



NIPPON SANSO HOLDINGS

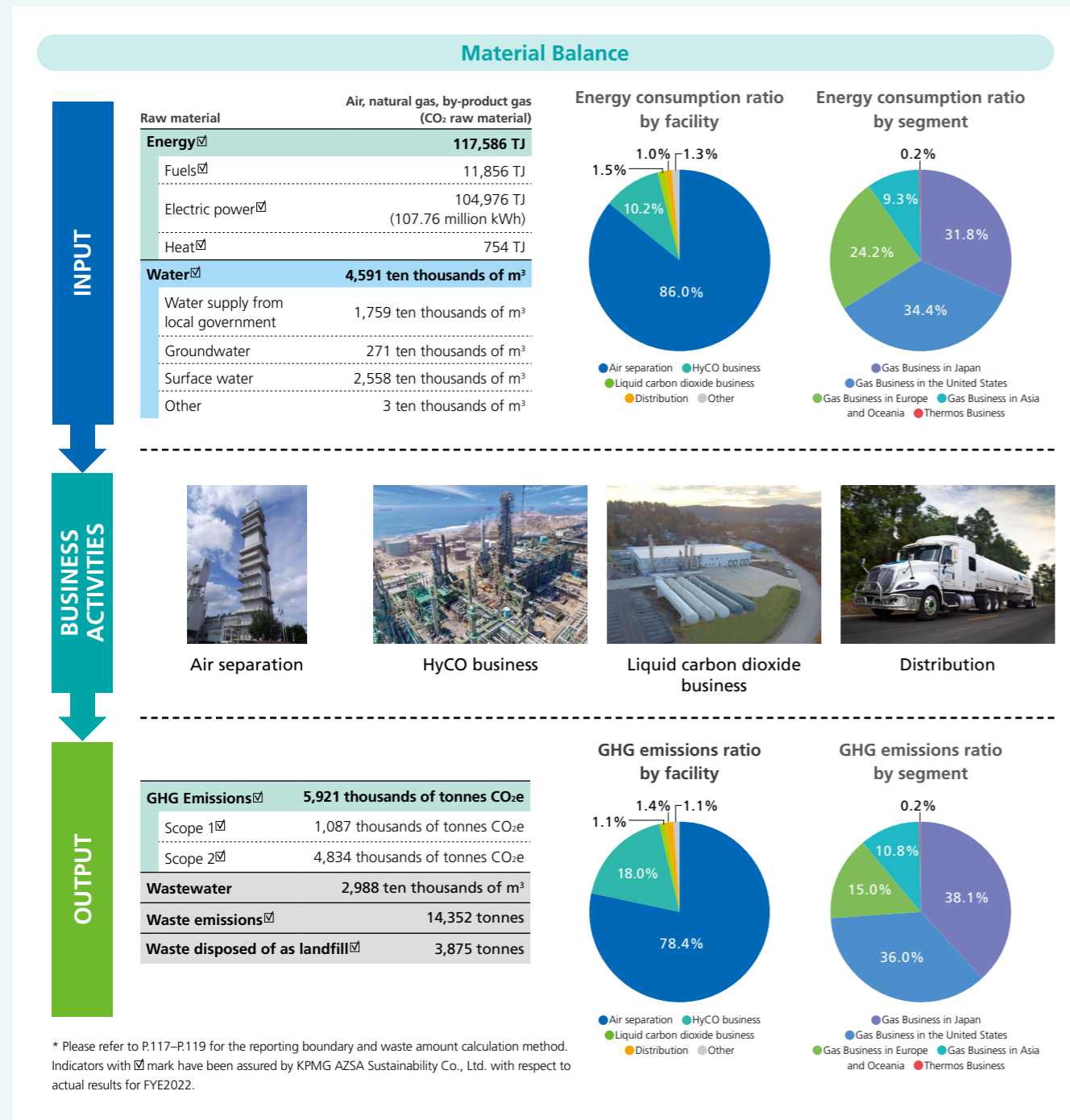
SUSTAINABILITY DATA

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Sustainability Data

Material Balance and Environmental Contribution of the Nippon Sanso Holdings Group



Environment

Unit	FYE2020	FYE2021	FYE2022	
Greenhouse Gas (GHG) Emissions				
GHG Emissions Scope 1 <input checked="" type="checkbox"/>	Thousands of tonnes CO ₂ e	1,061	987	1,087
GHG Emissions Scope 2 <input checked="" type="checkbox"/>	Thousands of tonnes CO ₂ e	4,747	4,664	4,834
GHG Emissions Scope 3—Total for the Following Categories* <input checked="" type="checkbox"/>	Thousands of tonnes CO ₂ e	3,667	4,341	3,408
Category 1 Purchased goods and services	Thousands of tonnes CO ₂ e	883	883	897
Category 2* Capital goods	Thousands of tonnes CO ₂ e	65	44	42
Category 3 Fuel- and energy-related activities not included in Scope 1 and Scope 2	Thousands of tonnes CO ₂ e	276	248	276
Category 4 Upstream transportation and distribution (Including transportation services whose cost is borne by the Company)	Thousands of tonnes CO ₂ e	40	37	39
Category 5 Waste generated in operations	Thousands of tonnes CO ₂ e	N/A	2	1
Category 6 Business travel	Thousands of tonnes CO ₂ e	1	1	1
Category 7 Employee commuting	Thousands of tonnes CO ₂ e	3	3	3
Category 8 Upstream leased assets	Thousands of tonnes CO ₂ e	N/A	N/A	N/A
Category 9 Downstream transportation and distribution	Thousands of tonnes CO ₂ e	N/A	N/A	N/A
Category 10 Processing of sold products	Thousands of tonnes CO ₂ e	N/A	N/A	N/A
Category 11 Use of sold products	Thousands of tonnes CO ₂ e	1,583	2,436	1,466
Category 12 End-of-life treatment of sold products	Thousands of tonnes CO ₂ e	N/A	N/A	N/A
Category 13 Downstream leased assets	Thousands of tonnes CO ₂ e	N/A	N/A	N/A
Category 14 Franchises	Thousands of tonnes CO ₂ e	N/A	N/A	N/A
Category 15 Investments	Thousands of tonnes CO ₂ e	816	687	683

Reporting boundary: Scope 1 emissions and Scope 2 emissions represent Nippon Sanso Holdings and its main consolidated subsidiaries. For information on Scope 3 emissions aggregation, please refer to P.126-P.127.

Scope 1 emissions: Direct emissions occurring from sources owned or controlled by the company

Scope 2 emissions: Indirect emissions from the use of electricity, steam, and heat

Scope 3 emissions: Indirect emissions other than Scope 2 emissions

GHG emissions in Japan are calculated using emission factors provided in Japan's Act on Promotion of Global Warming Countermeasures (for electricity, up until FYE2021 the basic emission factors for each electricity provider and from FYE2022 the adjusted emission factors for each provider). For GHG emissions overseas, Scope 1 emissions are calculated using emission factors set forth in Japan's Act on Promotion of Global Warming Countermeasures. Scope 2 emissions are calculated using country-specific emission factors published by the IEA. However, for electricity in Europe, beginning FYE2021 a separate emission factor for each electricity provider is used, and emissions are calculated making reference to the Guarantee of Origin. Furthermore, from FYE2022, emissions from electricity use at Taiyo Gases Co., Ltd. and Top Thermo Manufacturing (Malaysia) Sdn. Bhd are calculated using emissions coefficients for each electricity provider, while emissions from electricity use in the United States, China, Taiwan, and Singapore are calculated using published grid coefficients for each country. Please refer to P.126-P.127 for calculation method for Scope 3 emissions.

Indicators with mark have been assured by KPMG AZSA Sustainability Co., Ltd. for FYE2022.

* Due to a revision of the aggregation method, figures presented in previous fiscal years have been retroactively amended.

GHG Emission Reduction Contribution

6,865 thousands of tonnes CO₂e*1	
Products and services*2	Industrial gases*3, **4
3,176 thousand of tonnes CO ₂ e <input checked="" type="checkbox"/>	3,689 thousand of tonnes CO ₂ e <input checked="" type="checkbox"/>

Indicators with mark have been assured by KPMG AZSA Sustainability Co., Ltd.

*1 For details on the reporting boundaries and calculation methods, please refer to P.128, "Calculation Methods for GHG Emission Reduction Contribution."

*2 GHG emission reduction contribution for products and services is calculated in accordance with the Guidelines for Quantifying GHG Emission Reductions of Goods or Services through Global Value Chain (Ministry of Economy, Trade and Industry).

*3 GHG emission reduction contribution from the use of industrial gases

*4 GHG emission reduction contribution through industrial gases includes the reduction contribution of consolidated subsidiaries in Japan, Europe, Asia and Oceania, and certain affiliated companies.

Sustainability Data

Unit			FYE2020	FYE2021	FYE2022
Contributions to Environmental Protection through Products					
GHG Emission Reduction	Products and Services ☑	Thousands of tonnes CO ₂ e	2,373	2,892	3,176
Contribution	Industrial Gases ☑	Thousands of tonnes CO ₂ e	—	2,174	3,689

See P.128 for details about reporting boundaries and the calculation methods.

Energy Usage				
Energy Consumption ☑				
Electric power	Terajoules	109,512	104,142	117,586
Fuels	Terajoules	97,483	93,400	104,976
Heat	Terajoules	11,378	10,004	11,856
	Terajoules	651	738	754

Reporting boundary: Nippon Sanso Holdings and its main consolidated subsidiaries

The energy of the consumed fuels are calculated based on the gross calorific values specified in Japan's Act on the Rational Use of Energy. Purchased electricity and purchased steam are converted into primary energy amounts.

Environmental Impact				
Nitrogen oxide (NOx) emissions ☑	Tonnes	3.2	1.8	2.0
Sulfur oxide (SOx) emissions ☑	Tonnes	1.4	1.0	1.1
Particulate emissions ☑	Tonnes	0.1	0.1	0.1
Volatile organic compound (VOC) emissions ☑	Tonnes	10	5	8
Releases of substances designated under the Pollutant Release and Transfer Register (PRTR)* ☑	Tonnes	21	8	10

Reporting boundary: Consolidated subsidiaries in Japan, including Taiyo Nippon Sanso Corporation

* Due to a revision of the aggregation method, figures presented in previous fiscal years have been retroactively amended.

Water Usage					
Water Withdrawal ☑	Ten thousands of m ³	3,002	4,335	4,591	
Breakdown of sources of fresh water withdrawn	Water supply from local government	Ten thousands of m ³	1,496	1,472	1,759
	Municipal water	Ten thousands of m ³	429	490	576
	Industrial water	Ten thousands of m ³	1,067	982	1,183
	Groundwater	Ten thousands of m ³	276	258	271
	Surface water	Ten thousands of m ³	1,230	2,602	2,558
	Other	Ten thousands of m ³	—	3	3

Reporting boundary: Gas production plants operated by consolidated subsidiaries of Nippon Sanso Holdings in Japan, business locations with facilities specified under the Water Pollution Prevention Act, and main overseas consolidated subsidiaries

Result of Water Stress Level Survey Results

The NSHD Group conducts a survey on water stress over all of its production sites in order to apprehend the risks related to use of water resources and facilitate more effective response to water risks. Using the Aqueduct water risk evaluation tool developed by the World Resources Institute, we surveyed water stress at 119 sites, with the following results.

	High	Medium-high	Medium	Medium-low	Low
Japan	0 (0/24)	0 (0/24)	1,834 (6/24)	4,675 (15/24)	488 (3/24)
The United States	840 (5/44)	305 (3/44)	1,469 (13/44)	490 (4/44)	4,122 (19/44)
Europe	752 (7/29)	0 (0/29)	9,521 (8/29)	249 (3/29)	16,489 (11/29)
Asia and Oceania	270 (3/20)	115 (1/20)	724 (5/20)	797 (6/20)	1,805 (5/20)
Thermos	0 (0/2)	0 (0/2)	0 (0/2)	84 (1/2)	111 (1/2)
Overall	1,862 (15/119)	420 (4/119)	13,548 (32/119)	6,295 (29/119)	23,015 (39/119)

- FYE2022 data
- Conducted a water stress survey using the Aqueduct water risk evaluation tool
- Reporting boundary: Production sites with ASU, HyCO, or liquid carbon dioxide facilities with annual water withdrawal of 20,000 m³ or more and Thermos

Unit		FYE2020	FYE2021	FYE2022
Waste				
Waste generated* ¹ ☑	Tonnes	3,762	14,715* ⁵	14,352
Waste disposed of as landfill* ² ☑	Tonnes	284	7,152	3,875
Hazardous waste generated* ³ ☑	Tonnes	197	1,799* ⁵	2,015
Waste recycled* ⁴	Tonnes	2,381	4,885* ⁵	7,623

Reporting boundary: Nippon Sanso Holdings and its main consolidated subsidiaries

Beginning FYE2021, main overseas consolidated subsidiaries are included in the reporting boundary. Waste generated by the Gas Business in Japan is the volume for which the Company issued a manifest.

*¹ Includes valuable materials *² Includes residue after intermediate treatment outside the Group company *³ Includes specially controlled industrial waste

*⁴ We consider waste collected to be the amount of resources recycled. *⁵ To improve the accuracy of data aggregation, values presented in FYE2021 have been retroactively amended.

The figures for chemical oxygen demand (COD) emissions, nitrogen emissions in wastewater, and phosphorus emissions have been omitted from disclosure since the amounts of these emissions have been immaterial. The Nippon Sanso Holdings Group uses water primarily for indirect cooling, and its impacts on water quality are therefore not large. Taiyo Nippon Sanso and its Japanese subsidiaries have five business sites that are subject to restrictions on the concentration of COD, nitrogen, and phosphorous emissions in wastewater. The total amounts of COD, nitrogen, and phosphorous emissions for all five sites amount to less than one tonne each.

GHG Emissions				
GHG Scope 1 + Scope 2 ☑	Thousands of tonnes CO ₂ e	5,808	5,651	5,921
Gas Business in Japan	Thousands of tonnes CO ₂ e	2,273	2,014	2,253
Gas Business in the United States	Thousands of tonnes CO ₂ e	2,164	2,066	2,130
Gas Business in Europe	Thousands of tonnes CO ₂ e	871	1,049	885
Gas Business in Asia and Oceania	Thousands of tonnes CO ₂ e	499	511	638
Thermos Business	Thousands of tonnes CO ₂ e	1	11	15

Energy Consumption				
Total ☑	Thousands of gigajoules	109,512	104,142	117,586
Gas Business in Japan	Thousands of gigajoules	37,048	33,635	37,442
Gas Business in the United States	Thousands of gigajoules	37,946	36,172	40,484
Gas Business in Europe	Thousands of gigajoules	25,068	24,960	28,468
Gas Business in Asia and Oceania	Thousands of gigajoules	9,437	9,201	10,952
Thermos Business	Thousands of gigajoules	13	174	240

Electricity Consumption				
Total ☑	Millions of kWh	10,013	9,592	10,776
Gas Business in Japan	Millions of kWh	3,742	3,402	3,783
Gas Business in the United States	Millions of kWh	2,861	2,824	3,114
Gas Business in Europe	Millions of kWh	2,464	2,442	2,762
Gas Business in Asia and Oceania	Millions of kWh	945	908	1,094
Thermos Business	Millions of kWh	1	16	23

Water Withdrawal				
Total ☑	Ten thousands of m ³	3,002	4,335	4,591
Gas Business in Japan	Ten thousands of m ³	732	676	746
Gas Business in the United States	Ten thousands of m ³	724	707	729
Gas Business in Europe	Ten thousands of m ³	1,317	2,730	2,703
Gas Business in Asia and Oceania	Ten thousands of m ³	229	205	393
Thermos Business	Ten thousands of m ³	—	17	20

Waste Generated (Including Valuable Materials)*¹				
Total ☑	Tonnes	3,762	14,715* ²	14,352
Gas Business in Japan	Tonnes	3,675	5,505	4,187
Gas Business in the United States	Tonnes	—	5,691	3,486
Gas Business in Europe	Tonnes	—	758	2,909
Gas Business in Asia and Oceania	Tonnes	—	395	1,399
Thermos Business	Tonnes	87	2,366* ²	2,371

*¹ Beginning FYE2021, main overseas consolidated subsidiaries are included in the reporting boundary. Waste generated by the Gas Business in Japan is the volume for which the Company issued a manifest.

*² To improve the accuracy of data aggregation, values presented in FYE2021 have been retroactively amended.

Society

	Unit	FYE2020	FYE2021	FYE2022
Employees and Diversity (Consolidated)				
Employees* ☒	Number of individuals	19,341	19,155	19,172
Gas Business in Japan	Number of individuals	6,292	6,295	6,465
Gas Business in the United States	Number of individuals	4,724	4,534	4,406
Gas Business in Europe	Number of individuals	2,794	2,884	2,912
Gas Business in Asia and Oceania	Number of individuals	4,195	4,114	4,102
Thermos Business	Number of individuals	1,336	1,328	1,287
Employees by gender				
Male ☒	Number of individuals	15,546	15,307	15,233
Female ☒	Number of individuals	3,795	3,848	3,939
Employees by age group (Composition ratio)				
20s and below	%	16.8	16.6	16.4
30s	%	24.8	24.6	25.0
40s	%	29.0	28.6	30.1
50s and above	%	29.4	30.2	28.5
Years of consecutive service				
Overall average	Years	12.4	11.3	11.4
Men	Years	12.7	11.7	11.5
Women	Years	11.5	9.5	11.1
Average age	Years	41.0	42.3	44.2
New hires	Number of individuals	2,095	1,893	2,917
Employee turnover rate	%	6.1	5.7	7.1
Female employees as a percentage of the total number of employees ☒	%	19.6	20.1	20.5
Female managers as a percentage of total managerial positions ☒	%	13.7	14.6	14.8

* Aggregated from actual figures of the Nippon Sanso Holdings Group companies as of the end of each fiscal year. Due to differences in the reporting periods, part of the data includes figures as of the end of December.

Employees and Diversity (Non-Consolidated)				
Employees	Number of individuals	—	81*	86*
Employees by gender				
Male	Number of individuals	—	66	71
Female	Number of individuals	—	15	15
Female employees as a percentage of the total number of employees	%	—	18.5	17.4
Female managers as a percentage of total managerial positions	%	—	4.1	3.6

* Includes employees working concurrently for Taiyo Nippon Sanso Corporation (47 employees in FYE2021, 49 employees in FYE2022)

	Unit	FYE2020	FYE2021	FYE2022
Employees, Diversity, and Work-Life Balance (Registered employees of Taiyo Nippon Sanso Corporation)				
Employees	Number of individuals	2,024	2,065	2,075
Employees by gender				
Male	Number of individuals	1,775	1,789	1,784
Female	Number of individuals	249	276	291
Employees by age group (Composition ratio)				
20s and below ☒	%	18.9	19.5	19.8
30s ☒	%	19.7	20.1	20.3
40s ☒	%	29.6	27.6	25.7
50s and above ☒	%	31.8	32.9	34.2
Years of consecutive service				
Overall average	Years	17.9	17.8	17.8
Men	Years	18.5	18.5	18.6
Women	Years	13.8	12.9	13.3
Average age ☒	Years	41.9	42.3	42.4
New hires ☒	Number of individuals	109	102	85
Employee turnover rate*1 ☒	%	3.1	2.8	3.3
Companywide employee training hours*2				
New employee training hours	Hours	31,200	32,160	16,320
Employee training hours	Hours	13,897	17,716	21,504
Unions members ☒	Number of individuals	1,146	1,195	1,214
Union members as a percentage of the total number of employees ☒	%	56.6	57.8	58.5
Layoffs*3 ☒	Number of individuals	0	0	0
Female employees as a percentage of total number of employees	%	12.3	13.4	14.0
Female managers as a percentage of total managerial positions	%	1.5	1.5	1.5
Employment ratio of persons with disabilities (as of June 1 of each fiscal year) ☒	%	2.3	2.3	2.5
Number of employees reemployed after retirement ☒	Number of individuals	64	74	82
Employees using childcare leave systems ☒	Number of individuals	7	16	19
Men ☒	Number of individuals	0	6	6
Women ☒	Number of individuals	7	10	13
Employees using nursing care leave or long-term nursing care leave ☒	Number of individuals	0	0	0
Usage rate for annual paid leave*4 ☒	%	62.5	60.2	61.5
Employees using volunteer leave system ☒	Number of individuals	0	0	0

*1 Employee turnover rate is the number of employees leaving the Company during the fiscal year (including mandatory-age retirees and excluding personnel transferring to other Group companies) divided by the number of employees at the end of the fiscal year

*2 Reporting boundary: Training hours of Taiyo Nippon Sanso Corporation employees and Taiyo Nippon Sanso Group employees who took training held by Taiyo Nippon Sanso Corporation

*3 Employees leaving the Company for reasons attributable to the Company (dismissals)

*4 The number of new days granted in the reporting year is the numerator. The number of days used in the reporting year is the denominator. The denominator does not include the number of days carried over from the previous fiscal year.

Sustainability Data

Unit	FYE2020	FYE2021	FYE2022	
Others (Consolidated)				
Expenditures on social contribution initiatives	Millions of yen	49.4	109.7	84.5

* Data is calculated on a consolidated basis from FYE2021.

Occupational Health and Safety				
Frequency rate of occupational accidents resulting in lost workdays (Number of injuries / fatalities due to occupational accidents per million work hours)				
Nippon Sanso Holdings Group (Including Taiyo Nippon Sanso Group) ☒	—	2.20*	2.51*	2.10
Taiyo Nippon Sanso Group ☒	—	0.73	0.64	0.52

* To improve the accuracy of data aggregation, values presented in past fiscal years have been retroactively amended.
Reporting boundary: Consolidated subsidiaries with production divisions in Japan and overseas

Reporting Boundary

Main consolidated subsidiaries

Consolidated subsidiaries in Japan including Taiyo Nippon Sanso Corporation (International Carbon Dioxide Co., Ltd. added from FYE2022); Matheson Tri-Gas, Inc.; Nippon Gases Euro-Holding S.L.U. and its consolidated subsidiaries; Leeden National Oxygen Ltd.; Leeden Gases Sdn. Bhd; Nippon Sanso Ingasco, Inc.; Nippon Sanso Ingasco Philippines, Inc.; Nippon Sanso Ingasco Clark, Inc.; Nippon Sanso (Thailand) Co., Ltd.; Ayutthaya Industrial Gases Co., Ltd.; Taiyo Gases Co., Ltd.; Nippon Sanso Vietnam Joint Stock Company; Taiyo Nippon Sanso India Pvt. Ltd.; Shanghai Taiyo Nippon Sanso Gas Co., Ltd.; Suzhou Taiyo Nippon Sanso Gas Co., Ltd.; Dalian Changxing Island Taiyo Nippon Sanso Gas Co., Ltd.; Dalian Taiyo Nippon Sanso Gas Co., Ltd.; Yangzhou Taiyo Nippon Sanso Semiconductor Gases Co., Ltd.; Matheson Gas Products Korea Co., Ltd.; Nippon Sanso Taiwan, Inc.; Taiyo Nippon Sanso Engineering Taiwan, Inc.; Fu Yang Gas Co., Ltd.; Supagas Pty Ltd; Nippon Sanso Myanmar Co., Ltd.; Top Thermo Manufacturing (Malaysia) Sdn. Bhd; Vacuumtech Philippines Inc.

Beginning FYE2021, environmental data includes the HyCO plant and liquid carbon dioxide plant of Nippon Gases Euro-Holding S.L.U. and its consolidated subsidiaries, Top Thermo Manufacturing (Malaysia) Sdn. Bhd. and Vacuumtech Philippines Inc.; and from FYE2022, data was added from Nippon Gases Euro-Holding S.L.U. and its subsidiary filling sites, Leeden Gases Sdn. Bhd., and Matheson Gas Products Korea Co., Ltd.

Governance

Unit	FYE2020	FYE2021	FYE2022	
Activities of Committees				
Management Configuration	Number of individuals	9	9	9
Internal directors	Number of individuals	7	7	6
Independent outside directors	Number of individuals	2	2	3
Directors serving concurrently as executive officers	Number of individuals	4	3	1
Percentage of directors serving concurrently as executive officers	%	44.4	33.3	11.1
Independent outside directors as a percentage of total Board of Directors' members	%	22.2	22.2	33.3
Female directors as a percentage of total Board of Directors' members	%	0.0	0.0	11.1
Term of appointment	Years	1	1	1
Frequency of Board of Directors' meetings	Times	12	11	14
Attendance at Board of Directors' meetings	%	99.1	98.0	98.4
Attendance of independent outside directors at Board of Directors' meetings	%	100.0	100.0	100.0
Number of directors attending less than 75% of Board of Directors' meetings	Number of individuals	0	0	0
Audit & Supervisory Board members	Number of individuals	4	4	4
Internal Audit & Supervisory Board members	Number of individuals	1	1	1
Independent outside Audit & Supervisory Board members	Number of individuals	2	2	2
Independent outside Audit & Supervisory Board members as a percentage of total Audit & Supervisory Board members	%	50.0	50.0	50.0
Female Audit & Supervisory Board members as a percentage of total Audit & Supervisory Board members	%	0.0	0.0	0.0
Frequency of Audit & Supervisory Board meetings	Times	16	16	17
Attendance at Audit & Supervisory Board meetings	%	92.2	100.0	100.0
Attendance of independent outside Audit & Supervisory Board members at Audit & Supervisory Board meetings	%	89.6	100.0	100.0
Number of Audit & Supervisory Board members attending less than 75% of Audit & Supervisory Board meetings	Number of individuals	1	0	0
Average age of directors and Audit & Supervisory Board members	Years	64.3	64.8	65.8
Number of executive officers*	Number of individuals	22	7	6
Female executive officers as a percentage of total executive officers	%	0.0	0.0	0.0

* Figures for FYE2021 represent executive officers of Nippon Sanso Holdings (including the President CEO). Figures for FYE2020 and earlier represent executive officers of Taiyo Nippon Sanso Corporation (including the President CEO).

Sustainability Data

Unit	FYE2020	FYE2021	FYE2022	
Activities of Committees				
Advisory Committee on Appointments and Remuneration				
Members	Number of individuals	3	3	5
Internal directors	Number of individuals	1	1	2
Independent outside directors	Number of individuals	2	2	3
Frequency of meetings	Times	11	6	10
Attendance	%	100.0	100.0	100.0
Management Committee				
Members	Number of individuals	17	13	13
Frequency of meetings	Times	16	6	11
Attendance*1	%	97.1	100.0	100.0
Investment Committee				
Members*2	Number of individuals	12	15	15
Frequency of meetings	Times	2	1	3
Attendance*1	%	100.0	93.3	93.3
Global Strategy Review Committee				
Members	Number of individuals	—	17	17
Frequency of meetings	Times	—	1	1
Attendance	%	—	100.0	100.0
Global Risk Management Committee				
Members	Number of individuals	—	17	18
Frequency of meetings	Times	—	1	1
Attendance	%	—	100.0	100.0
Global Compliance Committee				
Members*3	Number of individuals	20	20	8
Frequency of meetings*4	Times	0	0	1
Attendance	%	—	—	87.5

*1 Average attendance rate *2 Excluding additional attendees and Secretariat *3 Excluding attendees and Secretariat from FYE2022 *4 Not held during FYE2020 or FYE2021 due to COVID-19

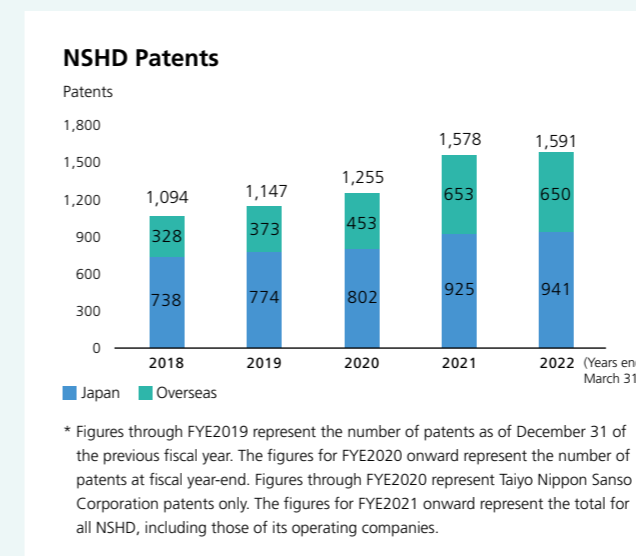
Remuneration for Officers				
Remuneration for directors (excluding outside directors)				
Total	Millions of yen	255	263	200
Basic remuneration	Millions of yen	162	169	141
Corporate political contributions	Millions of yen	93	94	59
Remuneration for Audit & Supervisory Board members (excluding independent outside members)				
Total	Millions of yen	25	27	28
Basic remuneration	Millions of yen	25	27	28
Remuneration for independent outside directors				
Total	Millions of yen	102	100	108
Basic remuneration	Millions of yen	102	100	108
Remuneration for independent auditors				
Total	Millions of yen	198	210	222
Remuneration for audit services	Millions of yen	195	209	218
Other remuneration for independent auditors	Millions of yen	3	1	4
Others				
Anti-takeover measures	—	Not adopted	Not adopted	Not adopted
Code of ethics	—	Adopted	Adopted	Adopted
Policy on transparency of tax affairs	—	Adopted (Internal)	Adopted (Currently disclosed on the Company website)	Adopted (Currently disclosed on the Company website)
Corporate political contributions*	Millions of yen	0.0	0.0	0.2
Violations of rules for the prevention of corruption	Number of violations	0	0	0
Monetary penalties incurred as a result of violations of guidelines for the prevention of corruption	Millions of yen	0.0	0.0	0.0

* Reporting boundary is consolidated from FYE2022.

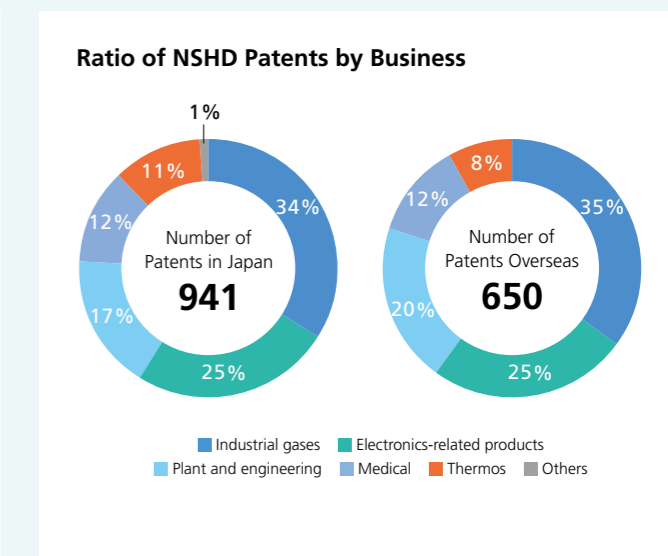
Intellectual Property and Research and Development

Unit	FYE2020	FYE2021	FYE2022	
Intellectual Property				
Registered patents				
Total	Patents	1,255	1,578	1,591
Japan	Patents	802	925	941
Overseas	Patents	453	653	650

* Figures through FYE2020 represent Taiyo Nippon Sanso Corporation patents only. The figures for FYE2021 onward represent the total for all NSHD Group operating companies combined.



* Figures through FYE2019 represent the number of patents as of December 31 of the previous fiscal year. The figures for FYE2020 onward represent the number of patents at fiscal year-end. Figures through FYE2020 represent Taiyo Nippon Sanso Corporation patents only. The figures for FYE2021 onward represent the total for all NSHD, including those of its operating companies.



Research and Development				
Research and Development				
Total	Millions of yen	3,389	3,315	3,569
Gas Business in Japan	Millions of yen	2,691	2,694	2,872
Gas Business in the United States	Millions of yen	658	589	659
Thermos Business	Millions of yen	39	32	37

Calculation Methods for Scope 3 GHG Emissions

Referenced Guidelines

Our Scope 3 GHG emissions are calculated based on the Corporate Value Chain (Scope 3) Accounting and Reporting Standard issued by the GHG Protocol.

For emission factors, we used the emission factor database Ver. 3.1 provided in the Green Value Chain Platform, the Inventory Database for Environmental Analysis (IDEA v2) for supply chain GHG emissions accounting, and information included in MilCA Ver. 2, a life-cycle assessment software developed by the Japan Environmental Management Association for Industry.

Reporting Boundary

Unless otherwise specified, the data covers Nippon Sanso Holdings and its consolidated subsidiaries in Japan, including Taiyo Nippon Sanso Corporation.

Calculation Method by Category

Category 1 Purchased goods and services	Calculated by multiplying the amounts of products and services in physical or monetary units purchased by Taiyo Nippon Sanso Corporation by the respective emission factor for each type of product or service. However, emissions from transport and shipping services and from oxygen, nitrogen, and argon purchased from Taiyo Nippon Sanso's consolidated subsidiaries or affiliates are included in the reporting boundary of Scope 1 or 2, or categories 4 and 15 of Scope 3, and are therefore deducted from the procured amounts used for this calculation.
Category 2 Capital goods	Calculated by multiplying the amounts of capital investment during each reporting fiscal year by an emission factor per price of capital goods.
Category 3 Fuel- and energy-related activities not included in Scope 1 and 2	This category includes emissions associated with the extraction, production, and transportation of purchased fuels and those consumed in the production of electricity and steam that are purchased by the Group. Fuels: Calculated by multiplying the amount purchased during the fiscal year by an emission factor for each fuel type. Electricity and steam: Calculated by multiplying the amount purchased from outside the Group by the upstream emission factor for each purchased energy reflecting electricity transmission loss.
Category 4 Upstream transportation and distribution (Including distribution services whose cost is borne by the Group)	Calculated by subtracting the CO ₂ emissions from logistics subsidiaries, which are included in Scope 1 emissions, from the CO ₂ emissions reported for Taiyo Nippon Sanso Corporation and Nippon Ekitan Corporation as specified shippers in accordance with the Act on Promotion of Global Warming Countermeasures. CO ₂ emissions related to transportation and distribution of products for which Taiyo Nippon Sanso Corporation and Nippon Ekitan Corporation bear the transportation costs are included in this category.
Category 5 Waste generated in operations	Calculated by multiplying industrial waste output by the emission factors for each waste type (including transportation stages).
Category 6 Business travel	Calculated by multiplying the number of employees of consolidated subsidiaries in Japan, including Taiyo Nippon Sanso Corporation by the emission factor (0.13 tonnes of CO ₂ /person/year).
Category 7 Employee commuting	Taiyo Nippon Sanso Corporation employees: For train commuters, the annual payment for commuter passes is multiplied by an emission factor per transportation expense. For car commuters, the round-trip distance is multiplied by the annual number of commuting days and an emission factor per person-kilometer for passenger car. Employees of Japanese consolidated subsidiaries: The number of employees is multiplied by the annual number of commuting days, and multiplied by the emission factor per commuting day.

Category 8 Upstream leased assets	Since the amount of applicable lease assets is negligible, emissions in this category are not calculated.
Category 9 Downstream transportation and distribution	The emissions associated with the transportation of sold products whose cost is borne by Taiyo Nippon Sanso Corporation and Nippon Ekitan Corporation fall within category 4 as the Group basically bears the cost of transporting products.
Category 10 Processing of sold products	The Taiyo Nippon Sanso Group's main product group is gas, and since it is difficult to rationally calculate the GHG emissions associated with the processing of these products, the emissions are not calculated.
Category 11 Use of sold products	The amount of CO ₂ emissions generated from the use of propane gas (LP gas), liquid carbon dioxide gas, and dry ice, and from use of electricity for the operation of its ASUs during the service life, which were sold to customers outside of the Taiyo Nippon Sanso Group.
Category 12 End-of-life treatment of sold products	The Taiyo Nippon Sanso Group's primary products are gases (oxygen, nitrogen, and argon). After use, these gases return to the atmosphere and do not become waste. Furthermore, since the gas containers are loaned, and therefore the amount of waste from sold is negligible, emissions in this category are not calculated.
Category 13 Downstream leased assets	Since the amount of applicable lease assets is negligible, emissions in this category are not calculated.
Category 14 Franchises	As the Group does not have any businesses in this format, there are no emissions in this category.
Category 15 Investments	Calculated by multiplying the GHG emissions of each of the eight affiliates of Taiyo Nippon Sanso Corporation in Japan that produce gas by the Company's shareholding ratio (as of the fiscal year-end). The eight companies' GHG emissions are based on their actual emissions in the reporting period.

Calculation Methods for GHG Emission Reduction Contribution

We include the following products and services sold by consolidated subsidiaries of Nippon Sanso Holdings and certain affiliated companies in the calculation of GHG emission reduction contribution. The calculation method per product or service is as follows. The CO₂ emission factors used for electricity are 0.453 t-CO₂/MWh in Japan, 0.402 t-CO₂/MWh in Europe, and the emissions factors published by the IEA for each country in Asia and Oceania.

Environmental product offerings and applications	Calculation method for GHG emission reduction	Calculation period		
		FYE2020	FYE2021	FYE2022
Products and services	Contribution to GHG emission reduction through products and services using the Nippon Sanso Holdings Group's proprietary technologies			
Combustion-type exhaust gas abatement system Reporting boundary: Consolidated subsidiaries in Japan	An average processing capacity of 0.6 L/min for nitrogen trifluoride (NF ₃) gas per one combustion-type exhaust gas abatement system was assumed, and this value was multiplied by the number of such systems that were installed in FYE2019 and FYE2022, the number of operating hours per year, and the global warming potential (GWP) of NF ₃ to calculate the GHG emission reduction contribution. The amount of CO ₂ emissions from fuel used in combustion equipment was deducted.	○	○	○
SF₆ recovery service Reporting boundary: Consolidated subsidiaries in Japan	The volume of sulfur hexafluoride (SF ₆) gas recovered in FYE2022 was multiplied by its GWP to calculate GHG emission reduction contribution.	○	○	○
SCOPE-Jet® Reporting boundary: Consolidated subsidiaries in Japan	Based on actual observed values at two electronic furnace manufacturers who had introduced SCOPE-Jet®, the electricity-saving effect per volume of jet oxygen (kWh/Nm ³) was calculated. The ratio of the number of plants that have introduced SCOPE-Jet® to the total number of electric furnace manufacturing plants was multiplied by the volume of crude steel products by electric furnaces in Japan in FYE2022, and the resulting number was assumed to be the production volume of crude steel contributed by the electricity saving from SCOPE-Jet®. The amount of oxygen consumed by SCOPE-Jet® in the production of this crude steel, and the amount of electricity saved per volume of oxygen were multiplied by the CO ₂ emission factor for electricity to calculate the GHG emission reduction contribution. The amount of the CO ₂ emissions generated during the manufacture of the oxygen was deducted.	○	○	○
MG Shield® Reporting boundary: Consolidated subsidiaries in Japan	The amount of SF ₆ gas whose use was avoided through use of MG Shield® sold in FYE2022 was multiplied by the gas' GWP to calculate the GHG emission reduction contribution.	○	○	○
New refrigerants Reporting boundary: Consolidated subsidiaries in Europe	We calculated the amount of reduction contribution by assuming a 7% per year leakage rate of new refrigerants sold from FYE2016 to FYE2022, and multiplying leakage amount by the difference between the GWP of alternative refrigerants and the GWP of new refrigerants. The reduction contribution assumes annual leakage of 7% from equipment sold in the preceding fiscal year, continuing at the same rate in the next fiscal year.	—	○	○
Nitrogen gas supply system for laser processing (PSA) Reporting boundary: Consolidated subsidiaries in Japan	The annual power consumption of Taiyo Nippon Sanso Corporation's conventional air compressor was compared with that of the energy-saving type nitrogen gas supply system to calculate the annual electricity saving from using the energy-saving type system. The annual electricity saved was multiplied by the CO ₂ emission factor for electricity and the cumulative number of units sold from FYE2013 to FYE2022 to calculate the GHG emission reduction contribution.	○	○	○
Shuttle Chef® Reporting boundary: Consolidated subsidiaries in Japan	The amount of electric power usage saved per year from using Shuttle Chef® when cooking was multiplied by the CO ₂ emission factor for electricity and the total number of units sold over the three years from FYE2020 to FYE2022 to calculate the GHG emission reduction contribution.	○	○	○
Hydrogen station Reporting boundary: Consolidated subsidiaries in Japan	The annual CO ₂ emissions, which include emissions during the manufacture of the hydrogen, emitted by fuel cell vehicles (FCVs) filled with hydrogen at hydrogen stations sold or operated by Taiyo Nippon Sanso Corporation and operated during FYE2022 was compared with the annual CO ₂ emissions of gasoline cars to calculate the GHG emission reduction contribution.	○	○	○
Industrial gases	Contribution to GHG emission reduction through industrial gases produced and supplied by the NSHD Group			
Oxygen-enriched combustion in blast furnaces Reporting boundary: Consolidated subsidiaries in Japan and Europe, and affiliated companies in Japan	We calculated the GHG emission reduction contribution as the difference between the amount of CO ₂ emissions in the production of crude steel using 100% coke and the production of crude steel via pulverized coal combustion based on crude steel production by the eight steel companies to whom the NSHD Group supplied oxygen in FYE2022. This calculation method is described in "The Impact of Oxygen on Reducing CO ₂ Emissions in Blast Furnace Ironmaking" (July 2011) by Dr. Michael F. Riley. We deducted the amount of CO ₂ emitted during the production of oxygen and the pumping of gas into the blast furnace.	—	○ (Japan)	○ (Japan and Europe)
Oxygen-enriched combustion in electronic furnaces Reporting boundary: Consolidated subsidiaries in Europe and Asia and Oceania	Based on actual observed values at two electronic furnace manufacturers who had introduced oxygen burners, the electricity-saving effect per volume of jet oxygen (kWh/Nm ³) was calculated. The amount of the reduction was calculated by multiplying the amount of oxygen transmitted to the customer by the electricity reduction per volume of oxygen for the oxygen burner, but the CO ₂ emissions coefficient for electricity. The amount of CO ₂ emission generated in manufacturing the oxygen has been deducted.	—	—	○
Argon (Ar) welding Reporting boundary: Consolidated subsidiaries in Europe	We calculated the contribution to the reduction of overall CO ₂ emissions from using Ar-CO ₂ mixed gas as a welding gas, based on actual values when performing CO ₂ welding and Ar-CO ₂ mixed gas welding using welding equipment. The calculation was based on the differences in welding speed and CO ₂ emissions to the atmosphere. Specifically, we calculated the contribution as the difference in CO ₂ emissions released directly when conducting CO ₂ welding and Ar-CO ₂ mixed gas welding with regard to the CO ₂ generated in both methods, adding the reduction effect of lower electric power consumption due to increased welding speed with mixed-gas welding. The impact of reduced electricity consumption was calculated by multiplying the amount of electricity consumption saved due to mixed gas welding by the CO ₂ emissions coefficient. The amount of CO ₂ emissions generated in the manufacture of Ar is deducted from the contribution to reduced CO ₂ emissions.	—	—	○

Independent Assurance Report

Independent Assurance Report

To the Representative Director, President CEO of Nippon Sanso Holdings Corporation

We were engaged by Nippon Sanso Holdings Corporation (the "Company") to undertake a limited assurance engagement of the environmental and social performance indicators marked with ☑ (the "Indicators") for the period from April 1, 2021 to March 31, 2022 included in its Integrated Report 2022 (the "Report") for the fiscal year ended March 31, 2022.

The Company's Responsibility

The Company is responsible for the preparation of the Indicators in accordance with its own reporting criteria (the "Company's reporting criteria"), as described in the Report.

Our Responsibility

Our responsibility is to express a limited assurance conclusion on the Indicators based on the procedures we have performed. We conducted our engagement in accordance with the 'International Standard on Assurance Engagements (ISAE) 3000, Assurance Engagements other than Audits or Reviews of Historical Financial Information' and the 'ISAE 3410, Assurance Engagements on Greenhouse Gas Statements' issued by the International Auditing and Assurance Standards Board. The limited assurance engagement consisted of making inquiries, primarily of persons responsible for the preparation of information presented in the Report, and applying analytical and other procedures, and the procedures performed vary in nature from, and are less in extent than for, a reasonable assurance engagement. The level of assurance provided is thus not as high as that provided by a reasonable assurance engagement. Our assurance procedures included:

- Interviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's reporting criteria.
- Inquiring about the design of the systems and methods used to collect and process the Indicators.
- Performing analytical procedures on the Indicators.
- Examining, on a test basis, evidence supporting the generation, aggregation and reporting of the Indicators in conformity with the Company's reporting criteria, and recalculating the Indicators.
- Visiting the Goi Plant of Chiba Sanso Center Co., Ltd. selected on the basis of a risk analysis.
- Evaluating the overall presentation of the Indicators.

Conclusion

Based on the procedures performed, as described above, nothing has come to our attention that causes us to believe that the Indicators in the Report are not prepared, in all material respects, in accordance with the Company's reporting criteria as described in the Report.

Our Independence and Quality Control

We have complied with the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which includes independence and other requirements founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior. In accordance with International Standard on Quality Control 1, we maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

/s/ Kazuhiko Saito
Kazuhiko Saito, Partner, Representative Director
KPMG AZSA Sustainability Co., Ltd.
Tokyo, Japan
September 16, 2022

Notes to the Reader of Independent Assurance Report:
This is a copy of the Independent Assurance Report and the original copies are kept separately by the Company and KPMG AZSA Sustainability Co., Ltd.