

Status of GHG Emissions

Facing the severe challenge of climate change, TSRC continues to review and examine the balance between industry and the environment, and dedicates our efforts to energy conservation and carbon reduction with the vision of achieving carbon neutrality. With 2021 as the base year, TSRC aims to reduce Scope 1 + 2 GHG emissions by 10% by 2025 and by 22.5% by 2030, and to achieve a renewable energy ratio of 10% by 2025 and 30% by 2030. TSRC's GHG emissions were reduced by 16.08% in 2025, exceeding the original target of a 10% reduction in 2025.

Goals and Achievement	Achievements in 2025	2025 Goals	2026 Goals	2030 Goals
	✓ Total emissions decreased by 16.08% compared to base year	Total carbon emissions decreased by 10% compared to the base year^{base} (56,068.51 tons CO₂e) Note: 2021 Emissions (base year): 560,685.08 tons CO₂e	Total carbon emissions reduced by 12.5% compared to the base year (reduced by 70,085.64 tons CO₂e)	Total carbon emissions reduced by 22.5% compared to the base year (126,154.14 tons CO₂e)

1. Strategy of GHG Emissions Reduction

In response to global climate action, TSRC has set a vision to achieve carbon neutrality. TSRC will continue to invest in green manufacturing processes and increase the use of renewable energy while actively implementing energy conservation and carbon reduction measures. As a manufacturer of specialty chemicals, TSRC prioritizes the reduction of Scope 1 and Scope 2 GHG emissions. TSRC optimizes its processes and utility systems and expanding its green process innovations. In response to the Scope 1 reduction strategy, TSRC has stopped using coal-fired boilers since 2020 to reduce emissions from coal use, while adjusting the fuel used in boilers at all plants to replace fuel oil with natural gas. No fuel oil was used in the entire TSRC Group. From 2022, TSRC has reduced the use of boiler fuel through steam reduction measures. In the future, TSRC will continue to reduce Scope 1 emissions by regulating steam consumption. Scope 2 emissions are reduced through saving energy resources, improving energy efficiency, and reducing the amount of electricity purchased from external sources. Together with using more renewable energy sources, we have further decreased Scope 2 emissions. Regarding Scope 3 emissions and product use, TSRC encourages suppliers to reduce their carbon footprint and continues to develop sustainable and environmentally friendly products. TSRC is continuously evaluating carbon offset options and accelerating the reduction of greenhouse gas emissions as part of our long-term goal to achieve carbon neutrality.

2. Direction of GHG Emissions Reduction

Low-Carbon Processes

TSRC is committed to promoting energy conservation and carbon reduction. All plants optimize their process operations and utility systems and invest in high-efficiency equipment as the main direction of carbon reduction to reduce electricity and steam consumption.

1. **Optimizing Process Operations:** Promotes the optimization of process operation to achieve energy saving and carbon reduction targets by adjusting parameters and operating methods. Added heat exchanger and AC inverter, and continuously optimized production processes to optimize energy efficiency and reduce electricity and steam consumption, total electricity savings of 57,902 kWh (208 GJ), steam savings of 7,054 metric tons (18,456 GJ), and annual emissions reduction of 1,641 metric tons of CO₂ equivalent.
2. **Optimizing Utility Systems:** For lighting systems, air conditioning systems, and other utilities, TSRC uses a combination of equipment replacement and optimized operating conditions to save electricity.
Optimized the operation of the cooling tower, and adopted internal ceramic coating techniques for the water pumps used for cooling tower circulation, improving pump performance efficiency, and integrated chilled water into the installation area. Total electricity savings of 41,700 kWh (150 GJ) and annual emissions reduction of 20 metric tons of CO₂ equivalent.
3. **Investing in High-Efficiency Equipment:** Actively invests in highly energy efficient process equipment to reduce energy consumption and carbon emissions per unit product.
Adopted cooler compressors with new models. Total electricity savings of 1,503,994 kWh (5,414 GJ), and annual emission reduction of 713 metric tons of CO₂ equivalent.

3. GHG Emissions

Direct Emissions and Indirect Emissions from Energy Use (Scope 1 + Scope 2)

The 2022-2025 reporting boundary covers all factories and subsidiaries identical to the reporting scope in the financial statements. The operational control approach is adopted in accordance with ISO14064-1:2018. Verification conducted by DNV GL Business Assurance Co., Ltd. (DNV). Data is rounded to the second decimal place. Please refer to the [TSRC website](#) for the Verification Statement.

● TSRC Group Greenhouse Gas Emissions and Emission Intensity (by Subsidiary)

Unit: t CO₂e

		TSRC Corporation (Global Business Headquarters, Gangshan Factory, and Kaohsiung Factory)	Shen Hua Chemical	Nantong Industries	TSRC-UBE	Shanghai Industries	TSRC (Vietnam)	TSRC Specialty Materials	Polybus	TSRC (Lux.)	TSRC Group Total
2022	Scope 1	96,900.17	6,380.22	7,485.08	3,192.44	25.81	5.58	24,274.45	0.00	0.00	138,263.75
	Scope 2	53,670.89	96,102.37	149,597.03	84,735.95	1,135.13	840.36	21,150.90	1.54	0.11	407,234.28
	Scope 1+2	150,571.06	102,482.59	157,082.11	87,928.39	1,160.94	845.94	45,425.35	1.54	0.11	545,498.03
	Production Volume (metric tons)	178,484	170,522	72,822	67,217	5,494	577	44,910	0	0	540,026
	Greenhouse Gas Emissions Intensity (tCO ₂ e/metric ton of product)	0.84	0.60	2.16	1.31	0.21	1.47	1.01	0.00	0.00	1.01
2023	Scope 1	101,462.37	6,474.18	8,658.28	3,237.44	32.63	5.74	19,379.14	0.00	0.00	139,249.78
	Scope 2	44,228.41	93,787.78	130,157.52	85,609.78	1,024.61	995.63	19,113.65	1.15	0.17	374,918.70
	Scope 1+2	145,690.78	100,261.96	138,815.80	88,847.22	1,057.24	1,001.37	38,492.79	1.15	0.17	514,168.48
	Production Volume (metric tons)	178,370	171,221	66,747	67,622	6,094	1,101	39,846	0	0	531,001
	Greenhouse Gas Emissions Intensity (tCO ₂ e/metric ton of product)	0.82	0.59	2.08	1.31	0.17	0.91	0.97	0.00	0.00	0.97
2024	Scope 1	107,440.13	5,781.87	7,763.53	4,252.66	29.26	6.71	26,088.11	0.00	0.00	151,362.26
	Scope 2	34,438.12	91,750.15	121,349.87	82,971.64	1,472.96	1,011.38	23,425.09	1.05	0.18	356,420.45
	Scope 1+2	141,878.25	97,532.02	129,113.40	87,224.30	1,502.23	1,018.09	49,513.20	1.05	0.18	507,782.71
	Production Volume (metric tons)	178,727	181,266	68,434	68,253	6,540	1,291	47,732	0	0	552,243
	Greenhouse Gas Emissions Intensity (tCO ₂ e/metric ton of product)	0.79	0.54	1.89	1.28	0.23	0.79	1.04	0.00	0.00	0.92

		TSRC Corporation (Global Business Headquarters, Gangshan Factory, and Kaohsiung Factory)	Shen Hua Chemical	Nantong Industries	TSRC-UBE	Shanghai Industries	TSRC (Vietnam)	TSRC Specialty Materials	Polybus	TSRC (Lux.)	TSRC Group Total
2025	Scope 1	116,947.76	7,977.98	7,020.78	3,246.09	29.33	N/A	19,474.96	0.00	0.00	154,696.90
	Scope 2	24,114.30	96,500.18	102,196.80	69,396.10	1,537.75	N/A	22,110.36	1.99	0.12	315,857.61
	Scope 1+2	141,062.05	104,478.15	109,217.58	72,642.20	1,567.08	N/A	41,585.33	1.99	0.12	470,554.50
	Production Volume (metric tons)	181,772	273,112	70,426	68,339	7,379	N/A	46,957	0	0	647,985
	Greenhouse Gas Emissions Intensity (tCO ₂ e/metric ton of product)	0.78	0.38	1.55	1.06	0.21	N/A	0.89	0.00	0.00	0.73

Note 1: This table includes seven types of greenhouse gases: carbon dioxide, methane, nitrous oxide, HFCs, PFCs, sulfur hexafluoride, and nitrogen trifluoride. The 2022-2025 GWP values are based on IPCC AR6.

Note 2: Scope 1 emissions are calculated using the emissions factor and the mass balance calculation method. Scope 2 emissions are calculated using emissions factors and market-based method, and the factors used in this table are as follows:

Taiwan Global Business Headquarters, Kaohsiung Factory, Gangshan Factory: The GHG Emission Factor announced by the Ministry of Environment (2024.02.05).

China 2022-2023: Shen Hua Chemical, Nantong Industries, and TSRC-UBE and Shanghai Industrial use China's provincial electricity emission factors, the United Nations Intergovernmental Panel on Climate Change (IPCC) assessment reports, and the Shanghai Bureau of Ecology and Environment [2022] No. 34 The Notice of Shanghai Ecological Environment Bureau on the Adjustment of Emission Factor Values related to the City's Greenhouse Gas Emission Accounting Guidelines. 2024: Nantong Industries uses the national average carbon emission factor of electricity (excluding non-fossil fuel electricity generated through market-based transactions), while Shen Hua Chemical, TSRC-UBE, and Shanghai Industries use the national average carbon emission factor of electricity. 2025: Shen Hua Chemical, Nantong Industries, and TSRC-UBE use the national average carbon emission factor of electricity (excluding non-fossil fuel electricity generated through market-based transactions). Shanghai Industries is based on the CO₂ emission factor of the surplus combined electricity from the Shanghai public grid.

Vietnam TSRC (Vietnam): Vietnam's Ministry of Industry and Trade, Vietnam Ministry of Natural Resources and Environment electricity emission factors, and Intergovernmental Panel on Climate Change (IPCC) Assessment Reports

USA TSRC Specialty Materials: U.S. EPA database and Intergovernmental Panel on Climate Change (IPCC) Assessment Reports

Note 3: According to the ISO14064-1:2018 standard, TSRC Group's Scope 2 GHG emissions (location-based) were 360,432.32 metric tons CO₂e in 2024 and 354,937.21 metric tons CO₂e in 2025.

Note 4: The 2022-2025 reporting boundary covers all factories and subsidiaries identical to the reporting scope in the financial statements. The operational control metric is adopted in accordance with ISO14064-1:2018. Verification conducted by DNV GL Business Assurance Co., Ltd. (DNV) in 2025. Data is rounded to the second decimal place. Please refer to the [TSRC website](#) for the Verification Statement.

Note 5: TSRC (Vietnam) suspended operations and ceased production at the end of December 2024, so no greenhouse gas inventory was conducted in 2025.

Other Indirect Emissions (Scope 3)

Since 2021, TSRC has complied with ISO 14064:2018 to identify and screen other indirect emissions according to the materiality criteria, and to inventory other material indirect emissions, including Category 3 (indirect GHG emissions from transportation) and Category 4 (indirect GHG emissions from products used by an organization), reporting boundary covers all factories and subsidiaries identical to the reporting scope in the financial statements.

Other Indirect Greenhouse Gas Emissions

Category 3: Indirect greenhouse gas emissions from transportation		Emissions (Unit: t CO ₂ e)	
Emissions from upstream transportation and distribution (major raw materials)		2022	597.53
Description Emissions from inland transportation of major raw materials for which each site pays its own transportation costs		2023	669.78
		2024	837.85
	Corresponding GHG Protocol Category 4. Upstream Transportation and Distribution	2025	785.78

Category 4: Indirect greenhouse gas emissions from products used by an organization		Emissions (Unit: t CO ₂ e)	
Emissions from the purchase of products (major raw materials)		2022	1,233,512.58
Description Emissions from upstream production activities of major raw materials as defined by each site		2023	1,221,527.83
		2024	1,266,833.82
	Corresponding GHG Protocol Category 1. Purchased Goods and Services	2025	1,516,893.99
Emissions from activities related to energy resources (excluding Categories 1 and 2)		2022	75,354.60
Description Emissions from upstream production activities of natural gas, fuel oil, water and electricity purchased for use at each site		2023	88,138.62
		2024	48,398.53
	Corresponding GHG Protocol Category 3. Fuel- and Energy-Related Activities	2025	51,421.85
Emissions from the removal and disposal of waste from operations		2022	23,756.76
Description Emissions from the removal and treatment of solid and liquid waste from the organization		2023	22,435.82
		2024	15,605.18
	Corresponding GHG Protocol Category 5. Waste Generated in Operations	2025	14,813.70

Note 1: This table includes seven types of greenhouse gases: carbon dioxide, methane, nitrous oxide, HFCs, PFCs, sulfur hexafluoride, and nitrogen trifluoride. Scope 3 adopted the emission factor method, and GWP values for 2022-2025 are based on IPCC AR6.

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