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Material Topics Target and Achievement

Key Performance Indicator	United Nations Sustainable Development Goals (SDGs)	2023 Goals	2023 Status and Achievements	Short-term Goals (2024)	Mid-term Goals (2025 - 2030)	Long-term Goals (2030 and beyond)			
		Climate Sti	rategy and Actions	\$					
GHG unit emission reduction (Scope 2) (compared to the base year of 2019)	13 ciment Acres	≧ 3%	Achieved (16.72%)	≧ 4%	≧ 10% (by 2030)	Achieve RE100			
Energy Management									
Reduction in Unit Electricity Consumption (compared to the base year of 2019)	12 standing of the second seco	≧ 3%	Achieved (8.17%)	≧ 4%	≧ 10% (by 2030)	Continue to introduce energy-saving measures and increase the utilization rate of renewable energy to reduce unit electricity consumption			
Waste Management									
Waste recycling rate (recycling and reuse treatment ratio for the total waste volume) (compared to the base year of 2019)	12 standard southern an instances	≧ 83%	Not achieved ^{note} (81.53%)	≧ 84%	≧ 90% (by 2030)	Continue to increase the recycling rate of waste generated by operational production sites			
0 abnormal incident was reported to the competent authority		0 case	Achieved	0 case	0 case	0 case			
		Water Reso	ource Managemen	t					
Reduction in Unit Water Withdrawal (compared to the base year of 2019)	Bittanana Bittananan Bittananan	≧ 4%	Achieved (26.08%)	≧ 5%	≧ 11% (by 2030)	Continue to implement water-saving and water recycling and reuse related measures to reduce the unit water withdrawal.			
0 abnormal incident was reported to the competent authority	CO 🕅	0 case	Achieved	0 case	0 case	0 case			

Note: Due to changes in waste treatment measures of subsidiaries

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3.1 Energy Management

By implementing the ISO 50001 Energy Management System, GlobalWafers monitors major energy-using equipment, formulates improvement plans, and regularly tracks the performance of improvement measures to achieve the goal of continuous improvement, energy conservation, and carbon reduction. 62.5% of all 16 production sites have implemented energy management systems, and the 5 production sites in overseas factories will complete the implementation of energy management systems (ISO 50001) and obtain third-party certification by the end of 2024. GlobalWafers also expects to facilitate corporate innovation power, lower environmental ecology footprints for various products and services, and enhance corporate image and competitiveness through our concerns over environmental protection and sustainable issues.

According to the statistics, the total power consumption of all GlobalWafers' plants in 2023 was 1,125,082 MWh, about 47,027 MWh less than the previous year. According to the statistics, purchased electricity accounted for about 90.75% of the energy consumption; the renewable energy usage ratio was about 2.70%^{Note}. In 2023, Taiwan reported a total energy saving of 5,479,658 kWh. In addition to continuing the previous energy-saving measures, in 2023, the Company invested in 25 energy-saving measures in Taiwan sites, including air conditioning energy saving, unit performance improvement, machine improvement, and lighting energy saving, at a cost of NT\$42,872,100, with energy-saving benefits reaching 2,660,106 kWh, reducing carbon emissions by 1,316.6 metric tons. For overseas sites, the Company invested in 37 energy-saving solutions in 2023, with setup costs totaled US\$9,908,665 (approximately NT\$304,242,550), resulting in a power-saving benefit of 9,709,788 kWh, which translates to a reduction of 4,469.2 metric tons of carbon emissions. In total, 7,181.5 metric tons of CO2 emissions were reduced by implementing the energy saving programs throughout the year.

Note: Renewable energy usage ratio = renewable energy (MJ)/total energy usage (MJ)

Total Electricity Consumption by Plants worldwide



Energy usage in Taiwan

	ltom	2021	20	22	20	23	
	nem	Taiwan	Taiwan	Overseas	Taiwan	Overseas	
	Externally purchased electricity	1,206,543,762	1,154,530,714	3,065,061,703	1,075,847,996	2,974,446,691	
tem	Renewable energy	42,496	76,420	105,287,309	76,779	120,316,442	
	Natural gas	20,754,905	24,925,829	265,855,091	24,643,471	244,596,617	
	Diesel	213,797	235,093	24,718,626	423,828	22,605,872	
	Gasoline	0	0	38,960	0	32,269	
	Total	1,227,554,960	1,179,768,055	3,460,961,689	1,100,992,074	3,361,997,892	

Note

- 1. Taiwan: GlobalWafers Headquarters, Zhunan Plant, and Taisil Branch.
- Overseas: GlobalWafers Japan Co., Ltd., Kunshan Sino Silicon Technology, MEMC Electronic Materials S.p.A, MEMC Korea Company, MEMC LLC, MEMC Japan Ltd., GlobiTech Incorporated., MEMC Electronic Materials Sdn. Bhd., Topsil GlobalWafers A/S.
- 3. For the year 2021, only data for Taiwan was disclosed. Starting from the years 2022-2023, data for overseas regions was also disclosed.
- 4. Conversion unit: 1 degree of electricity = 3.6 MJ; 1 cubic meter of natural gas = 33.494 MJ; 1 liter of diesel = 35.169 MJ; 1 liter of gasoline = 32.657 MJ.
- 5. For the years 2022-2023, except for the offices and production sites added in November 2023, the data in the above chart covers 100% of GlobalWafers' production facilities.

Note:

- 1. Taiwan: GlobalWafers Headquarters, Zhunan Plant, Taisil Branch
- Overseas: GlobalWafers Japan Co., Ltd., Kunshan Sino Silicon Technology, MEMC Electronic Materials S.p.A, MEMC Korea Company, MEMC LLC, MEMC Japan Ltd., GlobiTech Incorporated., MEMC Electronic Materials Sdn. Bhd., Topsil GlobalWafers A/S.
- 3. Except for the offices and production sites added in November 2023, the data in the above chart covers 100% of GlobalWafers' production facilities.

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GlobalWafers' Denmark subsidiary Topsil is poised to become the first semiconductor crystal manufacturing factory to utilize its own installed 100% green electricity in the second half of 2024.



Denmark Plant solar power plant simulation diagram

As part of GlobalWafers' push for green manufacturing, Topsil, a subsidiary in Denmark, signed a cooperation agreement with SolarFuture, a solar power system service provider, in November 2023 to build a brand-new solar power plant next to Topsil's plant. GlobalWafers' Danish site, Topsil, is poised to become the first semiconductor crystal manufacturing site to utilize its own installed 100% green electricity during 2H of 2024. By constructing a new solar park with an estimated capacity of 10.2MW, the power plant is expected to generate 9,500,000 kWh per year. Accordingly, Topsil is set to produce more electricity than it consumes, marking a significant milestone in GlobalWafers' green manufacturing process.

$\odot \textbf{Energy}$ conservation measures

[Case in Focus]

Classification	Energy Saving Projects	Calculated Energy Saving Period	Annual Energy Savings (kWh)	Annual Energy Savings (GJ)	Carbon emission reduction equivalent(ton CO ₂ e)	Electricity Bill Saved (NT\$)	Investment (NT\$)
	G	ilobalWafers Headqu	uarters & Zhunan	Plant			
Air Condition Energy Saving	B1 medium warehouse inverter box-type air conditioner project (continued)	1/1~4/30	24,528	88,301	12.1	77,214	-
	Quality inspection air conditioning box motor energy saving improvement project (30HZ)	5/1~12/31	10,368	37,325	5.1	32,638	1,000
	Cooling tower energy-saving fans in the factory	2/1~12/31	52,828	190,181	26.1	164,189	163,000
	Add inverter control to air conditioners and ice machines	2/1~12/31	696,666	2,507,998	344.8	2,165,238	6,000,000
	Permanent Magnet Motor Power Saving Project	2/1~12/31	33,000	118,800	16.3	102,564	220,000
	Frequency reduction for MAU441	3/1~12/31	7,790	28,044	3.9	24,211	0
	Switching to IE3 for subscription 4R and 4R water pumps (continued)	1/1~10/31	7,694	27,699	3.8	24,221	-
Machine Efficiency Enhancement	Benefit improvement project of obsolete replacement of air compressor heads (continued)	1/1~3/31	13,946	50,206	6.9	43,903	-
	A005 Consolidated benefits of rinsing tower aging (continued)	1/1~11/30	118,470	426,492	58.6	372,944	-
	Replacement of 7.5HP*2 sets of energy-saving fans for GWC1 cooling tower	4/1~12/31	7,808	28,107	3.9	24,578	140,000

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Classification	Energy Saving Projects	Calculated Energy Saving Period	Annual Energy Savings (kWh)	Annual Energy Savings (GJ)	Carbon emission reduction equivalent(ton CO ₂ e)	Electricity Bill Saved (NT\$)	Investment (NT\$)
	13T 10T ultrapure water booster pump adjustment case	4/1~12/31	16,632	59,875	8.2	52,358	1,000
	Operation control of cutting fluid mixer (continued)	1/1~2/28	401	1,444	0.2	1,246	-
	Implementation of total energy-saving thermal field (15 furnaces) (continued)	1/1~5/31	811,250	2,920,500	401.6	2,521,365	-
	Office computer virtualization*15 (continued)	1/1~1/31	109	392	0.1	339	-
Machine	Development of high-efficiency heat treatment process in polysilicon furnace (continued)	1/1~3/31	7,680	27,648	3.8	23,869	-
Efficiency	Update of wastewater discharge pump B (continued)	1/1~11/30	4,004	14,414	2.0	12,444	-
Enhancement	Adjustment of the ice outlet water temperature by the plant manager (continued)	1/1~9/30	439,200	1,581,120	217.4	1,365,034	-
	Energy saving of acid rinsing tower cycle PUMP	2/1~12/31	4,004	14,414	2.0	12,444	80,000
	Energy saving project of transfer pump in reclaimed water relay pond	5/1~12/31	866	3,118	0.4	2,692	100,000
	MCZ Energy Saving Project	1/1~12/31	322,346	1,160,446	159.6	1,001,851	6,500,000
	Ice crystal growth machine/monitoring system update	10/1~12/31	503,284	1,811,822	249.1	1,564,207	10,000,000
Machine	TENCOR6220 Solid-State Laser Evaluation Report (continued)	1/1~3/31	3,338	12,017	1.7	10,508	-
Improvement	FF grinding machine vacuum machine energy saving	8/1~12/31	1,073	3,863	0.5	3,335	2,000
	GWC1 lobby lighting energy saving improvement project (continued)	1/1~4/30	324	1,168	0.2	1,021	-
	Lighting energy saving case for washing machine flats (continued)	1/1~6/30	362	1,303	0.2	1,140	-
	Large conference room and new conference room lighting improvement project	3/1~12/31	1,229	4,425	0.6	3,869	357,000
Energy	Quality assurance lighting fixtures were replaced with LED panel lights case	11/1~12/31	238	857	0.1	750	23,800
Saving on Lighting	Improvement in the replacement of lighting fixtures in the wafer area with LED flat panel lights	11/1~12/31	212	763	0.1	667	66,300
	Improvement of lighting in the chemical warehouse on 1F (continued)	1/1~1/31	93	335	0.0	289	-
	Visual inspection room lighting turned off during breaks (continued)	1/1~10/31	1,200	4,320	0.6	3,730	-
	Energy-saving improvement of office lighting on 3F (continued)	1/1~2/28	1,303	4,691	0.6	4,050	-
	Change of lighting in the aisle area on 2F	10/1~12/31	1,392	5,011	0.7	4,326	130,000



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		Taisil Electro	onic Plant				
Air Condition	Replacement of water-cooled box-type air conditioners for IT equipment rooms with high-efficiency environmentally friendly models (continued)	1/1~6/30	185,632	668,276	91.9	565,064	-
Energy Saving	Energy Saving Project for ingot cooling room in crystal growth area	8/1~12/31	150,446	541,605	74.5	457,957	1,684,000
	Added UB#7 ice machine (load switching)	7/1~12/31	701,002	2,523,608	347	2,133,850	15,000,000
Machine Efficiency	Adoption of a new type of heater to enhance the heating efficiency of grinding and cleaning machines (continued)	1/1~9/30	7,548	27,174	3.7	22,977	-
Enhancement	Improvement of 200mm wire saw pulp pipeline (continued)	1/1~5/31	4,113	14,805	2	12,519	-
	Improve the 300mm thermal field design to enhance the thermal insulation effect Option A (continued)	1/1~11/30	403,584	1,452,904	199.8	1,228,511	-
	Improve the 300mm thermal field design to enhance the thermal insulation effect Option A (continued)	1/1~10/31	263,190	947,485	130.3	801,151	-
	Improve the crystal growth process and shorten the processing time Option A (continued)	1/1~11/30	514,145	1,850,924	254.5	1,565,059	-
Machine Improvement	Improve the 300mm thermal field design to enhance the thermal insulation effect Solution C	12/1~12/31	7,859	28,292	3.9	23,922	1,089,000
	Improve the crystal growth process and shorten the processing time Option A	2/1~12/31	125,806	452,903	62.3	382,954	136,000
	Adoption of a new type of heater to enhance the heating efficiency of sandblasting and cleaning machines (continued)	10/1~12/31	3,418	12,305	1.7	10,404	108,000
	300mm epitaxy machine using low-power pump	11/1~12/31	2,467	8,880	1.2	7,508	360,000
	Replacement of halogen lamps with LED lamps for the visual inspection machine	10/1~12/31	4,896	17,627	2.4	14,905	315,000
	Replacement of strong lights with LED lamps for the visual inspection machine	12/1~12/31	1,397	5,030	0.7	4,253	240,000
Energy Saving on Lighting	Replacement of inspection machine with LED lamps	4/1~12/31	3,079	11,085	1.5	9,373	156,000
	Installation of an automatic cut-off device for the LED lamp of the polishing machine (continued)	1/1~9/30	6,635	23,884	3.3	20,196	-
	Replacement of halogen lamps with LED lamps for visual inspection machines (continued)	1/1~3/31	801	2,885	0.4	2,439	-
Taiwan Total	Electricity		5,479,658	19,726,769	2,712.3	16,886,276	42,872,100



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Energy Saving Projects	Calculated Energy Saving Period	Annual savings (kWh)	Annual savings (GJ)	Carbon emission reduction equivalent (ton CO ₂ e)	Electricity bill savings (USD)	Investment (USD)
MEMC EI	ectronic Material	s S.P.A (Merano F	Plant)			
Sludge drain pumps power reduction		131,400	473,040	30.9	13,266	8,791
Replace the liquid nitrogen system's water evaporators with a natural convection mode	I	50,174	180,626	11.8	5,066	0
Low power puller HZ expansion 2023 - 5 puller	0000	547,000	1,969,200	128.5	55,226	0
Second inverter on pumps station of CZA demi cooling water loop	2023	105,120	378,432	24.7	10,613	10,989
Recycle water from puller cooling loop to Administrative building heating		11,340	40,824	2.7	1,145	16,484
Energy usage efficiency improvements activities as for ISO 50001 plan		157,680	567,648	37.1	15,919	0
MEMC EI	ectronic Material	s S.P.A (Novara P	lant)			
New Guardhause Heat Pump		60,000	216,000	14.4	6,058	18,545
New sludge dryer		50,000	180,000	12.0	5,048	2,408,791
Electrical power station factor correction (CE 03)	2023	700,000	2,520,000	168.0	70,673	19,181
Chiller replacement "Glicolated water" (only summer season)		70,000	252,000	16.8	7,067	0
Upgrade of the air compressors cooling system		75,261	270,940	18.1	7,598	0
	MEMC Korea	Company				
Reduce agitator operation time		166,411	599,080	76.0	16,801	0
Install ceiling fan instead of the aircon		70,068	252,245	32.0	7,074	0
G-scrubber#5 circulation pump motor down sizing (45 \rightarrow 37.5kW)	2023	65,689	236,480	30.0	6,632	0
power off when vaccum pump for puller is not needed at Fab#1 and Fab#2		227,721	819,796	104.0	22,991	0
Grinder hydraic pump idle tiem controls at Fab#1 and Fab#2		10,948	39,413	5.0	1,105	0
Fab#2 Class 1 Clean Room Humidity (26%→28%)		602,146	2,167,726	275.0	60,793	0
CPCW Temperature Change (27→28.5)		1,057,587	3,807,313	483.0	106,775	0
Kunsh	an Sino Silicon T	echnology Co., L	td.			
Replacement of magnetic levitation inverter ice machine & water system integration for 1#350RT ice water chiller	2023	710,000	2,556,000	552.8	71,682	0
Replacement of high-efficiency T8 LED lights		40,800	146,880	31.8	4,119	0
MEN	IC Electronic Ma	terials Sdn. Bhd.				
Install Variable Speed Drive (VSD) to control chiller cooling tower fan speeds (total 6 fans 11kW) based on condensor water supply temperature)	190,716	686,578	111.6	19,255	18,271
Install VSD to control Chiller condenser water pumps speed (total 3 pumps 45kW based on return condensor water temperature from individual chillers.	2023	397,920	1,432,512	232.8	40,174	36,166
Install VSD for 3DI RO pump (18.5kW - 4 units) to control flow of water by slow down the pump instead of controlling using valve		135,492	487,771	79.3	13,679	10,911

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Classification	Energy Saving Projects	ng Projects Calculated Energy Annua Saving Period (Annual savings (GJ)	Carbon emission reduction equivalent (ton CO ₂ e)	Electricity bill savings (USD)	Investment (USD)
		Topsil Globa	Iwafers A/S				
Re-use heat from	n kompressor	2023	40,000	144,000	5.6	4,038	10,000
		МЕМС	LLC				
Optimize Cooling	Optimize Cooling Tower G condensor water setpoint to reduce chiller energy use		400,000	1,440,000	262.0	40,384	0
Reclaim SOI was	stewater for use in cooling towers	2023	524,000	1,886,400	343.2	52,903	865,836
		MEMC Ja	pan Ltd.				
Switch Heat Sour	rce of WSAW		180,000	648,000	78.8	18,173	34,590
Reducing transfo	Reducing transformer no-load losses. COP is improved by lowering the brine chiller cooling water temperature.		12,487	44,953	5.5	1,261	4,842,165
COP is improved			2,880	10,368	1.3	291	0
Change lighting t	o LED.	2023	5,952	21,427	2.6	601	4,856
Updated package	e air conditioner.		35,784	128,822	15.7	3,613	51,885
Building 4 solar p	ower generation		245,050	882,180	107.3	24,740	414,389
Inverter refrigerat	tor installed in Building 4		2,160,000	7,776,000	946.1	218,075	775,233
		GlobalWafers 、	Japan Co.,Ltd.	1			
LED Lighting			9,354	33,674	4.4	944	9,475
Renewal of Trans	sformer	0000	4,608	16,589	2.2	465	43,629
Replacement of o	Replacement of cooling water pump for cooling tower		14,136	50,890	6.7	1,427	58,468
Aggregation of ch	niller		442,064	1,591,430	209.5	44,631	250,000
Overseas Total	Electricity		9,709,788	34,955,237	4,469.2	980,305	9,908,655

Note:

The carbon emission coefficient of electricity in Taiwan is calculated based on 0.495 (kg CO2 e/degrees 2), the MEMC Electronic Materials SPA (Merano Plant) is calculated at 0.235 (kg CO2 e/degree), and the MEMC Electronic Materials SPA (Novara Plant) is calculated at 0.235 (kg CO2 e/degree), MEMC Korea Company is calculated at 0.4567 (kg CO2 e/degree), Kunshan Zhongchen Silicon Crystal Co., Ltd. is calculated at 0.77865 (kg CO2 e/degree), MEMC Korea Company is calculated at 0.4567 (kg CO2 e/degree), Kunshan Zhongchen Silicon Crystal Co., Ltd. is calculated at 0.7865 (kg CO2 e/degree), MEMC Electronic Materials SAn. Bhd. is calculated at 0.585(kg CO2 e/degree), Topsil Globalwafers A/S calculated at 0.14 (kg CO2 e/degree), MEMC LLC is calculated at 0.655 (kg CO2 e/degree), MEMC Japan Ltd. is calculated at 0.438 (kg CO2 e/degree), GlobalWafers Japan Co., Ltd. is calculated at 0.474 (kg CO2 e/degree).

2. After weighted calculation, the electricity fee of each factory is calculated at 3.148 NTD/kWh for GlobalWafers Headquarters, 3.148 NTD/kWh for the Zhunan plant, and 3.044 NTD/kWh for the Taisil Branch. For overseas locations, due to the difficulty in obtaining precise statistics, the average amount of Taiwan's plants is converted to USD for calculation.



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Case in Focus

GlobalWafers' Zhunan Plant has outstanding performance in energy conservation due to its deep cultivation of green manufacturing

GlobalWafers continues to promote green technology and energy-saving concepts. By introducing a number of energy-saving projects, we achieved remarkable results in electricity consumption, water usage, and waste management. As a representative of manufacturers with outstanding energy saving performance, GlobalWafers' Zhunan Plant was invited to host an energy saving observation activity in 2023 to provide a platform for science park manufacturers to exchange and learn from each other and inspire more enterprises to participate in environmental protection actions.

Through various improvement activities, the unit product electricity intensity and greenhouse gas emission intensity decreased by 23.7% in 2022 compared to the previous year. In 2023, energy-saving improvements were made by installing variable frequency drives on the air conditioning chiller units and chilled water circulation pumps, replacing the crystal growing process chiller units with high-temperature variable frequency chillers, and upgrading the monitoring systems. These upgrades allow the equipment to automatically adjust its operating frequency based on actual demand. Thereby reducing energy consumption while further improving energy efficiency. This resulted in an impressive annual electricity savings of nearly 3.09 million kWh and a reduction of 1,530 tons of carbon emissions

per year.

Regarding renewable energy, in order to meet the Group's sustainable growth goal of using 100% green energy by 2050, GlobalWafers' Zhunan Plant has installed solar panels on the roof. The utilization rate of the roof reached 100%. It is estimated that this setup can generate 250,000 kWh of electricity annually, thereby enhancing energy resilience and mitigating the impact of climate change.



3.2 Water Resource Management

Due to the extreme global climate, the risk of climate change has become a key issue that enterprises must face in their operations, making water resource management critical

3.2.1 Water Withdrawal, Discharge, and Consumption

• Management of water withdrawal-related impacts

The water sources for GlobalWafers' factories worldwide are divided into the third-party water supply. surface water, and groundwater sources. The water source of each base is fresh water (<1,000 mg/ L total dissolved solids). The water in the Taiwan area is taken from the tap water supplied by the Taiwan Water Company. None of the raw water sources are classified as national or international nature reserves or sensitive water bodies.

GlobalWafers' total water withdrawal in 2023 showed a downward trend compared to previous years. The water withdrawal in 2023 was 18,874 megaliters, which decreased by 889.6 megaliters compared to 2022. In terms of water withdrawal impact, in Taiwan, for example, the water withdrawal in 2023 was approximately 2,149.6 megaliters.

According to the World Resources Institute's "Water Risk Assessment Tool" (WRI Aqueduct), our global facilities' water risk assessment results indicate that the plant in Mainland China is rated as "High - Medium risk (3)" for water sources. The other bases are rated as "Low - Medium risk (1-2)" without any water source pressure issues. The proportion of our total water withdrawal/total water consumption and high water stress areas are 1.64% and 1.97%, respectively. Nonetheless, each factory has adopted internal water management and external cooperation strategies to reduce the impacts that operational activities have on water resources.

• Management of water discharge-related impacts

To ensure compliance with water discharge standards, GlobalWafers adheres to local regulations and implements pollution prevention measures at all facilities. In addition to reducing the amount of pollutants in the process and using high-efficiency equipment for water recycling and pollutant treatment, we also conduct self-testing and regular outsourced wastewater testing and long-term follow-up monitoring of effluent quality to ensure that the quality of effluent from each factory area meets local effluent standards. In addition to the previously listed substances of concern for the substances of concern to the Taiwan factory, new pre-treatment devices for fluoride ions were set up. We use equipment to reduce the emission concentration to reduce the harm to discharged water bodies. GlobalWafers' total water discharge volume was 16,390.4 megaliters in 2023, a slight decrease from 16,825.2 megaliters in 2022. In 2023, there were no major leakage or overflow incidents from the GlobalWafers plant areas.



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• Water Resource Management and Conservation

Global rainfall has become extremely unstable in recent years, and water supply stability has become a challenge due to extreme climate problems. GlobalWafers is dedicated to reusing recovered water in response to the water shortage risks caused by global climate change. In terms of water recycling and reuse, the total volume of water recovered by our plants worldwide in 2023 is 5,154.2 megaliters. In 2023, the plants in Taiwan recovered and reused1,773.3 megaliters of water, which accounted for 34.41% of the total water volume recovered. With respect to the water resource recycling rate, the average water resource recycling rate for global factories in 2023 is 21.45%, a 0.44% increase from 21.01% in 2022. For Taiwan area, the water resource recycling rate for 2022 and 2023 were 45.47% and 45.2% respectively, making it the region with the better water resource recycling area amongst all of our global factories.



⊙ 2021~2023 Water withdrawal, discharge, and consumption

	2021		2022			2023			
Item	Taiwan	Overseas	Water resource stressed areas	Taiwan	Overseas	Water resource stressed areas	Taiwan	Overseas	Water resource stressed areas
Surface water	0	1,269.4	0	0	1,261.2	0	0	2,024.4	0
Underground water	0	9,492.5	0	0	8,274.2	0	0	7,135.1	0
Seawater	0	0	0	0	0	0	0	0	0
Third-party water	2,117	8,016.9	341.8	2,297	7,930.8	334.1	2,149.6	7,565.0	309.5
Total	20,895.9		341.8	19,763.6		334.1	18,874.0		309.5
Surface water	0	5,656.7	0	0	4,634.6	0	0	3,912.8	0
Underground water	0	0	0	0	0.0	0	0	0.0	0
Seawater	0	4,738	0	0	4,435.1	0	0	3,619.5	0
Third-party water	1,731.3	5,221.6	300.6	1,869.9	5,885.6	273.0	1,788.6	7,069.5	260.3
Total	17,3	47.6	300.6	16,8	25.2	273.0	16,3	90.4	260.3
sumption Volume	385.7	3,162.6	41.2	427.5	2,510.9	61.2	361.0	2,122.7	49.2
Total	3,54	8.3	41.2	2,93	38.4	61.2	2,48	33.7	49.2
	Item Surface water Underground water Seawater Third-party water Total Surface water Underground water Seawater Third-party water Total umption Volume	ItemTaiwanSurface water0Underground water0Seawater0Third-party water2,117Total20,83Surface water0Underground water0Surface water0Underground water0Total20,83Surface water0Underground water0Third-party water1,731.3Total17,34umption Volume385.7Total3,54	2021ItemTaiwanOverseasSurface water01,269.4Underground water09,492.5Seawater00Third-party water2,1178,016.9Total20.89,492.5Surface water00Underground water00Surface water00Underground water00Seawater00Seawater00Seawater1,731.35,221.6Third-party water1,731.35,221.6Unption Volume385.73,162.6Total3,54.33,162.6	2021ItemTaiwanOverseasWater resource stressed areasSurface water01,269.40Underground water09,492.50Seawater0000Third-party water2,1178,016.9341.8Surface water05,656.70Underground water000Surface water000Underground water000Seawater04,7380Seawater1,731.35,221.6300.6Third-party water1,731.35,221.6300.6umption Volume385.73,162.641.2Total3,35.73,162.641.2	Item20212021TaiwanVater resource stressed areasTaiwanSurface water01,269.4ColorUnderground water09,492.5ColorSeawater09,492.5ColorSeawater2.1178,016.9341.8Total20,8341.82,297Surface water05,656.7ColorUnderground water05,656.7ColorSurface water04,738ColorOuderground water1,731.35,221.6300.6Third-party water1,731.35,221.6300.6Total17,327.6300.61,869.9Total385.73,162.641.2427.5Total3,523.73,162.641.22,93Total3,523.73,162.641.22,93Total3,523.73,162.641.22,93	Item20212022ItemTaiwanOverseasWater resource stressed areasTaiwanOverseasSurface water01,269.4001,261.2Underground water09,492.5008,274.2Seawater000000Third-party water2,1178,016.9341.82,2977,930.8Total20,89.7341.819,-7341.819,-7Surface water05,656.7000Underground water0000.00.0Seawater00000.0Seawater04,738000.0Third-party water1,731.35,221.6300.61,869.9Total17,34.7300.616,859.72,510.9umption Volume385.73,162.641.22,93.1Total3,52.73,162.641.22,510.9	ItemOverseasVater resource stressed areasTaiwanOverseasWater resource stressed areasSurface water01,269.4001,261.20Underground water09,492.5008,274.20Seawater09,492.50008,274.20Third-party water2,1178,016.9341.82,2977,930.8334.1Total20.78,016.9341.819,-7334.1Surface water05,656.700000Underground water05,656.70004,634.600Surface water04,738004,634.6000Didderground water04,738000000Surface water00000000Didderground water0000000Other ground water0000000Didderground water0000000Didderground water0000000Didderground water0000000Didderground water0000000Didderground water00 <t< td=""><td>ItemOverseasVater resource stressed areasTaiwanVater resource stressed areasVater resource stressed areasTaiwanTaiwanTaiwanTaiwanSurface water01,269,40.000.01,261,20.000.00Underground water09,492,50.000.08,274,20.000.00Seawater000.000.000.000.000.000.00Third-party water2,1178,016,93418,82,2977,930,8334.12,149,6Total20.85570.0100.00.000.000.000.00Underground water05,656,70.000.000.000.00Surface water00.00.000.000.000.00Underground water0.03,521,60.000.000.000.00Seawater1,731,35,221,6300,61,869,95,885,6273,01,788,6Total17,31,35,221,6300,61,659,72,510,90.61,23,61,0Total3,8573,162,6441,2427,52,510,90.61,23,61,0Total3,522,73,162,6441,2427,52,510,90.61,23,61,2Total3,523,73,162,6441,2427,52,510,90.61,23,61,2Total3,523,73,162,6441,2427,52,510,90.61,23,61,2</td><td>ItemQuerses:Q</td></t<>	ItemOverseasVater resource stressed areasTaiwanVater resource stressed areasVater resource stressed areasTaiwanTaiwanTaiwanTaiwanSurface water01,269,40.000.01,261,20.000.00Underground water09,492,50.000.08,274,20.000.00Seawater000.000.000.000.000.000.00Third-party water2,1178,016,93418,82,2977,930,8334.12,149,6Total20.85570.0100.00.000.000.000.00Underground water05,656,70.000.000.000.00Surface water00.00.000.000.000.00Underground water0.03,521,60.000.000.000.00Seawater1,731,35,221,6300,61,869,95,885,6273,01,788,6Total17,31,35,221,6300,61,659,72,510,90.61,23,61,0Total3,8573,162,6441,2427,52,510,90.61,23,61,0Total3,522,73,162,6441,2427,52,510,90.61,23,61,2Total3,523,73,162,6441,2427,52,510,90.61,23,61,2Total3,523,73,162,6441,2427,52,510,90.61,23,61,2	ItemQuerses:Q

Unit: megaliters

5,256.2

45.5%

2022

5,154.2

45.29

-0

2023

100%

80%

60%

40%

20%

0%

Water Resource

Recycling Rate

in Taiwan



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Note:

1. Taiwan: GlobalWafers Headquarters, Zhunan Plant, Taisil Branch

2. Overseas: GlobiTech Incorporated, GlobalWafers Japan Co., Ltd., MEMC Electronic Materials Sdn. Bhd., MEMC Electronic Materials S.p.A, MEMC Japan Ltd., MEMC Korea Company, MEMC LLC, Kunshan Sino Silicon Technology, Topsil GlobalWafers A/S

3. Water consumption density: water consumption (megaliters)/consolidated revenue (NT\$millions)

4. Except for the offices and production sites added in November 2023, the data in the above chart covers 100% of GlobalWafers' production facilities.

5. Water resource recovery rate: Reclaimed water volume/(total water withdrawal + reclaimed water volume); the reclaimed water volume in Taiwan is based on the data reported on the water balance chart formulated by the governing unit.

• Water conservation programs

Site	Project name	Description for the project	Benefit (Reduce the water consumption, reduce water-related expenses, etc.)
GlobalWafers Co., Ltd Zhunan Plant	GWC2 ultrapure water equipment resin cleaning water recycling and reuse project	Plan the pipeline engineering, change the pipeline, install new water meters and record the water, and recycle the wastewater after washing.	It is estimated that water consumption from tap water can be reduced by 40 m^3 per year.
GlobalWafers, Taisil Branch	POU water recycle system in the EPI expansion area	Add a water recycling system to reduce the amount of tap water taken	It is estimated that water consumption from tap water can be reduced by 90,000 m ³ per year.
	Removal of liquid nitrogen evaporators	Replace the liquid nitrogen system's water evaporators with a natural convection model	Reduction of a continuous consumption of first level water equal to 30 m 3 /h (saving equal to 260,000 m 3 water per year)
MEMC Electronic Materials	Heat pump Administrative Building	Recycle water from puller cooling loop to Administrative building heating	Reduction of the water consumption equal to 30 m ³ /h for the building heating system operation period. (saving equal to 130,000 m ³ water per year)
S.p.A. (Merano plant)	Reduction of water cooling loop pressure	Lower the cooling water circuit pressure from 4.2 to 4.0 bar to reduce the energy consumption of submersible pumps by 16%	Reduction of a continuous consumption of first level water equal to 30 m 3 /h (saving equal to 260,000 m 3 water per year)
MEMC Electronic Materials S.p.A. (Novara plant)	Upgrade of the air compressors cooling system	Replacement of the air compressors cooling loop using well water with a closed loop of chilled water	Saving of a continuous consumption of first level water equal to 300,000 m ³ per year





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3.3 Waste Management

GlobalWafers' waste management emphasizes source reduction, manufacturing process improvement and source reduction in order to reduce waste generated. Meanwhile, recycling, re-use and re-utilization are implemented within factories to reduce amount for newly purchased raw materials while lowering amount of wastes generated. Finally, the company implements commissioned clearance (including incineration, landfill and physical treatment). Currently, all wastes in our respective factories are treated through commissioned clean-up. There are no cases of multi-national (overseas) waste treatment. In the past 3 years, no major waste treatment vendor violations have been discovered, and an audit mechanism has been established to ensure legal compliance by the waste treatment vendors and determine whether to cooperate with such vendors. There has been also no major leakage or overseas hazardous industrial waste disposal incidents from any plants

In Taiwan, our waste generated goes through clearance and handling in accordance with waste clearance related regulations to comply with the most basic requirements from laws and regulations. Prior to commissioning the waste treatment, collection by categories and storage management are implemented within the plants. After appropriate and legal waste clearance and handling contractors are selected based on the features of waste, the waste is thus handed over to the contractors for handling, clearance and reporting where the waste is shipped all in accordance with environmental protection regulations. To effectively manage waste flow and ensure proper waste disposal, GlobalWafers conducts audits based on the nature of the vendors (removal/treatment/recycling). As for clearance institutes, we emphasize on factory access control. For handling/reutilization institutes, audit is conducted on materials of their storage facility, treatment facility, treatment capability, operation of pollution prevention equipment, on-site safety, hygiene and firefighting management as well as company operation condition. Audit results then are categorized into grades to determine whether later collaboration will be continued or the audit frequency should be enhanced.

\odot In addition, our waste-related impact management includes :

- \star a. Preventing any significant impact caused by managed wastes
 - (1) To prevent the significant impact of waste management, GlobalWafers has installed air pollution control equipment, waste (sewage) pre-treatment facilities, and proper waste storage facilities, and the operation and management of all factories around the world comply with the requirements of local environmental protection laws and regulations, and proper operation and management reduce the impact on the environment.
 - (2) GlobalWafers strictly adheres to the principle of recycling and reuse and has taken proper recycling measures and control operations to reduce the impact on environmental quality.
- \star b. Treatment flow for wastes derived from our own operations

Derivative waste generated from its own operations is managed through incineration, landfill, and recycling by third-party organizations. Proper waste disposal is ensured through contractual agreements.

★ c. Collection of waste-related data

The quantity of derivative waste generated from its own operations is recorded monthly. Waste removal is conducted in accordance with local environmental regulations at each global plant, either handled internally or outsourced to third-party organizations for processing.

In 2023, Taiwan's waste disposal volume was 7,733 metric tons, of which general industrial waste accounted for 98.71% and hazardous industrial waste accounted for 1.29%. The amount of waste processed in overseas areas was 26,832.6 metric tons, of which general industrial waste accounted for 69.6% and hazardous industrial waste accounted for 30.4%.

Percentage of industrial Waste in 2023



- Note:
- 1. Taiwan: GlobalWafers Headquarters, Zhunan Plant, Taisil Branch
- Overseas: GlobiTech Incorporated, GlobalWafers Japan Co., Ltd., MEMC Electronic Materials Sdn Bhd, MEMC Electronic Materials S.p.A., MEMC Japan Ltd., MEMC Korea Company, MEMC LLC, Kunshan Sino Silicon Technology, Topsil GlobalWafers A/S
- 3. Except for the offices and production sites added in November 2023, the data in the above chart covers 100% of GlobalWafers' production facilities.





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Taking the wastes generated by GlobalWafers' operations in 2023 as an example, general wastes (including recycled raw materials) accounted for 76.11% (26,307.37 metric tons) of the total wastes, and hazardous wastes accounted for 23.89% (8,258.27 metric tons) of the total waste. Regarding waste treatment, we have prioritized the waste recycling operations implemented during waste disposal (such as recycling and reuse), which account for approximately 89.9% of the total waste disposal volume.

Contrat 200

Unit: Metric Ton



Note:

1. Preparation for reuse: Take a product or composition intended for waste and adopt the inspection, cleaning, or repair methods to reuse it for its original purpose. 2. Recycle: Reprocess (chemical, physical, heat treatment, solidification, or other methods) waste products or components to produce new materials.

Unit: Metric Ton

Turno of wasto	Total autout	Transfer during disposal				Direct disposal			
Type of waste		Transfer method	On-site	Off-site	Total	Disposal method	On-site	Off-site	Total
General waste (include renewable raw materials)		Preparation for reuse	0.00	0.00	0.00	Incineration	0.00	690.59	690.59
	26,307.37	Recycle	0.00	23,130.41	23,130.41	Landfill	0.00	2,486.36	2,486.36
		Total	0.00	23,130.41	23,130.41	Total	0.00	3,176.95	3,176.95
		Preparation for reuse	0.00	0.00	0.00	Incineration	0.00	314.08	314.08
Hazardous waste	8,258.27	Recycle	0.00	7,934.13	7,934.13	Landfill	0.00	10.06	10.06
		Total	0.00	7,934.13	7,934.13	Total	0.00	324.14	324.14
Total	34,565.64	Total	0.00	31,064.54	31,064.54	Total	0.00	3,501.09	3,501.09



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2021-2023 Total waste output from GlobalWafers



Curring Treat Landfill Thermal treat Chemical Tre Chemicals Incineration Recycle Recycle & ret Note: 1. Taiwan: Global 2. Overseas: Glob LLC, MEMC Ja 3. Waste output a 4. Waste density: 5. Except for the



1. Taiwan: GlobalWafers Headquarters, Zhunan Plant, Taisil Branch

 Overseas: GlobiTech Incorporated, Kunshan Sino Silicon Technology, MEMC Electronic Materials S.p.A, MEMC Korea Company, MEMC LLC, MEMC Japan Ltd., GlobiTech Incorporated., MEMC Electronic Materials Sdn. Bhd., Topsil GlobalWafers A/S.

3. Waste output and general waste, excluding recycled raw materials

4. Waste density: waste volume (ton)/consolidated revenue (NT\$millions)

5. Except for the offices and production sites added in November 2023, the data in the above chart covers 100% of GlobalWafers' production facilities.

2021-2023 GlobalWafers' Industrial Waste Disposal Method



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3.3.1 Raw Material Re-Utilization

GlobalWafers has promoted the ISO 14001 environmental management system and introduced the product life cycle concept in order to reduce raw material consumption and waste output, and achieve the goal of sustainable operation and environmental protection.

Based on different manufacturing processes, our respective factories utilize as much recycled raw materials as possible. Recycled raw materials utilized by GlobalWafers' respective global factories include silicon raw materials, cutting fluid (supporting agent), product package carton and wafer cassette.

GlobalWafers relies mainly on silicon as its main raw materials for production. During the crystal growth stage, we use the tailings recycled within the plants as much as possible to save the procurement costs and to reduce the waste outputs.



⊙ 2023 Recycled Raw Materials Utilization Status

ltem	Total Amount of the Year (Tons)	Total Recycled Amount of the Year (Tons)	Recycle Rate of the Year
Silicon raw material	5,269.94	1,012.15	19.21%

Note: This table includes GlobalWafers Headquarters, GlobalWafers Zhunan Plant, Taisil Branch, MEMC Electronic Materials S.p.A, GlobalWafers Japan Co., Ltd., MEMC Japan Ltd., MEMC Korea Company.

Single Factory Re-Utilization Rate

- GlobalWafers Zhunan Plant 24.55%
- Taisil Branch 18.13%
- GlobalWafers Japan Co.,Ltd 19.73%
- MEMC Electronic Materials S.p.A 14.79%
- MEMC Korea Company 21.65%

Single Factory Re-Utilization Rate

- Taisil Branch 62.8%
- MEMC Electronic Materials S.p.A 71.3%
- MEMC Korea Company 55.8%
- MEMC Japan Ltd. 59.92%



Single Factory Re-Utilization Rate

- GlobalWafers Headquarters 95.34%
- Taisil Branch 5.18%
- GlobalWafers Japan Co., Ltd 18.34%
- MEMC Japan Ltd. 14.78%
- MEMC Korea Company 55.07%

Single Factory Re-Utilization Rate

- GlobalWafers Headquarters 20.75%
- Taisil Branch (Hybox) 80.88%



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3.4 Air Pollutant Emissions

GlobalWafers' production processes vary across different plants, leading to slight differences in process emissions at each location. For instance, in Taiwan, the Hsinchu Plant & Zhunan Plant produce three main types of emissions: acidic waste gas, volatile organic compounds (VOCs), and particulate matter. In contrast, the Taisil Branch produces four main types of emissions: acidic gases, nitrogen oxides, volatile organic compounds (VOCs), and particulate matter. Based on the characteristics of the process exhaust, we divert the flow at the source of the pollutants. For the vapor and combustible gases, first pre-treat high-concentration pollutants in the on-site processing equipment before sending the gas to the central processing equipment for the second stage of treatment. Treatment with terminal control equipment to improve air pollution treatment efficiency.

We continue to pay attention to the operational stability of air pollution control equipment. We have installed continuous and automatic monitoring flow meters and other monitoring instruments in discharge pipelines, as well as backup equipment. The backup equipment can be turned on in a timely manner in the event of an equipment malfunction. To maintain the stable operation of the control equipment and minimize the risk of pollution; in addition, the responsible unit performs daily on-site inspection of the control equipment, implements movement management, and confirms that the air pollution system is operating normally and that various operating parameters are within the control range. In 2023, we did not encounter any abnormal air pollution control equipment or other air pollution-related disciplinary incidents. In addition, we did not emit perfluorinated compound pollutants in 2023.

Air Pollution Control and Treatment Process



Air Pollutant Emissions from 2021 to 2023



1. Taiwan: GlobalWafers Headquarters, Zhunan Plant, Taisil Branch

 Overseas: GlobalWafers Japan, Co., Ltd., Kunshan Sino Silicon Technology MEMC Electronic Materials S.p.A(Novara plant), MEMC Korea Company, MEMC LLC., GlobiTech Incorporated., MEMC Electronic Materials Sdn. Bhd., Topsil GlobalWafers A/S.