2022

Solar Applied Materials Technology Corp.

ESG Report

SOLAR and Circular Economy

Company Profile

Established in 1978, Solar Applied Materials Technology Corporation (SOLAR) is the world's leading supplier of sputtering targets. Founded upon a platform of recycling and refining precious and rare metals, we are particularly focused on the research, development and manufacturing of high-value functional materials applied in data storage, optoelectronic displays and semiconductors. We expect to create value through innovation, and have made it our mission to develop critical materials in Taiwan. By integrating resources within the company, we built a complete and fast product development cycle and a business model in the circular economy. We are able to offer clients a total solution covering everything from the supply of raw materials, manufacturing of sputtering targets, component production and maintenance, parts cleaning, recycling and refining, to management of precious and rare metals.

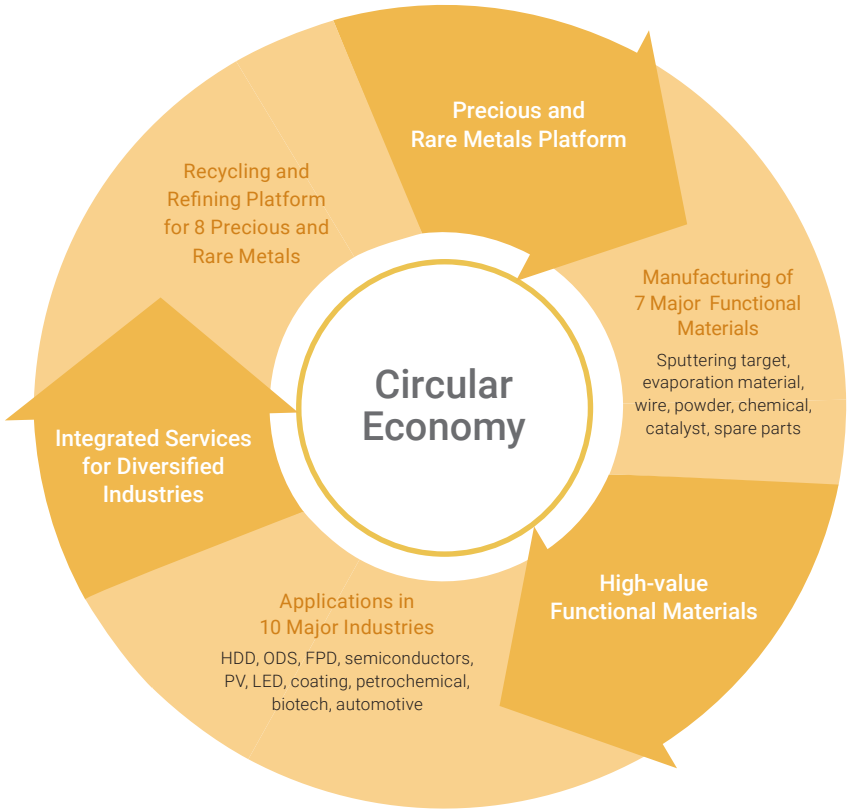
In terms of functional materials, SOLAR has developed over 3,000 alloys and 30 types of metal oxides with a combination of more than 50 elements. With extensive experience in material design, we offer products in the forms of thin-film sputtering target, evaporation material, wire, powder, chemical and catalyst. As for the recycling and refining of precious and rare metals, we have a competitive business model – our technology can raise the purity of waste materials to industrial grade 3N5 (99.95%). We also attained accreditation from the London Bullion Market Association (LBMA) in gold, silver and platinum bars. SOLAR offers recycling and refining services in five precious metals and three rare metals.

Additionally, SOLAR is actively involved in electronic waste recycling. We are dedicated to promoting a green circular economy model for precious and rare metals, offering clients the solution to transform scraps into high-end materials. In 2019, we became the world's first sputtering target supplier to pass BS 8001 Circular Economy Certification with Level 4, the highest level. In 2020, four of our products were validated to UL 2809 Standard for Recycled Content, including potassium gold cyanide (PGC), evaporation slug, gold kilo bar and ITO sputtering target.

Circular Economy – Transforming Scraps into High-end Materials

With the vision of “Green, Value and Future” in mind, SOLAR recycles scraps of precious and rare metals, processing them into industrial-grade raw materials through proprietary refining and purification technologies. These refined materials are directly made into various industrial products for use by domestic and global clients, thus implementing the circular economy model of transforming scraps into high-end materials.

▼ SOLAR's green circular economy model for precious and rare metals



Carbon Emissions Reduced by Metals Recycling and Refining

Here at SOLAR, we believe in circular economy and urban mining. We extract precious and rare metals from electronic waste so that waste materials can be recycled and reused, thereby reducing dependence on imported resources, maximizing the use of resources, and reducing environmental impact created by resource exploitation. Our goal is to build a green circular economy. SOLAR regularly statistics on the recycled volumes of the top six metals. In 2022, the total recycled volumes of the six metals was approximately 247 tonnes. Regarding our recycled volumes in 2022, gold and silver respectively reduced by 28% and 21% due to a reducing volume of imported materials. Platinum grew by 16% due to higher demand. Palladium reduced by 13% due to decrease in waste liquid recycling. Indium decreased by roughly 6% due to a reducing volume of the spent target of clients.

▼ Total amount of the top six metals recycled by SOLAR over the past three years

(unit: kilogram)

Material	Recycled Volume		
	2020	2021	2022
Gold (Au)	12,967	14,726	10,655
Silver (Ag)	146,553	169,499	134,486
Platinum (Pt)	3,913	4,552	5,286
Ruthenium (Ru)	12,150	14,513	14,534
Palladium (Pd)	209	484	421
Indium (In)	103,194	87,344	81,764
Total	**278,986**	**291,118**	**247,146**

Note: Recycled volume of silver (Ag) excludes the processing of imported materials from LBMA.

SOLAR recycled nearly 247 tonnes of precious and rare metals in 2022, and the recycled volumes of gold, silver, platinum, and indium was approximately 232 tonnes. Through data retrieved during 2022 and statistics collected from internal inventory, SOLAR proceeded the carbon footprint verification on these four recycled precious and rare metals and verified by BSI (impartial third-party). According to the result of verification, we conducted a differential analysis between greenhouse gas emissions generated by metals recycling and by mining. It shows that metals recycling generates much less carbon emissions than mining. The former reduces carbon emissions by 441,564 tonnes per year, which is equivalent to the carbon footprint produced by 36,797 people in Taiwan. Our business model creates the double effect of reusing recycled resources and reducing carbon emissions. We will continue to focus on this aspect and work with our partners to facilitate a sustainable future.

▼ Carbon emissions reduced by precious and rare metals recycling and refining of SOLAR

Mining

Metals recycling and refining reduce carbon emissions by

“441,564” tonnes CO_2e per year

The recycled volumes of the four metals (gold, silver, platinum, and indium) was 232 tonnes in 2022

Total Carbon Reduction

Equivalent to the amount of carbon footprint generated by

≈ **36,797** people in Taiwan annually

Equivalent to the amount of carbon absorbed by

≈ **1,135** parks of Daan Forest Park in Taiwan annually

Urban Mining

Note 1: The annual amount of Taiwan's carbon emissions per capita reached approximately 12 tonnes.
Note 2: The annual amount of carbon absorbed by Daan Forest Park reached approximately 389 tonnes.
Note 3: The data represents the difference in carbon emissions generated by metals recycling and by mining.

Environment

Climate Adaptation

Under the impact of climate change, the world is increasingly facing severe climate disasters with affected regions and populations expanding gradually. Therefore, how to limit global warming to within 1.5˚C by the end of this century and take proactive actions is a common challenge for everyone. In response to international trends and stakeholders' concerns, SOLAR adopted the concepts and framework of the Task Force on Climate-related Financial Disclosures (TCFD) in 2022. By incorporating governance, strategy, risk management, and setting metrics and targets, SOLAR gradually assessed and clarified the risks and opportunities associated with climate change. Furthermore, SOLAR presented corresponding management measures to enhance our operational resilience.

Governance

The Supervision and Management by the Board of Directors

- Regular reporting of progress and achievements to the board of directors
- Regular supervision and management are conducted by directors who possess expertise in sustainability

The Supervision and Management by the Management Team

- Establishing the Sustainable Development Committee, with the President serving as the Chairperson of the Committee, to provide guidance and supervision for sustainable promotion projects and strategic plans
- Establishing a dedicated Sustainable Development Department responsible for driving ESG projects
- Conducting regular meetings to track the progress and outcomes of ESG projects
- Continuously monitoring international trends and external issues

Strategy

- Assessing the potential impact of climate change risk factors on the operational risks and opportunities of SOLAR
- Building renewable energy facilities to reduce greenhouse gas emissions
- Implementing energy management system to enhance energy efficiency in usage

Risk Management

- Each functional unit manager will utilize the TCFD framework to identify and evaluate the risks and opportunities associated with climate change. Based on the types of risks and opportunities identified, the respective functional unit managers will be authorized to develop corresponding strategies, and they will integrate these strategies into daily risk management measures to enhance the operational resilience of SOLAR.

Metrics and Targets

Carbon Emissions Management

- Since 2012, SOLAR implemented ISO 14064-1 (Scope 1, Scope 2). In 2022, SOLAR further added Scope 3 and received reasonable assurance from impartial third-party.
- In 2022, all manufacturing sites in Taiwan implemented ISO 50001 energy management system to improve energy efficiency in usage and received the verification from impartial third-party
- In 2022, SOLAR completed ISO 14067 carbon footprint verification for 8 products, aiming to know well carbon emissions data of products and seek opportunities for further improvements
- In 2022, SOLAR expanded our solar photovoltaic system in our plant areas to promote renewable energy, reduce dependence on purchased energy, and decrease greenhouse gas emissions

Energy Management

In 2020, SOLAR began to introduce ISO 50001 energy management system at Guangxin Building in Solar Park. Due to the urgency and necessity of energy saving, in 2022, SOLAR expanded the sites of implementation of ISO 50001 energy management system, including three manufacturing sites in Taiwan (TTIP Plant, Solar Park, ESTP Plant), and we received reasonable assurance from SGS (impartial third-party). By systematically inventorying significant energy-consuming equipment, setting goals, proposing multiple energy saving action plans, reducing energy consumptions, and improving the efficiency in energy usage, SOLAR aims to achieve the goal of energy saving.

- **SOLAR's Energy Management Policy**

Conform to energy regulations and implement proactive energy saving measures

Execute green purchasing and achieve energy saving and carbon reduction

Boost efficiency of energy performance to build a sustainable environment

- **SOLAR's Energy Saving Goal**

The annual amount of energy saving ≥1%

Status of Energy Consumption

We mainly use non-renewable energy purchased externally. In 2022, SOLAR consumed 215,907 GJ of purchased non-renewable energy (electricity) and 79,411 GJ of non-renewable energy (natural gas, gasoline and diesel), which totaled to 295,318 GJ of energy consumption.

▼ **Energy consumption over the past three years**

(unit: GJ)

Year	2020	2021	2022
Natural gas, gasoline and diesel (A) (Note)	57,875	67,583	79,411
Purchased electricity (B)	225,306	214,097	215,907
Heating, cooling, steam and other energy sources (C)	0	0	0
Sale of non-renewable energy (D)	0	0	0
Total energy consumption (A+B+C-D)	**283,181**	**281,680**	**295,318**

Note: Calculation of non-renewable energy = consumption * carbon emissions coefficient. We use the list of various energy commodities' heat values published by the Bureau of Energy, Ministry of Economic Affairs, to convert to carbon emissions coefficients (natural gas = 9.3; motor gasoline = 9.07; diesel = 9.77).

In 2022, the energy consumption of SOLAR per NT$1,000 revenue was 0.02665 GJ which was higher than 2021. In the future, SOLAR expects to find out opportunities for continuous improvement in energy saving by implementing ISO 50001 energy management system in three plants in Taiwan at the end of 2022.

▼ **Energy intensity over the past three years**

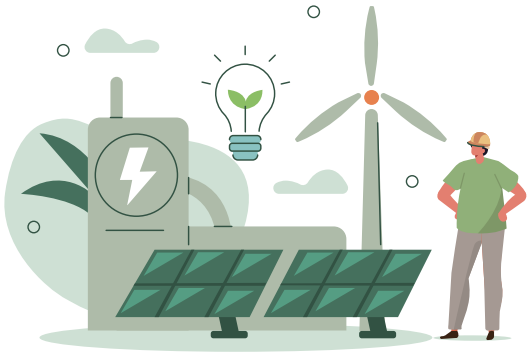
Year	2020	2021	2022
Total energy consumption (GJ/year)	283,181	281,680	295,318
SOLAR's revenue (NT$1,000)	11,730,877	13,622,814	11,081,066
Energy intensity (GJ/NT$1,000)	0.02414	0.02068	0.02665

In response to Taiwanese government's sustainable environment policies, we have installed solar panels with a peak power of 513.06kWp on the roofs of Solar Park and ESTP Plant. Our PV system generated 385,308 kWh of power in 2022 and reduced 196 tonnes of carbon dioxide emissions. Furthermore, we installed solar panels with a peak power of 97.98kWp at the motorcycle parking shed of TTIP Plant by the end of 2022. Since they did not start generating electricity in 2022, they were not included in the scope of this statistical analysis.

▼ Results of our rooftop solar panels over the past three years

Year	2020	2021	2022
Power generation (kWh)	458,748	458,960	385,308
Carbon reduction (tonne CO_2e/year)	230	234	196

Note: Solar power includes those generated by Solar Park and ESTP Plant. Our carbon reduction data are calculated based on 2021 Electricity Carbon Emission Factor released by Taipower (0.502 kg CO_2e/kWh in 2020; 0.509 kg CO_2e/kWh in 2021 and 2022).



Greenhouse Gas Inventory and Management

Climate change is a pressing global concern. It affects a wide range of realms, including natural environment, global competition, economic development, etc. It is crucial to take actions to reduce greenhouse gas (GHG) emissions and combat climate change. In 2012, SOLAR introduced ISO 14064-1, International Standard for GHG Emissions Inventories and Verification, in order to understand GHG sources and emissions through annual internal inventory management and impartial third-party verification. ISO 14064-1 provides a reference for how much emissions should be reduced and how carbon reduction measures should be executed. SOLAR further added Scope 3 in 2022 to holistically examine GHG emissions by including the following categories: (a) indirect GHG emissions from transportation; (b) indirect GHG emissions from products used by organization; (c) indirect GHG emissions associated with the use of products from the organization. Additionally, SOLAR has started organizing employee trainings since 2020 to equip them with knowledge on GHG as well as carbon reduction goal and measures. This also demonstrates our determination in sustainable development.

Greenhouse Gas Emissions

SOLAR's GHG emissions mainly come from purchased power and stationary combustion, which account for 96% of total emissions. In 2022, our GHG emissions under Scope 1 and Scope 2 amounted to 41,930 tonnes of CO_2e, showing a year-over-year rise of 4.6%. Our GHG emissions under Scope 3 amounted to 208,105 tonnes of CO_2e. Our data received reasonable assurance from BSI (impartial third-party) in 2023, as stated in the verification opinion statement.

▼ GHG emissions (under Scope 1 and 2) over the past three years

(unit: tonne CO_2e)

Scope	Category	2020	2021	2022
Scope 1	Stationary combustion	8,276	8,338	9,694
	Process emissions	1	0	0
	Mobile emissions	685	954	721
	Fugitive emissions	800	946	988
Scope 2	Indirect energy emissions	31,856	29,854	30,527
Total		**41,618**	**40,092**	**41,930**

▼ GHG emissions (under Scope 3) in 2022

(unit: tonne CO_2e)

Category			Emissions
Category 3: indirect GHG emissions from transportation			
3.1	Emissions from upstream transport and distribution of goods	GHG emissions from transport of raw materials and consumables procured during the inventory period	200
3.2	Emissions from downstream transport and distribution of goods	GHG emissions from transport of products during the inventory period	-
3.3	Emissions from employee commuting	Employees commuting includes car, motorbike, etc.	931
3.4	Emissions from client and visitor transport	Client/visitor transport includes car, motorbike, public transport, etc.	-
3.5	Emissions from business travel	Business travel includes transport by land, sea and air (e.g., domestic travel by high-speed rail)	15
Category 4: indirect GHG emissions from products used by organization			
4.1	Emissions from purchased goods	Raw materials and consumables associated with plant production	191,212
		Purchased energy associated with production but excluding emissions categorized under Scope 1 and Scope 2	6,222
4.2	Emissions from capital goods	Equipment procured during the inventory period	-
4.3	Emissions from disposal of solid and liquid waste	Waste disposal inventory, such as annual disposal volume and transport of disposal (consumer waste, recycled products, etc.)	132
4.4	Emissions from the use of assets	Scope 1 and Scope 2 GHG emissions generated by assets leased from others, such as electricity, gasoline and diesel used at a rental property, during the inventory period	-
4.5	Emissions from the use of services that are not mentioned in the above subcategories	Emissions from the use of consulting, cleaning and maintenance services	-
Category 5: indirect GHG emissions associated with the use of products from the organization			
5.1	Emissions from the use of products	GHG emissions from the use of products that are manufactured during the inventory period (assumption)	-
5.2	Emissions from downstream leased assets	Scope 1 and Scope 2 GHG emissions generated by assets leased out to others, such as electricity, gasoline and diesel used at a leased property, during the inventory period	-
5.3	Emissions from end-of-life products	Waste generated after products are used, such as packaging material, during the inventory period	-
5.4	Emissions from investments	Electricity, gasoline and diesel used at investment locations	9,393
Category 6: other sources			
6.1	Others	Emissions from other sources	-
Total			**208,105**

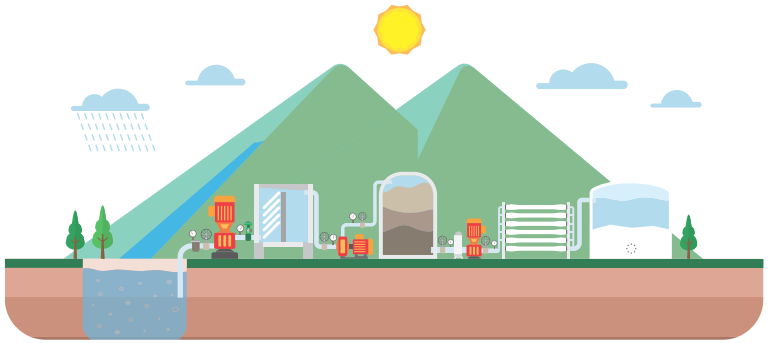
Water Resources Management

Water is an indispensable substance to human survival. It is also an important lifeline to business operations. The lack of water resources has gradually become an important issue. SOLAR values water recourses management. We properly manage water intake and discharge of wastewater. In 2022, our water intake and wastewater discharge respectively reached 562.858 million liters and 307.343 million liters, with total water consumption of 255.515 million liters. In order to meet the discharge standards for ammonia nitrogen in wastewater in 2022, SOLAR made parameter adjustments in the existing wastewater facilities and treatment processes. As a result, there was a significant increase in water intake and discharge. To deal with this issue, we have initiated the planning and construction of the new wastewater treatment system. Our goal is to improve the effectiveness of water resource management in the future.

▼ Water consumption over the past three years

(unit: million liter / cubic meters)

Year	2020	2021	2022
Total water intake	439.123	436.702	562.858
Total water discharge	265.393	184.376	307.343
Total water consumption	173.730	252.326	255.515



SOLAR encourages operations personnel to propose water saving solutions. We built a wastewater treatment system dedicated to recycling and reusing water resources and improving water efficiency. Specifically, our system reclaims wastewater used during manufacturing process and recycles rainwater collected on site for use in tower washing or other purposes. We recycled 12,756 tonnes of wastewater in 2022.

▼ Water recycling and statistics over the past three years

(unit: tonne)

Year	2020	2021	2022
Reuse of effluent in manufacturing processes (Note 1)	671	389	0
Rainwater recycling (Note 2)	1,306	2,503	2,320
Reuse of wastewater from manufacturing processes (Note 3)	217	0	0
Reuse of wastewater from back-end processes in tower washing (Note 4)	255	287	0
Water reclaim system (Note 5)	5,851	7,106	10,436
Total volume of recycled water	**8,300**	**10,285**	**12,756**

Note 1: Effluent recycling is mainly used in the incinerator dust wash-off process. We replace tap water with wastewater to save the cost and usage of tap water. Based on the kilogram of incinerator dust, we use 200 times as much wastewater to wash off dust (for example, 30kg incinerator dust * 200 times of wastewater = saving 6 tonnes of tap water = reducing the generation of 6 tonnes of wastewater).

Note 2: Calculation = rainfall * recycled area (storage).

Note 3: Calculation = 15~20 batches are generated per month; the consumption of tap water per batch used to be 15~20 tonnes, but after improvement we saved around 1 tonne of tap water. By reusing 1 tonne of water, we can reduce the generation of 15~20 tonnes of wastewater per month.

Note 4: In the first round, each batch of powder needs to undergo 18 rounds of washing process with 60L of water added; in the second round, each batch of powder needs to undergo 3 times of washing process with 170L of water added. Calculation = (number of batches * number of washing in the first round * volume of water added) + (number of batches * number of washing in the second round * volume of water added).

Note 5: Water reclaim system in the wastewater treatment plant of Solar Park

Waste Management

We have waste management system in place for treating the waste generated by three plants. In 2022, 7,060.99 tonnes of waste were generated, of which 4,289.67 tonnes (60.75%) were recycled and reused. Among the non-hazardous waste, the total volume of solid waste was 4,322.91 tonnes, of which 1,972.38 tonnes were recycled and reused, and 147.98 tonnes were incinerated with energy recovery.

▼ Volume of waste generation over the past three years

(unit: tonne)

Type of waste		2020	2021	2022	2022
Hazardous waste	Type A waste	64.62	52.58	49.98	
	Type B waste	12.31	17.45	13.58	
	Type C waste	193.50	695.36	459.65	
	Subtotal	270.43	765.39	523.21	
Non-hazardous waste	Type D waste	1,940.93	2,035.26	5,229.02	
	Type E waste	34.34	77.90	112.69	
	Type R waste	334.22	488.41	914.59	
	Non-precious metal	23.82	426.40	281.48	
	Subtotal	2,333.31	3,027.97	6,537.78	
Total		2,603.74	3,793.36	7,060.99	

▼ Volume of method of waste treatment in 2022

(unit: tonne)

Type of waste		Volume of waste generation	Diverted from disposal			Directed to disposal				
			Recycling	Other recovery operations		Incineration (with energy recovery)	Incineration (without energy recovery)		Landfilling	Other disposal operations
			offsite	onsite	offsite	offsite	onsite	offsite	onsite	offsite
Hazardous waste	Type A waste	49.98	0	14.02	0	0	0	0	0	35.96
	Type B waste	13.58	0	8.52	0	0	0	5.06	0	0
	Type C waste	459.65	29.61	5.08	96.79	0	0	0	0	328.17
	Subtotal	523.21	29.61	27.62	96.79	0	0	5.06	0	364.13
Non-hazardous waste	Type D waste	5,229.02	432.73	2,009.40	384.76	147.98	7.13	41.46	2,035.92	169.64
	Type E waste	112.69	92.63	0	20.06	0	0	0	0	0
	Type R waste	914.59	722.64	0	191.95	0	0	0	0	0
	Non-precious metal	281.48	0	0	281.48	0	0	0	0	0
	Subtotal	6,537.78	1,248.00	2,009.40	878.25	147.98	7.13	41.46	2,035.92	169.64
Total		7,060.99	1,277.61	2,037.02	975.04	147.98	7.13	46.52	2,035.92	533.77

Social

SOLAR highly values the development and interests of our employees. We strive to build a workplace where safety, respect, ethics, equality and diversity are valued, enabling our employees to fulfil their potential and ambition here. We continue to work towards building a better, healthy, diverse and inclusive workplace to attract more talents. Our people are the core strength behind our sustainable operations.

Human Resources Policy

Our talent development mission is aimed at building the best team for each business unit to strengthen our competitive edge on a continuing basis through comprehensive selection, training, placement and retention of talents. In order to achieve organizational goal, we launched three phases of talent development (TD) strategies as follows: (a) three TD strategies from 2016 to 2018 for transformation during crisis; (b) five TD strategies from 2019 to 2021 for our return to glory; (c) eight TD strategies from 2021~2030 for a decade of prosperity. We continue to create value and empower our people to become more competitive through diversified talent development programs.

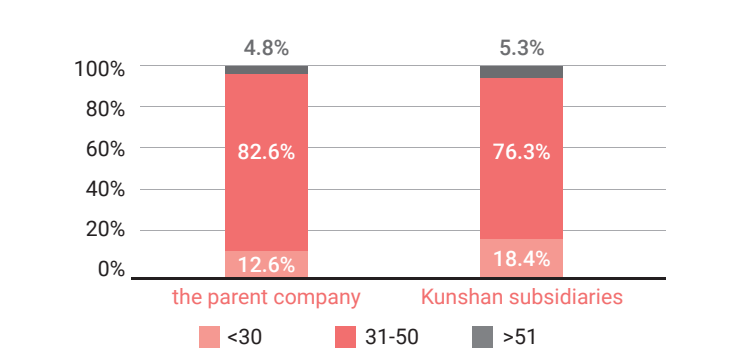
SOLAR has designed various management training programs that are in line with our talent development mission. Starting from 2018, we have completed 39 rounds of management training programs covering 22 topics for 1,455 employees. By organizing training programs for managers of all levels, the number of employees being promoted to managerial positions has grown from 23 in 2017 to 39 in 2022. Not only did this figure nearly double, the proportion of promotion to managerial positions also rose from 13.0% to 19.5%.

Previous Stage (2016-2018)	3 talent development strategies for transformation during crisis	**New Era (2019-2021)**	5 talent development strategies for our return to glory	**A Decade of Prosperity (2021-2030)**	8 talent development strategies for sustainable development

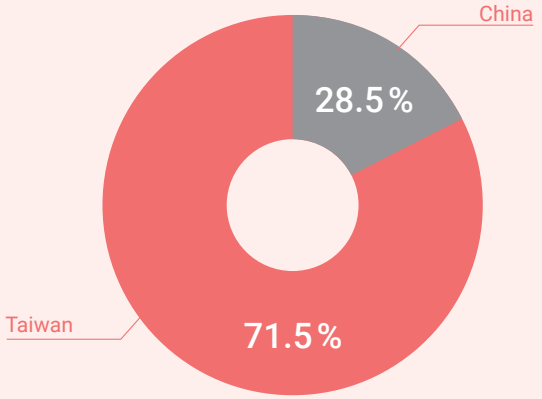
Workforce Structure and Composition

As of the end of 2022, SOLAR has 1,521 employees, with 1,087 employees in the parent company and 434 employees in Kunshan subsidiaries. In terms of age distribution, early adulthood constitutes the primary workforce - employees in both the parent company and Kunshan subsidiaries aged between 31 and 50 account for 82.6% and 76.3%, respectively. Employees below the age of 30 account for 12.6% and 18.4%, respectively. Employees above the age of 51 account for 4.8% and 5.3%, respectively.

▼ Age distribution of our employees



▼ Number of our employees by region



▼ Workforce structure and composition

Region	Category	Group	Female		Male		Total	
			Number of employees	Proportion	Number of employees	Proportion	Number of employees	Proportion
Taiwan	Age	<30	31	2.8%	106	9.8%	137	12.6%
		31-50	214	19.7%	684	62.9%	898	82.6%
		>51	6	0.6%	46	4.2%	52	4.8%
	Type of contract	Indefinite	247	22.7%	753	69.3%	1,000	92.0%
		Fixed-term	4	0.4%	83	7.6%	87	8.0%
	category of employment	Full-time employees	250	23.0%	836	76.9%	1,086	99.9%
		Part-time employees	1	0.1%	0	0 %	1	0.1%
China	Age	<30	27	6.2%	53	12.2%	80	18.4%
		31-50	88	20.3%	243	56.0%	331	76.3%
		>51	3	0.7%	20	4.6%	23	5.3%
	Type of contract	Indefinite	22	5.1%	53	12.2%	75	17.3%
		Fixed-term	96	22.1%	263	60.6%	359	82.7%
	category of employment	Full-time employees	115	26.5%	315	72.6%	430	99.1%
		Part-time employees	3	0.7%	1	0.2%	4	0.9%

Note: As of December 31, 2022, SOLAR has 1,521 employees, with 1,087 employees in the parent company and 434 employees in Kunshan subsidiaries.

In 2022, the new hires in the parent company were mostly aged between 31 and 50 (18.2% of total employees), and the resigned employees were likewise mostly aged between 31 and 50 (26.3% of total employees). In Kunshan subsidiaries, the new hires were mostly aged below 30 (8.3% of total employees), and the resigned employees were mostly aged between 31 and 50 (12.3% of total employees).

▼ Proportions of new hires and resigned employees by age group and gender and region

Region	Age		Female		Male		Total	
			Number of employees	Proportion	Number of employees	Proportion	Number of employees	Proportion
Taiwan	New hire	<30	22	2.0%	97	8.9%	119	10.9%
		31-50	26	2.4%	172	15.8%	198	18.2%
		>51	0	0%	8	0.7%	8	0.7%
		Total	48	4.4%	277	25.4%	325	29.8%
	Resigned employee	<30	52	4.8%	82	7.5%	134	12.3%
		31-50	91	8.4%	195	17.9%	286	26.3%
		>51	6	0.6%	20	1.8%	26	2.4%
		Total	149	13.8%	297	27.2%	446	41.0%
China	New hire	<30	12	2.8%	24	5.5%	36	8.3%
		31-50	11	2.5%	23	5.3%	34	7.8%
		>51	0	0%	1	0.2%	1	0.2%
		Total	23	5.3%	48	11.0%	71	16.3%
	Resigned employee	<30	6	1.4%	19	4.4%	25	5.8%
		31-50	15	3.5%	38	8.8%	53	12.3%
		>51	1	0.2%	0	0%	1	0.2%
		Total	22	5.1%	57	13.2%	79	18.3%

Note 1: As of December 31, 2022, SOLAR has 1,521 employees, with 1,087 employees in the parent company and 434 employees in Kunshan subsidiaries.
Note 2: Calculation = number of new hires and resigned employees / number of employees in each region.

Diverse Learning Channels

SOLAR encourages mid-level and senior management to promote knowledge sharing and self-directed learning among employees through effective and diverse learning programs. We built various learning channels, including e-learning, team sharing, corporate internal training, external training, course taught by consultant, reading club, experiential and interactive course, and online discussion forum. Our corporate culture and knowledge are shared via “hybrid courses” consisted of both digital learning materials and brick-and-mortar courses.

SOLAR is fully committed to and invested in talent development. Our training system is comprised of five major sections as follows: (a) training for new hires; (b) general training; (c) professional training; (d) management training; (e) self-directed development. We cover both general and specialized trainings through job design and training/development. Our people are empowered to choose and plan their career paths.

- Training for new hires: basic onboarding training and on-the-job training for new hires
- General training: corporate culture, values, customer satisfaction, quality, safety and hygiene, etc.
- Professional training: specialized course and project-based learning assigned based on job functions
- Management training: MA program, management training, various trainings on leadership and operations management
- Self-directed development: on-the-job training, self-directed learning, group discussion, etc.

SOLAR plans different training courses for various job functions based on human resources strategy and policy. We strive to enhance learning efficiency and improve work quality and performance of our employees through a variety of general trainings and self-development courses. Our employees may not only improve competency in cross-functional collaboration and project management but also apply learning into practice to create a positive cycle of persistent improvement. In 2022, we executed 1,397 employee training courses, with an average training hours of 16.7 hours per employee.

▼ Annual average training hours per employee

Item	Managerial role		Non-management (IDL)		Non-management (DL)		Total
	Female	Male	Female	Male	Female	Male	
Number of employees during the reporting period (A)	74	173	220	202	75	777	1,521
Hours of training received during the reporting period (B)	1,319	3,620	3,934	5,371	956	10,195	25,395
Average training hours during the reporting period (C) C=B/A	17.8	20.9	17.9	26.6	12.7	13.1	16.7

Note 1: We have 1,521 employees as of December 31, 2022.
Note 2: The statistical scope includes the parent company and Kunshan subsidiaries.

Friendly Workplace

Effective Communication Channels

SOLAR has built a diverse, equal and healthy workplace through comprehensive human resources policy. We established effective communication channels to accommodate different ideas and voices. Moreover, we hold campaigns against infringing acts in the workplace, offering training courses to new hires and sending notice to current employees on an irregular basis to raise awareness. We also conduct preventative surveys every year to highlight employees who are exposed to high risks and offer them assistance.

If any of our employees suffers from physical or mental harm during the execution of duties due to the infringing acts committed by employer, supervisor, co-worker, client or other third party in the workplace, or if anyone has any comment or feedback to share, he or she can report directly to the CEO's email or a physical mailbox for employees.

Cordial Labor Relations

In addition to strengthening cross-functional communication, SOLAR encourages voluntary consultation and collaboration between employees and employer, so as to enhance communication, build consensus and work jointly towards an agreed resolution. We organize employer-labor meeting on a long-term and regular basis. This meeting is attended by an equal number of representatives from both sides (namely, five representatives from each plant) and discussed through presentation and proposal. A resolution is made with approval from three-fourths of the representatives, creating the vision of a mutually beneficial relation and a win-win situation. In 2022, SOLAR held 4 quarterly employer-labor meetings and 1 ad-hoc meeting, where the number of attendees met the quorum in every meeting.

Labor Human Rights are Respected

Here at SOLAR, we believe everyone should be treated with respect. We invest in manpower and ensure various regulations and labor management are in line with the principles of human rights and justice. Meanwhile, we comply with laws and

regulations. We prohibit the use of child labor and forced labor, slavery and trafficking of persons. Our employees' rights to freedom of association and collective bargaining are respected without any form of discrimination. We also implement humane treatment by reasonably arranging work hours and rest hours for employees and providing reasonable salary and benefits. Furthermore, we continue to improve employee benefits and interests in connection with regulatory changes and external information, and periodically examine whether these are in compliance with laws and regulations.

During the reporting period, none of the following major human rights violations occurred at SOLAR: (a) evidence of any operational base that may violate or seriously endanger the freedom of association and collective bargaining; (b) use of child labor at any operational base; (c) sexual harassment incident; (d) forced labor at any operational base.

Gender Equality is Implemented

SOLAR highly values gender equality in the workplace. We formed a Gender Equality Committee in accordance with the Act of Gender Equality in Employment. Not only did we implement gender equality, we also followed the principle of equal pay for equal work in employment, compensation and reward system regardless of race, ethnicity, social class, ancestry, religion, physical and mental disabilities, gender, sexual orientation, family responsibilities, marital status, political belief and age. Furthermore, female employees account for 30% of total managerial roles. When it comes to career development, we value personal competency, not gender.

Diversity and Inclusion

According to statistics from the Ministry of Labor, Tainan has the fourth largest population of migrant workers in Taiwan. SOLAR values the human rights of migrant workers just as much as those of Taiwanese workers. We make sure migrant workers receive equal treatment and enjoy the same or even better benefits. Each migrant worker is entitled to a single room in employee dormitory, rent subsidy and free use of paid TV channels. Employee dormitory is equipped with a gym, karaoke facility and new basketball shooting machines for free use. A bar in the common area and self-service laundry are also available for use.

▲ Various facilities are available for use in the dormitory

Occupational Safety and Health Management

In compliance with the Environment, Health and Safety (EHS) Policy, we have introduced ISO 45001 Occupational Health and Safety (OH&S) Management System to ensure everyone's safety at work. We built a team and management system responsible for OH&S and set forth stringent policy, procedures and management standards to promote internal occupational safety. In 2022, we continued to pass SGS audit and verification, making sure our management system remains current and effective. Our employees and non-employees (contractors) are all covered by the scope of OH&S management system. We will ensure every aspect in the OH&S system is thoroughly implemented in the future.

In 2022, SOLAR executed 55 improvement plans to reduce risks and seize the improvement opportunities, including reducing chemical hazards, reducing exposure to musculoskeletal hazards, reducing dust hazards, reducing noise hazards, and reducing other safety and health risks.

▼ Occupational health and safety improvement plans in 2022

No.	Indicator	Number of improvement plans
1	Reduce chemical hazards	11
2	Reduce exposure to musculoskeletal hazards	11
3	Reduce dust hazards	6
4	Reduce noise hazards	3
5	Reduce other safety and health risks	24
Total		**55**

Occupational Health Services

SOLAR is concerned about employee health and safety management. We organize a number of events and seminars every year to promote physical and mental well-being and enhance awareness on employee health and safety. We see our people as our greatest asset. The parent company offers annual health check-ups to employees who have joined SOLAR for more than a year. In 2022, 1,129 employees participated in health check-ups. This statistic did not include Solar Chemical Applied Materials Technology (Kunshan) Co., Ltd., as the health check-ups at Solar Chemical Applied Materials Technology (Kunshan) Co., Ltd. are conducted once every two years and are scheduled to be conducted in 2023. Moreover, employees are classified based on their health conditions. Those with abnormal conditions are recommended to have a follow-up examination and a face-to-face consultation with the on-site physician.

▼ SOLAR organizes various events and seminars to promote the physical and mental well-being of employees

▼ SOLAR offers annual health check-ups to employees

Regarding health protection, SOLAR conducts health screening for employees who perform special tasks in accordance with applicable regulations. We combine workplace monitoring with on-site inspection and assessment to build a safe work environment. We also protect the safety of employees who are exposed to high occupational risks, including those working with noise, ionizing radiation, hazardous substances (dust, specific chemicals, organic solvent) and lead. Employees involved in tasks with special health hazards (as defined above) are required to undergo special health screening prior to work commencement. For employees currently hired by SOLAR, we arrange special health examinations for them every year. If an employee is classified as under second-tier health management, we offer on-site physician consultation, health education and follow-up. In 2022, 1,337 of our employees completed special health examinations.

Solar Charity Foundation

We place a strong emphasis on social participation. Since there are still many people in our society who need long-term support, we founded Solar Charity Social Welfare Foundation on April 28, 2008 (hereinafter as Solar Charity Foundation) with the purpose of pursuing educational equality for the underprivileged and supporting the vulnerable. By setting up a foundation and holding charity events, we wish to set an example and send our kind regards to the wider community, thereby inspiring more acts of kindness. We are actively involved in social charity events every year, mostly in local services but occasionally in cross-regional services.

Music Project: “Follow Your Dreams”

In response to the Sustainable Development Goals (SDGs) of “Quality Education” and “Reduced Inequalities”, SOLAR is devoted to promoting the development of arts and culture in rural areas. Since 2021, we have partnered with Guitar Maniac Co., LTD. to launch a music project called “Follow Your Dreams”, which is designed to promote guitar culture and discover young musical talents. Recognizing that children in rural area often lack learning resources, we sponsor guitar lessons for two students selected separately from Sin-Shan Elementary School and Chong-Xi Elementary School (near the Solar Park). We hope to bring more music elements and resources into children’s daily learning routine.

▲ The “Follow Your Dreams” project conducted guitar check-ups and changed the strings for the students in 2022

Continuing the guitars donation event from 2021, Chairman C.F. Huang of SOLAR and Chairman Ben Hong of Guitar Maniac visited the two schools again in March and November 2022 to conduct guitar check-ups, change the strings, and have special privilege of inviting Golden Melody Award producer Bing Wang to provide guidance. The “Follow Your Dreams” will continue in the future with the aim of narrowing the gap in art education between urban and rural areas. This music project seeks to provide high-quality music education environments for rural children, allowing them to pursue their musical dreams without being limited by physical appearance or other external conditions.

Collaboration and Sharing Between Industry and Academia

In addition to teaching in schools, SOLAR has actively tapped into industry-academia exchange. Since 2008, we have launched an industry-academia exchange program offering students opportunities of internship, seminar and research presentation at SOLAR during academic year, school semester and summer vacation. Several universities and colleges across Taiwan participated in our program, including National Taiwan University, National Tsing Hua University, National Cheng Kung University, National Chung Hsing University, National Chung Cheng University, National Sun Yat-sen University, National Taiwan University of Science and Technology, National Kaohsiung University of Science and Technology, Southern Taiwan University of Science and Technology, Ming Chi University of Technology, Kun Shan University, etc.

Holding a Scientific Contest with National Chung Cheng University

The 2nd "Solar Scientific Challenge: Communicating Science in an Innovative Way" has been expanded from regional high school event in the Yun-Chia-Nan area to a nationwide science competition for high school and college students in 2022. To assist students in familiarizing themselves with globally significant environmental issues, the contest adopted "Science of Carbon Neutrality" as the competition theme in 2022. It aimed to train the participating students to express scientific knowledge through creative media approaches, thereby fostering their excellent skills in argumentation.

SOLAR believes that nurturing the youth's understanding and expressive abilities in science is a common responsibility of the industry and academia. NT$229,000 in cash prizes were awarded in this event, with 20 winners out of nearly 60 high school contestants and 12 winners out of 16 college contestants.

▼ Group photo of honored guests and award-winning contestants at the event

▼ Woodcraft from Treeman Foundation in commemoration of our sponsorship

Sponsoring National Tsing Hua University's "Treeman Foundation" to Nurture Young Scholars

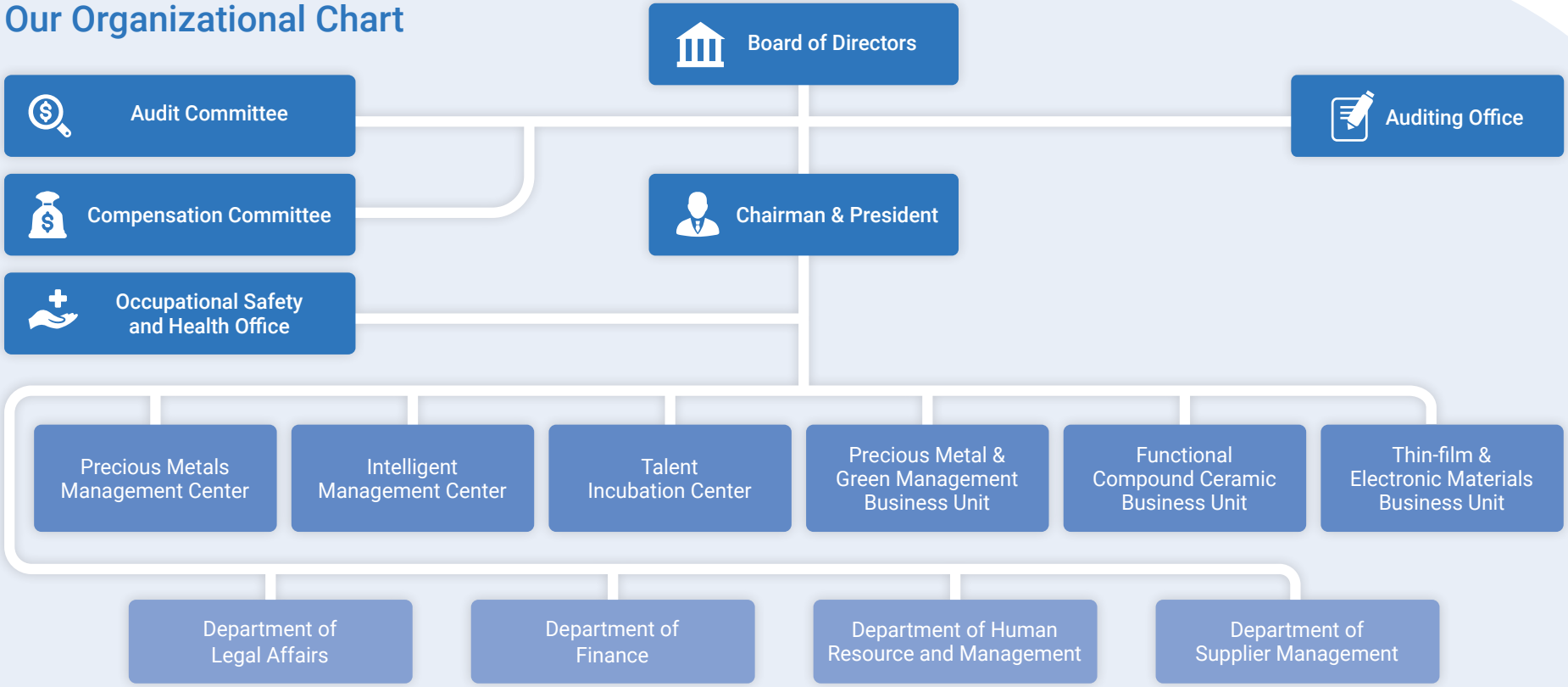
In an effort to extend the fundamentals of teaching and research, the College of Engineering, National Tsing Hua University, set up "Treeman Foundation" in 2020. This foundation is formed to raise the salaries of young scholars and create incentives for attracting and retaining talents in Taiwan. SOLAR understands the difficulties in talent incubation. As a company, we do our part in creating an excellent research and education environment. We facilitate knowledge exchange between industry and academia to form a positive cycle. From 2020 to 2022, we have donated NT$1.5 million to the Treeman Foundation, supporting sustainable development in education. It is our hope to nurture more talents for the society through school-enterprise cooperation.

Governance

Sustainable Operations

SOLAR values corporate governance. We fulfil our responsibilities as a business operator, protect the rights of our shareholders, and consider the interests of other stakeholders. To implement good corporate governance, we established policies regarding ESG, safety and health, environmental protection, information security, intellectual property, and quality. Additionally, we established a governing body to assist with business operations and provide effective supervisory mechanism. For more detailed information regarding our policies, please refer to our official website.

Our Organizational Chart

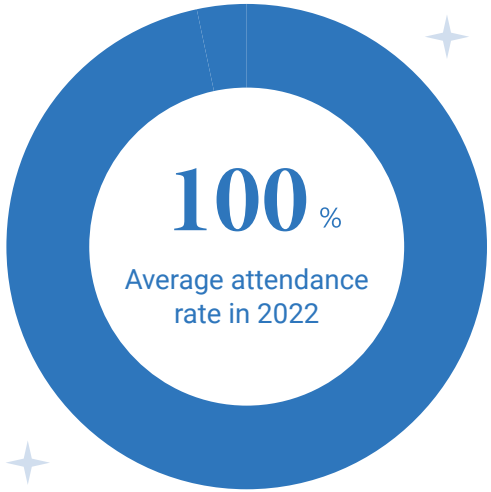


Functioning of the Board of Directors

The board of directors ("the Board") at SOLAR prioritizes the long-term interests of the company and shareholders, exercises the Board's powers objectively and independently, and follows the principles of corporate governance. According to Article 4 of Procedures for Election of Directors, the election of the Board is based on the following criteria: directors (including independent directors) at the Company shall be elected from among persons with disposing capacity by the shareholders' meeting. The number of directors (including independent directors) is stipulated in the Company's Articles of Incorporation. The registered cumulative voting method shall be adopted in the election of directors (including independent directors). The candidate nomination system shall be adopted in the election of directors (including independent directors). Candidates who receive votes representing the most voting shares shall be elected in order according to the number of votes they receive. Various functional committees are established under the Board to strengthen its functions. SOLAR adheres to high-standard corporate governance policy to ensure effective functioning of the Board, thereby protecting the rights and interests of shareholders.

In accordance with SOLAR's internal regulations and the "Regulations Governing Appointment of Independent Directors and Compliance Matters for Public Companies", we elect board members based on their judgement and competency in operations and management, accounting and financial analysis ability, crisis management, industry knowledge, perspective on global markets, leadership and decision-making ability. During the reporting period, SOALR had 9 members in the Board, including 3 independent directors (who accounted for 33% of total board members). The Board is composed of professionals from different backgrounds who are well equipped with the knowledge, skills and competency required for execution of duties. Independent directors specialize in the financial, legal and commercial fields. Other directors specialize in the fields of metallurgy, metal materials, industrial engineering, financial management and electronics. Two of our directors are female, with one being an independent director.

SOLAR has established functional organizations such as Audit Committee, Compensation Committee, Internal Audit Unit, and Corporate Governance Officer. These functional organizations report important strategies to the Board through regular meetings, ensuring effective communication. The Board follows corporate governance principles, reviews business performance, and discusses important strategic issues relevant to economic, environmental and social impacts as well as risks and opportunities. Any resolution made by the Board is posted on the TWSE Market Observation Post System (MOPS) immediately to keep stakeholders informed. Meanwhile, SOLAR has made the following information public and accessible for domestic and foreign investors: (a) the articles of incorporation; (b) regulations governing the board meetings; (c) functioning of the Board; (d) the recusal of board members from matters concerning conflict of interests.



The board meeting is held at least once every quarter.
Seven board meetings were held in 2022 with an average attendance rate of 100%.

Board Performance Evaluation

SOLAR started implementing board performance evaluation in 2020. The performance of the Board is periodically reviewed to examine efficiency and strengthen its supervisory role. In 2022, board members rated the overall board performance as “excellent” through self-assessment.

▼ SOLAR implements board performance evaluation

Frequency	Duration	Participant	Method	Scope of Evaluation	Result
1 Once a year	2022 5/31-12/31 (The Board underwent a comprehensive re-election on May 31, 2022)	The Board, individual board members and functional committees	Self-assessment by **board members**	Awareness of responsibilities Degree of participation in company operations Improving the quality of decision made by the Board and functional committees Composition and structure of the Board and functional committees Board election and continuing professional development Staying on top of company goal and mission Internal control Internal relationship management and communication	The overall board performance is rated as “excellent” by board members’ self-assessment. It is recommended to plan for the provision of director training by recognized continuing education institutions.

Audit Committee

Organization

(1) Founded on July 20, 2016
(2) Audit Committee is composed of three independent directors

Convener

Independent Director Feng-Chi Kao

Independent Director Tse-Hsiang Ting

Independent Director Chun-Hung Tung

Key Responsibilities

(1) Assist the Board in fulfilling its oversight of the quality and integrity of accounting, financial reporting and auditing procedures of the Company
(2) Strengthen internal supervisory mechanism within the Company
(3) Establish or revise internal control system, and verify the effectiveness of such system
(4) Review matters concerning the personal interests of directors
(5) Substantial asset transaction or derivatives trading
(6) Substantial monetary loan, endorsement or provision of guarantee
(7) Offering, issuance, or private placement of any equity-type securities
(8) Appointment, dismissal or remuneration of a certified public accountant
(9) Appointment or dismissal of finance, accounting, or internal auditing officers

State of Implementation

Audit Committee holds at least one meeting every quarter. Four meetings were held in 2022 with an average attendance rate of 100%.

Compensation Committee

Organization

(1) Founded on December 16, 2011
(2) Compensation Committee is composed of three independent directors

Convener

Independent Director Feng-Chi Kao

Independent Director Tse-Hsiang Ting

Independent Director Chun-Hung Tung

Key Responsibilities

(1) Periodically evaluate the performance of directors and managers, and formulate policies, framework, standards and structure concerning compensation
(2) Periodically evaluate the compensation paid to directors and managers
(3) Compensation, as mentioned above, includes cash remuneration, stock option, offering of stock ownership, retirement benefits or severance pay, allowances or stipends of any kind and other substantive incentive measures; its scope shall be consistent with that set out in the "Regulations Governing Information to be Published in Annual Reports of Public Companies"

State of Implementation

Compensation Committee holds at least two meetings per year. Seven meetings were held in 2022 with an average attendance rate of 100%.

Corporate Governance Officer

Organization

(1) President Chii-Feng Huang assumed the role of corporate governance officer in 2021 in accordance with the Board's approval
(2) Corporate governance officer shall serve in a managerial position related to legal, financial or stock affairs at a public company for more than 3 years and complete professional training as per regulatory requirements

Key Responsibilities

(1) Provide information required for directors to execute their duties
(2) Assist directors with legal compliance
(3) Company incorporation registration or alteration of registration
(4) Process matters related to board meetings and shareholder meetings in compliance with laws
(5) Prepare and review meeting minutes for board meetings and shareholder meetings

State of Implementation

(1) Assist directors with execution of duties, provide information of the Company to directors, and facilitate smooth communication between directors and various business unit managers
(2) Provide relevant training information to directors, and arrange for the professional development of directors
(3) Facilitate communication among Audit Committee, CPA and chief auditor
(4) Assist with performance evaluation of the Board and committees, and submit performance evaluation to the Board
(5) Send meeting agenda to directors and provide meeting information 7 days prior to the board meeting; issue a reminder if any subject of discussion requires the avoidance of conflict of interests; send meeting minutes to directors within 20 days after the meeting
(6) Assist with handling affairs related to shareholder meetings

Internal Audit

Organization

(1) An internal audit unit is established under the Board as per regulatory requirements
(2) Audit unit is composed of five auditors (including chief auditor)
(3) Appointment and dismissal of chief auditor is approved by Audit Committee and the Board

Key Responsibilities

(1) Assist the Board and managers to inspect and evaluate the soundness and effectiveness of internal control system
(2) Provide consultation and feedback for improvement of internal control system to ensure effective execution of internal control

State of Implementation

(1) Formulate annual audit plans based on regulatory requirements and self-assessment of risks and internal control
(2) Conduct auditing, issue report, and follow up on improvements
(3) Periodically report to the Board and Audit Committee on the execution of audit work to ensure smooth communication
(4) In 2022, a total of 59 audit projects were conducted, and no significant abnormalities were identified. The internal audit unit summited the internal control statement to the Board and received approval.

Risk management

Risk Management Strategy

Affected by market, environment, climate change, information security, and financial market upheaval, the volatility of various operational factors that affect the business has increased, leading to higher operational risks. It is crucial for the company to acknowledge the necessity and urgency of risk management. As a result, SOLAR has formulated risk management procedures, identified and defined the scope of risk management, assigned organizational responsibilities, strengthened corporate governance, and established an effective risk management mechanism.

The risk management scope of SOLAR covers various types of risks faced in daily operations, including market risk, operational risk, investment risk, environmental risk and so on. We regularly conduct operational impact analysis and risk identification, adopt corresponding risk management strategies, and thereby promote our sound operation and sustainable development.

Risk Management Process

Our risk management is authorized by the President, who delegates the daily implementation of risk management measures to the respective functional unit managers based on the types of risks. Moreover, we emphasize the importance of comprehensive risk control by all employees and the proper execution of internal control system regulations to ensure the risk management can be executed effectively.

1. Each functional unit manager should conduct risk assessments and control them in daily operations.
2. For uncertain factors that may threaten business operations, it is advisable to convene responsible and relevant departments for discussions prior to implementation, based on the significance of risks. If necessary, we consult with experts to assess the risks and propose preventive measures.
3. Within their respective scope of responsibility, each functional unit should implement risk management measures. They have the autonomy to convene meetings or report through appropriate channels, such as the weekly operational meeting or the Sustainable Development Committee, depending on the urgency, importance, and complexity of the issues.

Intellectual Property Management

SOLAR has formulated four intellectual property (IP) policies: "implement compliance with Corporate Governance Regulations", "strengthen employees' IP knowledge", "respect others' intellectual property rights to reduce operational risks", and "protection and accumulation of IP rights", to protect relevant IP rights. Dedicated IP department has been set up to implement the aforementioned policies through formulating management rules and strengthening advocacy for IP knowledge to avoid corporate IP losses and mitigate infringement risk. Additionally, SOLAR values innovation and R&D and has formulated an incentive system to encourage innovations as well as a system to protect intellectual property assets.

▼ SOLAR's intellectual property policy and goal

Implement Compliance with Corporate Governance Regulations

- Take the initiative to implement the newly added intellectual property management provisions in the “Corporate Governance Best Practice Principles for TWSE/TPEx Listed Companies” and the intellectual property indicators added to the “Taiwan Corporate Governance Evaluation System”.

Strengthen Employees’ IP Knowledge

- Establish a dedicated department for intellectual property, formulate intellectual property management regulations, and strengthen the promotion of intellectual property knowledge.
- Through education and training sessions, lectures by experts, and posters, SOLAR aims to convey knowledge on national intellectual property laws and regulations, SOLAR's intellectual property policies, or the intellectual property knowledge related to our colleagues.

Respect Others' Intellectual Property Rights to Reduce Operational Risks

- Each department shall comply with the "Management Regulations for Confidential Information" to classify information and establish appropriate confidentiality measures to reduce the risk of information leakage by managing access control to specific locations, documents, and personnel, etc.

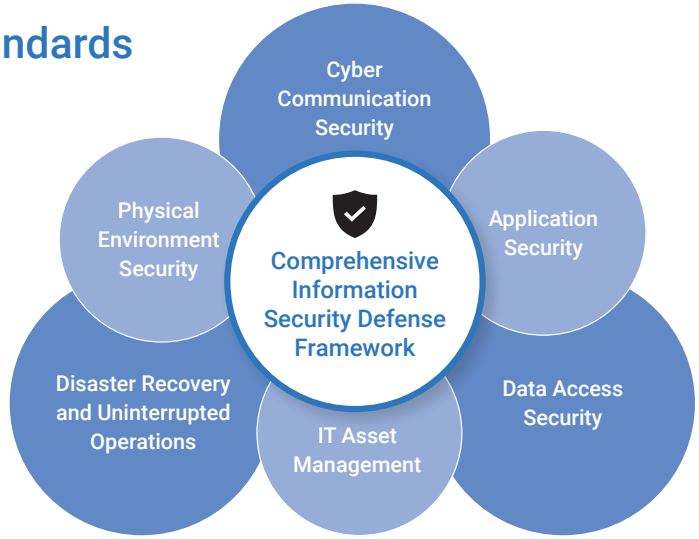
Protection and Accumulation of IP Rights

- Formulate the "Procedures for Patent Application Management" and "Regulations for the Registration and Management of Trade Secrets" to regulate the process of production and protection of patents and trade secrets.
- Through the incentive system of patent application and trade secret registration, SOLAR encourages our employees to actively innovate and retain their results of innovation, and accumulate them to become SOLAR's competitiveness.

Information Security Management Geared to International Standards

Information security and protection of confidential information are the commitments we have made to our clients, shareholders and employees. SOLAR has launched an information security management system, specifically set out relevant policies, management procedures and guidelines, and further published the “Information Security Policy” to declare our determination in defending and promoting information security. We strive to remain competitive in market and safeguard the interests of our clients and partners.

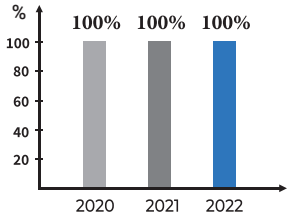
Our Information Security Office coordinates the formulation of relevant policies, execution, risk management and compliance audit. We also set up an Information Security Committee to hold a review meeting every year and report the results of information security management, including relevant topics, framework, system, evaluation of the introduction of new information security product or technology, results and review. SOLAR designed a security framework from a comprehensive perspective, while setting out various guidelines to ensure safe, stable and effective function of each system inside the framework.



▼ The achievements in implementing information security measures in 2022

Received International Information Security Management System Certification (ISO/IEC 27001:2013)

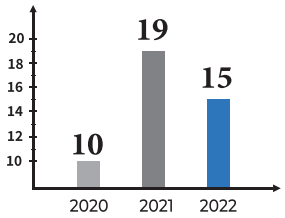
Campaign



100%

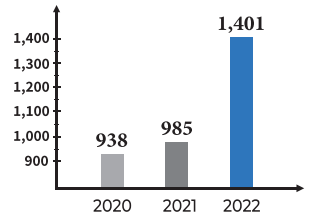
All new hires are required to complete training on information security

Training



15 Campaign Posters

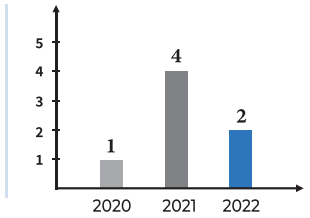
Created 15 campaign posters to deliver important guidelines on information security and safe use of device



1,401 Employees

1,401 employees completed annual information security online training, including:

- Mobile device security
- Email security
- Data leak and cybersecurity management
- Importance of signing confidentiality agreement



2 Campaign Videos

Created 2 campaign videos to deliver important guidelines on information security and safe use of device

2 Social Engineering Assessments

Completed 2 email phishing tests with more than 800 participants

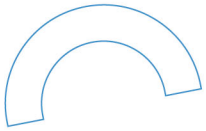
Control

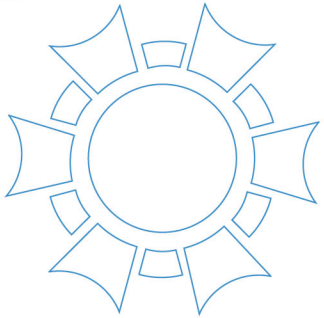
More than **7,500** electronic devices are managed under plant access control

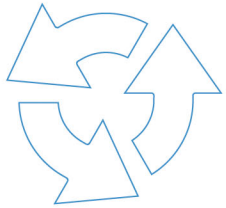
Over 60,000 pieces of control labels are issued to electronic devices, with more than 7,500 electronic devices under control

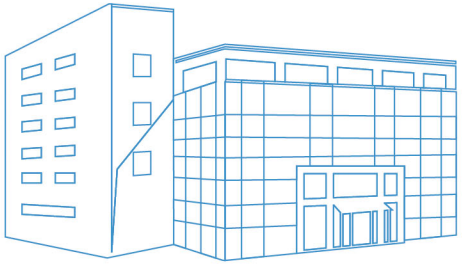
Passing Third-party Verification

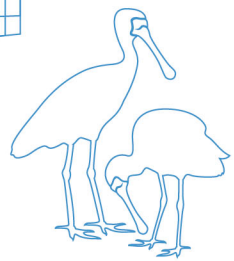
- ISO 9001 Quality Management System
- ISO 14001 Environmental Management System
- ISO 14064-1 Greenhouse Gas Emissions Inventory and Verification
- ISO 14067 Carbon Footprint of Products
- ISO 17025 Laboratory Quality Management System
- ISO 27001 Information Security Management System
- ISO 45001 Occupational Health and Safety Management System
- ISO 50001 Energy Management System
- CNS 45001 Taiwan Occupational Safety and Health Management System (TOSHMS)
- IATF 16949 Automotive Quality Management System
- AEO Authorized Economic Operator
- BS 8001 Circular Economy
- UL 2809 Environmental Claim Validation Procedure for Recycled Content











Solar Applied Materials Technology Corp.

2022 ESG Report