduction compared to FY2010. Thus, JCIA members have achieved significant reductions along with their voluntary target for FY2025*3.

*2 VOC (volatile organic compound): VOC is a collective term for a wide variety of volatile organic compounds that turn into gas and enter the atmosphere, including toluene, xylenes and ethyl acetate.

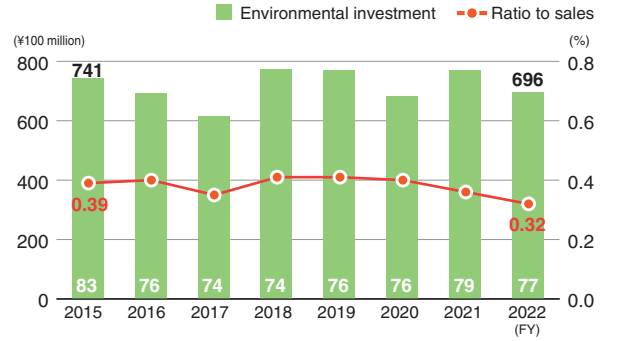
*3 FY2025 voluntary target: Reduce PRTR/VOC emissions to no worse than FY2010 levels in FY2020 and beyond. As for highly toxic substances, reduction efforts should be continued individually.

1–5 Environmental Protection (Investment in Environmental Measures)

Investment in Environmental Measures

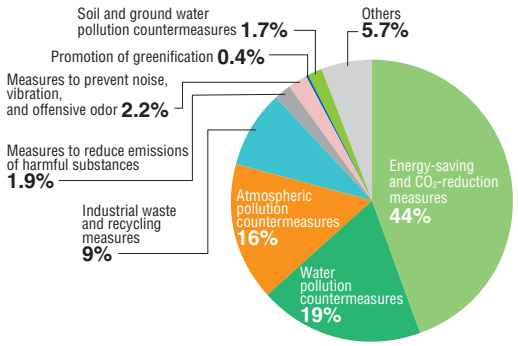
In FY2022, the sum of investments by JCIA members in the installation and maintenance of environment-friendly equipment, such as energy-savingand CO2 reduction equipment, and investments in the development of environment-friendly products and technologies amounted to ¥69.6 billion. Thisrepresents a ratio of investment to sales of 0.32%. The amount of investment in environmental protection measures continues to be around 70 billion yen, but the ratio to sales has been declining for the past three years. The planned investments in environmental protection measures by JCIA members have been steadily improvingtheir environmental performance.

Investment in Environmental Measures



* Emission intensity: Emissions per ¥1 million sales. The figures in the bars indicate the number of companies that submitted data.

Breakdown of Environmental Investment in FY2022

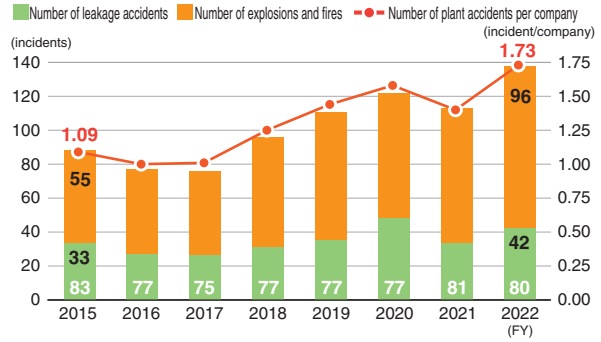


2—Process Safety and Disaster Prevention (Efforts to Prevent Plant Accidents)

Accident Occurrences

In FY2022, the total number of accidents at plants (138) and the number of accidents at plants per company (1.73) have once again begun to increase, both reaching all-time highs.

Accident Occurrences

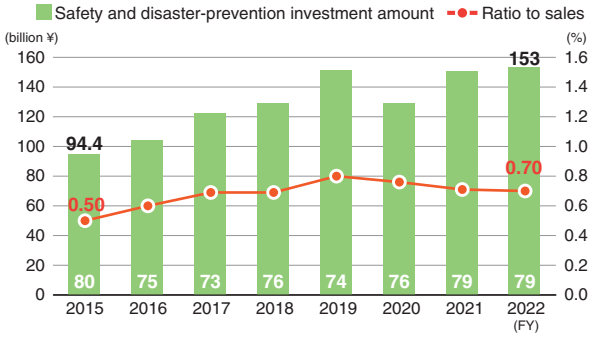


The figures at the bottom of the bars indicate the number of companies that submitted data.

Investment in Safety, Security, and Disaster-Prevention Measures

JCIA member's investment in safety and disaster-preventive maintenance for FY2022 was 153 billion yen, a 1.7% increase compared with FY2021, with the ratio of investment to sales standing at 0.70%, down 0.01% compared with FY2020. The amount of investment recovered to the pre-COVID-19 level, as it did last year, but the investment ratio declined slightly.

Investment in Safety, Security, and Disaster-Prevention Measures

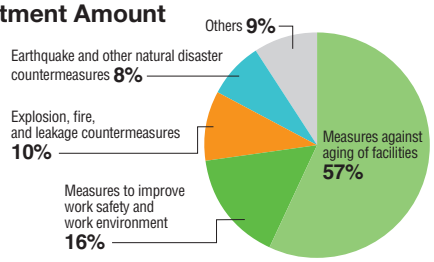


The figures at the bottom of the bars indicate the number of companies that submitted data.

Breakdown of Safety and Disaster-Prevention Investment Amount

The breakdown of investment costs for safety and disaster-preventive maintenance in FY2022 shows that the maintenance for aging facilities accounts for nearly 60% of this investment. This trend indicates that countermeasures for the aging facilities has been a major investment item over the past several years.

Breakdown of Safety and Disaster-Prevention Investment Amount



3—Industrial Health and Safety

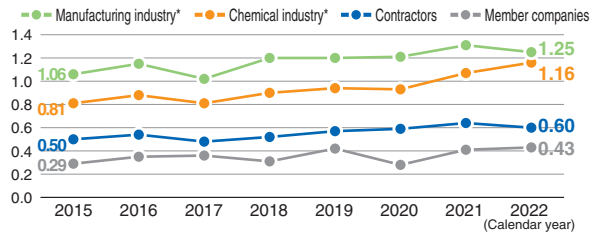
Occurrence of Occupational Accidents

Lost Time Injury Rate (LTIR) Trends

$$\text{LTIR}^{*1} = \frac{\text{Number of lost time injuries}}{\text{Total working hours (per one million hours)}}$$

*1 LTIR: Indicator that shows the frequency of lost time injuries

LTIR Trends



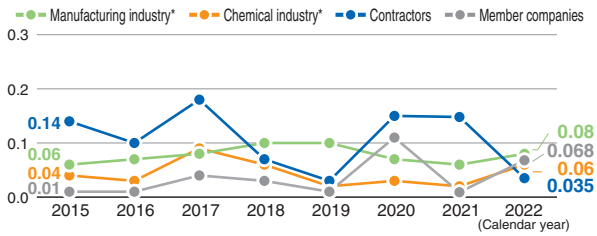
Frequency rates for JCIA members and their subcontractors in 2022 are below those for the manufacturing and chemical industries as a whole, but are trending upward overall.

Lost Time Injury Severity Rate* Trends

$$\text{Lost Time Injury Severity Rate}^{*2} = \frac{\text{Number of work days lost}}{\text{Total work hours (per thousand hours)}}$$

*2 Lost Time Injury Severity Rate: Indicator that shows the severity of occupational accidents

Overall Severity Rates



In 2022, there were no fatal accidents at subcontractors, but there were three fatal accidents at member companies, so the intensity rate was significantly worse than in 2021, when there were zero fatal accidents, and higher than in the chemical industry as a whole.

Number of Fatalities from Occupational Accidents

	2015	2016	2017	2018	2019	2020	2021	2022
Member companies	0	0	1	1	0	2	0	3
Contractors	1	1	3	1	0	2	2	0
Chemical industry*	22	12	12	18	12	10	12	19
Manufacturing industry*	160	177	102	183	141	136	137	140

* Data publicly announced by Ministry of Health, Labour and Welfare (MHLW)

Number of Fatalities from Occupational Accidents

Although there were no fatalities due to work-related accidents in 2022 at subcontractors, there were three fatalities at JCIA members.

4—Social (Regional) Dialogue

Implementation of Regional Dialogue Meetings

Areas of implementation in FY2022	Okayama, Western Yamaguchi, Iwakuni & Otake, Sakai & Senboku, Kawasaki, Oita (All were document-based meetings.)
Areas of implementation in FY2021	Eastern Yamaguchi, Aichi, Chiba, Hyogo (All were document-based meetings.)

Implementation of Regional Dialogue Meetings

JCIA's Responsible Care Committee convened meetings and maintained dialogue with regional communities once every two years in each area where there is a concentration of JCIA member sites, especially chemical complexes. In FY2022, with COVID-19 still ongoing, two regions used the face-to-face method and six regions used the document-based method for dialogue.

5—Members' Self-Assessment

Details of Self-Assessment Scores (Average scores reported by JCIA members)

Assessed item	Important items						
Code	MS	EP	PS	OSH	DS	CPS	SD
1 Policy	4.7	4.7	4.6	4.7	4.2	4.6	4.5
2 Identification of striking environmental aspects, identification of dangerous and harmful factors, etc.	4.6	4.6	4.6	4.6	3.9	4.6	–
3 Legal and other requirements	4.6	–	–	–	–	–	4.0
4 Objectives	4.7	4.4	4.3	4.3	4.0	4.2	3.7
5 Plans	4.6	4.2	4.6	4.6	4.1	4.2	3.9
6 Organization	4.3	–	–	–	–	–	–
7 Education and training	4.3	4.2	4.4	4.4	4.1	4.1	3.5
8 Communication	4.3	4.1	4.2	4.7	4.1	4.3	4.0
9 Response to emergency situations	4.3	–	4.2	–	3.6	–	–
10 Documentation and document management	4.3	–	–	–	–	–	–
11 Operation management	4.5	4.3	4.5	4.5	4.0	4.1	3.6
12 Inspection and monitoring	4.5	4.6	4.4	4.5	3.8	4.3	3.6
13 Corrections and preventive measures	4.5	4.5	4.5	4.6	4.1	4.6	4.0
14 Collection of information and management of records	4.5	–	–	–	–	–	–
15 Auditing	4.6	–	–	–	–	–	–
16 Revisions by management	4.6	–	–	–	–	–	–
(Overall assessment)	4.5	4.4	4.4	4.6	4.0	4.4	4.0

Abbreviation	Code
MS	Management system
EP	Environmental protection
PS	Process safety and disaster prevention
OSH	Occupational health and safety
DS	Distribution safety
CPS	Chemicals and product safety
SD	Social dialogue

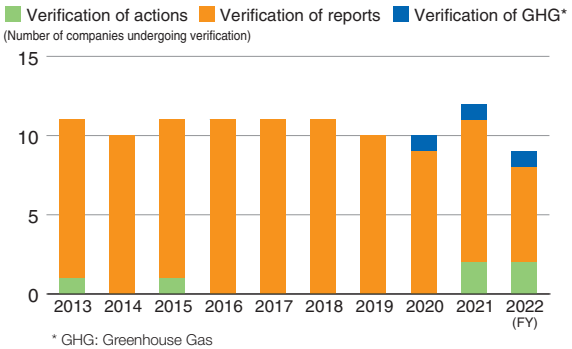
Self-assessment score	Classification
4.5 points or over	Very satisfactory
3.5 to under 4.5 points	Just about satisfactory
2.5 to under 3.5 points	Somewhat unsatisfactory
Under 2.5 points	Unsatisfactory

Details of Self-Assessment Scores (Average scores reported by JCIA members)

On a scale of 5, scores in the 4-point range were recorded for all important items in the categories of management system, environmental protection, process safety and disaster prevention, occupational health and safety, and chemicals and product safety. This shows that the PDCA cycle is being implemented at a high rate in these categories. For distribution safety, issues remain in the identification of significant environmental aspects, objectives, plans, education and training, and response to emergency situations, and inspection/monitoring, but the rest were in the 4-point range. Regarding social dialogue, there are still many issues to be addressed in all items except for the policy. The overall low score for social dialogue may be due to the fact that the effects of COVID-19 are still present and not enough opportunities for dialogue have been created.

6—Responsible Care Verification

Companies Undergoing RC Verification



* GHG: Greenhouse Gas

Companies Undergoing Responsible Care (RC) Verification

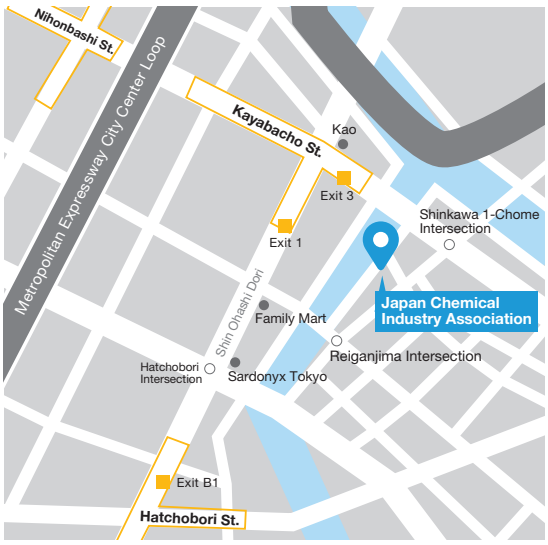
In FY2022, 9 JCIA members underwent RC verification (six companies for verification of reports, two companies for verification of actions, and one company for GHG verification). The total number of JCIA members that have undergone RC verification is 258 (206 companies for verification of reports, 49 companies for verification of actions, and three companies for GHG verification).

Verification of reports (Six companies):
Sanyo Chemical Industries, Ltd., Asahi Kasei Corporation, Shin-Etsu Chemical Co., Ltd., Sumitomo Seika Chemicals Company Ltd., Nippon Soda Co., Ltd., and Tokyo Ohka Kogyo Co., Ltd.

Verification of actions (Two companies):
Sanyo Chemical Industries, Ltd., Nissan Chemical Corporation.

GHG verification (One company): Shin-Etsu Chemical Co., Ltd.

Please refer to the publications posted on the JCIA website regarding other information such as the aggregate results of the JCIA member questionnaire.



Access Information

Kayabacho St. (Tokyo Metro Hibiya Line, Tozai Line)
Approximately 3 minutes on foot from Exit 1 or Exit 3
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JCIA ANNUAL REPORT 2023

Responsible Care®
OUR COMMITMENT TO SUSTAINABILITY

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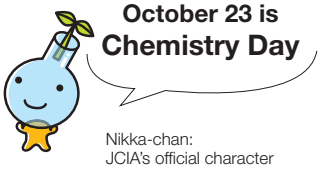

Nikka-chan:
JCIA's official character

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