



SUSTAINABLE IMPACT VALUATION REPORT

2023 SUSTAINABLE IMPACT VALUATION REPORT

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Executive Summary

The sustainability of an enterprise is based on the long-term value it creates for its stakeholders¹. Since 2017, Innolux Corporation (Innolux) has been working with the Tunghai University Corporate Sustainability Impact Center to establish a sustainable impact management structure based on the “Triple Bottom Line” (TBL) by analyzing the intersection of economic, environmental, and social issues through causality-oriented impact pathway analysis, and identifying positive and negative, potential and actual, and long-term or short-term impacts from upstream supply chains, production operations, and downstream product sales processes.



In terms of supply chains, Innolux utilizes an input-output model to analyze increased output driven by supply and demand generated from procurement demands and product sales. Regarding supply chain sustainability, Innolux identifies the environmental hotspots derived from the process of supplier production and service provision and the social costs incurred by contractors from occupational accidents. In terms of production and operations, Innolux measures the economic value, including employee remuneration, cash dividends, taxes, depreciation, and amortization, created by the operating process for stakeholders through the Gross Value Added (GVA) method. In addition, in accordance with the Natural Capital Protocol and Social & Human Capital Protocol guidelines, Innolux assesses the environmental and social externalities derived from operational activities, including water resource use, greenhouse gases, air conditioning, wastewater discharge, waste disposal, employee accidents, employee career development, and health promotion. In terms of product sales, Innolux focused on four main end uses of the Liquid-Crystal Module, including TV, desktop screens, portable computers, mobile phones, and commercial products. It evaluates the value of the product sales process created for the customer's business and environmental impacts arising from energy consumption during stages of product use.

In 2023, Innolux generated a total of NT\$211.7 billion in operating revenue. Consumer markets have become more conservative due to uncertainties like rising interest rates and inflation, resulting in a NT\$18.6 billion net loss after tax. On the other hand, taxation, employee remuneration, R&D investments, depreciation and amortization has created a net positive impact of NT\$82.8 billion for stakeholders, contributing to social and economic growth. Occupational accidents resulted in a social cost of NT\$24.73 million, and the environmental footprint and resource depletion of the manufacturing process has incurred an environmental cost of NT\$4.9 billion. However, the deployment of renewable energy and water recycling has created environmental benefits worth NT\$140 million. In addition to creating NT\$352.7 billion in value for upstream supply chains, Innolux indirectly contributed to the creation of 24,000 jobs and NT\$8.9 billion in worker salaries. Resource depletion and energy consumption has resulted in NT\$10.9 billion in environmental costs, and NT\$4.15 million in social costs were incurred by contractors due to occupational accidents. In downstream supply chains, Innolux products are used in TVs, desktops, laptops, cell phones, and other commercial end-use products, creating

¹ Stakeholders refer to employees, customers, shareholders/investors, suppliers/contractors, the government, and the society

NT\$164 billion in value for customer industries. However, product use resulted in an environmental cost of NT\$92.5 billion.

For activities across the entire value chain, Innolux created a total of NT\$618 billion in positive impacts for stakeholders in 2023, primarily through driving upstream supply chain and downstream industry output through procurement and product sales, respectively. At the same time, accompanying environmental footprints and occupational hazards generated a negative impact of NT\$124.7 billion, with the environmental externality of energy consumption at the product end-use stage being the most significant. In the future, in addition to improving the sustainable impact management structure, we will seek opportunities to reduce environmental impacts and improve social welfare. We will also focus more on supply chain transformation and energy-saving product development to drive our impact on sustainability and create more significant positive value for society.

Impact Factors	Sustainable Issue Management	Activity Output	Type of Capital	Impact Item	Impact Attribute	Monetary Value (KNTD)		Impact Object/Stakeholders
						2022	2023	
Supply Chain	Supply chain management	Procurement needs drive supply and demand along the supply chain	Social capital	Social externalities- Elevating supply chain value	Positive (+)	389,112,596	352,743,337	Society
		Procurement needs create job opportunities along the supply chain	Human capital	Social externalities- Employment and salaries for supply chain workers	Positive (+)	9,863,124	8,888,260	External employees
		Supply chain GHG emissions	Natural capital	Environmental externalities- Supply chain GHG emissions	Negative (-)	3,692,652	3,347,061	Environment
		Supply chain air pollutant emissions	Natural capital	Environmental externalities- Supply chain air pollutant emissions	Negative (-)	8,212,222	7,540,051	Environment
		Supply chain wastewater discharge	Natural capital	Environmental externalities- Supply chain wastewater discharge	Negative (-)	14,679	13,367	Environment
		Supply chain waste production	Natural capital	Environmental externalities- Supply chain waste management	Negative (-)	41,601	38,384	Environment
	Occupational health and safety	Contractors' occupational accidents	Human capital	Social externalities- Contractors' occupational accidents	Negative (-)	0	4,147	External employees, society
Company Operations	Financial performance	Net revenue	Financial capital	Stakeholder Gross Value Added Income (GVA)	Negative (-)	27,914,776	18,598,730	Shareholders/
		Taxation	Financial capital		Positive (+)	1,692,323	2,235,599	investors
		Depreciation and amortization	Manufactured Capital		Positive (+)	32,457,777	30,773,369	Society
	Talent recruitment and retention	Salary and employee benefits	Financial capital		Positive (+)	42,613,298	37,827,219	Suppliers
		R&D of new technologies	Intellectual Capital		Positive (+)	13,045,403	12,011,556	Employees
	Energy management and GHG emissions	Energy consumption causes GHG emissions	Natural capital	Environmental externalities- Operational GHG emissions	Negative (-)	4,211,212	4,099,738	Customers
		Use of renewable energy prevents GHG emissions	Natural capital		Positive (+)	21,656	134,860	Environment
	Water resource management	Process water usage depletes water resources	Natural capital	Environmental externalities- Operational water resource consumption	Negative (-)	811,949	708,150	Environment
		Use of recycled water prevents water resource depletion	Natural capital		Positive (+)	2,388	4,303	Environment
		Process wastewater discharge causes water pollution	Natural capital	Environmental externalities- Operational wastewater discharge	Negative (-)	1,390	1,044	Environment
	Air pollution prevention	Process gas emissions cause air pollution	Natural capital	Environmental externalities- Operational air pollutant emissions	Negative (-)	23,935	25,372	Environment
		Waste treatment process impacts the environment	Natural capital	Environmental externalities- Operational waste management	Negative (-)	22,972	18,227	Environment
	Occupational health and safety	Employee occupational accidents	Human capital	Social externalities- Employee occupational accidents	Negative (-)	15,524	24,731	Environment
		Number of persons at risk of cardiovascular diseases	Human capital	Social externalities- Employee health management	Positive (+)	127,903	100,207	Employees, society
Product and Services	Customer relations management	Product sales drive supply and demand in downstream industries	Social capital	Social externalities- Elevating industry chain value	Positive (+)	177,158,543	163,977,150	Society
	Green product management	Product use causes GHG emissions	Natural capital	Environmental externalities- Product use	Negative (-)	95,063,952	92,501,293	Environment

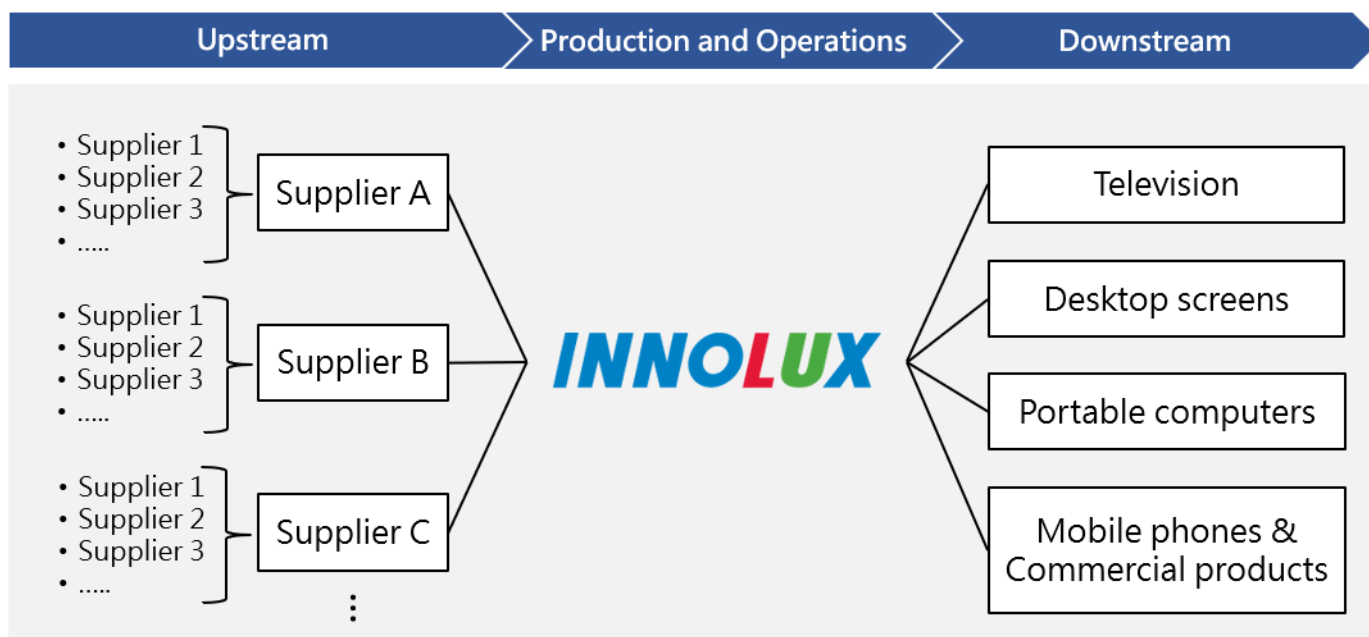
Methodology

There are four steps in assessing Innolux's sustainability impact: defining boundary and scope, mapping impact pathways, confirming data sources and quality, and establishing a valuation method. Each step is interconnected, and decisions made during each step may affect the integrity and accuracy of the final result.

Defining Boundary and Scope

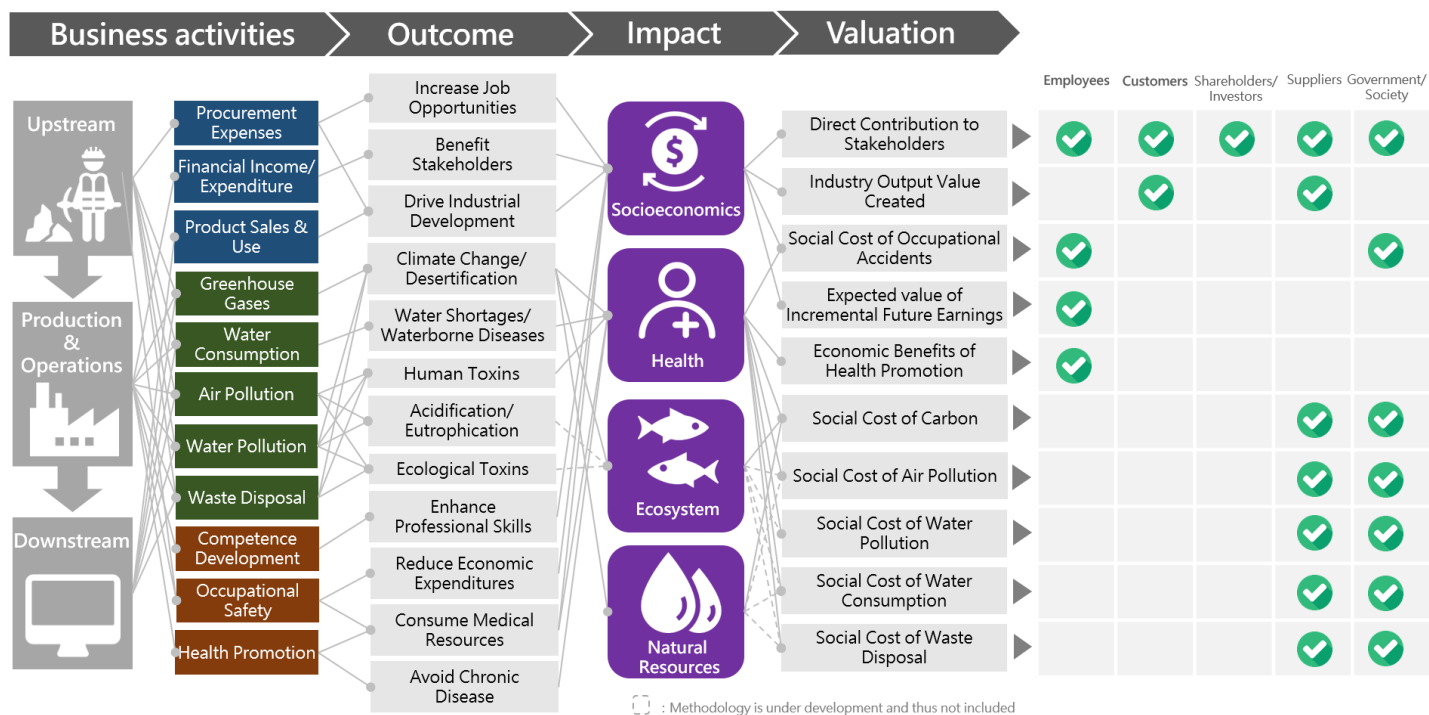
Innolux's value chain activities cover supply chain (upstream), production and operations, and product sales (downstream), during which Innolux generates both positive and negative impact for stakeholders. Innolux's production and operations generate direct impact, while value chain upstream/downstream partners generate indirect impact.

- **Upstream (supply chain):** All economic activities, such as backlight component production, logistics, transportation, etc., undertaken by the raw material suppliers or service providers to fulfill Innolux orders.
- **Production & Operation:** All activities at Innolux's production and operating locations across the world.
- **Downstream (product sales):** Considering the diversity of product applications, priority is given to end-use industries such as television, desktop screens, portable computers, mobile phones, and commercial products. The product usage during its life cycle is considered as well.



Mapping Impact Pathways

To clarify the direct/indirect, positive/negative, and potential/actual impact that each type of activity in the value chain has on stakeholders, Innolux uses the impact pathway method in this report, considering the input and output of each activity, the change and impact to people's lives, and the social value/cost generated in the process. The aim is to examine the complex cause-and-effect relationships systematically and logically. Please refer to the [analysis results](#) description of each section for further details.



Confirming Data Sources

The activity data sources include primary data (original data collected from actual inventory) and secondary data (collected from relevant literature, databases, or estimation. When assessing Innolux's sustainability impact, primary data, whose quality is higher, takes precedence over secondary data. However, secondary data will be used when primary data is unavailable. For example, the relationships between supply and demand of each industry within the supply chain, and the volume of pollution generated per unit of output value, could only be obtained from country-level investigation reports and estimated by industry average.

		Upstream supply chain	Production and operations	Downstream product sales
Economic	Activity data	Amount of procurement/ Relationship between industry supply and demand	Internal financial profit and loss indicators	Amount of product sales/ Relationship between industry supply and demand
	Data quality	Primary and Secondary data	Primary data	Primary and Secondary data
	Impact Categories	Supply chain output value generated	Direct economic value generated	Industry chain output value generated
Environmental	Activity data	Industry average databases	Energy resources and pollution generation	Product energy consumption/use scenario
	Data quality	Secondary data	Primary data	Primary and Secondary data
	Impact Categories	Social cost of carbon, Human health and Ecosystem loss		
Social	Activity data	Contractor occupational accidents	Employee occupational accidents, health examinations, remuneration, etc.	Methodology in development
	Data quality	Primary data		
	Impact Categories	Change to personal or social welfare		

Establishing a Valuation Method

Innolux's sustainability impact management framework covers the three major stages of the value chain (upstream / production and operations / downstream), the three significant sustainability management aspects (economic/environmental/social), and 14 impact indicators. The methodology refers to the practices of benchmark companies in Taiwan and abroad and relevant research.

Boundary	Scope	Impact indicators	Calculation methodology
Upstream	Economic	Supply chain output value gained from procurement	This report uses Input-Output Analysis (IOA) model to assess the economic benefit derived from gains in industry chain supply and demand generated by procurement activities; the report also uses the volume of pollution caused per unit of output value to assess the external environmental costs created caused from greenhouse gasses, wastewater disposal, waste disposal (incineration) and air pollution.
	Environmental	Social costs generated by the environmental footprint of the supply chain	
	Social	Social costs generated by occupational accidents (contractor)	The report refers to the research report by the UK's Health and Safety Executive (HSE, 2017), which considers the loss of productivity due to work injury, compensation for occupational accidents, and willingness to pay to avoid occupational accidents in calculating the social cost.
Production and Operations	Economic	Direct economic contribution	The report uses Gross Value added (GVA) method to examine the stakeholder value flows in operations, including business revenue (customers), dividends (shareholders/investors), remuneration and benefits (employee), taxes (government), depreciation and amortization (suppliers).
	Environmental	Social costs generated by greenhouse gas emissions, water consumption, air pollution, wastewater and waste treatment	The report applies the Environmental Profit and Loss (EP&L) mindset to assess the external environmental cost generated by energy and resource depletion, emissions, and pollution during the company's operations and the company's input to mitigate the negative impact on the society.
	Social	Future income generated from employee training	The report refers to Ecomatters (2016) methodology to assess the professional skills and knowledge that employees gained from the company's training programs, which improves their productivity, competitiveness, and salary income further down their careers.
		Social costs generated by occupational accidents (employee)	The report refers to the research report by the UK's Health and Safety Executive (HSE, 2017), which considers the loss of productivity due to work injury, compensation for occupational accidents, and willingness to pay to avoid occupational accidents in calculating the social cost.
		Medical costs avoided from the health promotion	The aims are early detection of hypertension, hyperlipidemia, high blood sugar, and obesity through regular health examinations and formulating health promotion programs to reduce or avoid cardiovascular diseases and the medical costs derived from such diseases.
Downstream	Economic	Client industry output enhanced by product sales	Focus on four main end uses of Liquid-Crystal Module, including TV, desktop screens, portable computers, and mobile phones; consider the supply-demand relationship between sales value and the output value of client industries; evaluate the indirect economic value created by product sales and environmental externalities from product use.
	Environmental	Social costs derived from product use stage	

Since the currency value conversion factors come from several different studies, Innolux follows the ISO 14008:2019 definitions of environmental impact and relevant currency valuation frameworks. The base year is 2018, and the conversions are adjusted according to geography and time.

- 1) Geographic adjustment: the report uses the Purchasing Power Parity (PPP) of each region to adjust the weighting (OECD, 2012) of Gross National Income (GNI). The equation is listed below.

$$E_i = (Y_i/Y_{ref})^{\epsilon}$$

In particular,

E_i is the income adjustment weighting

Y_i is the adjusted GNI of the region of the value conversion using the region's PPP

Y_{ref} is the adjusted GNI of the region of the original studies using the region's PPP

ϵ Income elasticity factor refers to the relationship between WTP and income. The value is between 0

and 1.

1 indicates a positive correlation between WTP and income, while 0 shows that the WTP is not correlated with income. The study adopts the recommended value of 0.6 by PwC UK (2015).

- 2) Temporal adjustment: the report considers inflation and exchange rates when adjusting the currency values of different periods to the currency value of the base year.

Analysis Results

In 2023, Innolux created a positive impact of over NT\$618.1 billion and a negative impact of NT\$124.7 billion. Production and operations generated NT\$66.5 billion in economic value for stakeholders, NT\$9.4 billion in future earnings from employee training and development, and NT\$4.9 billion in environmental external costs from the production process, mainly from greenhouse gas emissions and water consumption, while the application of renewable energy and reclaimed water created NT\$140 million in environmental external benefits. In the upstream supply chain, the demand for each unit of procurement brought a threefold increase in output value to the supply chain, totaling NT\$352.7 billion, which created 24,000 supply chain jobs and NT\$8.9 billion in salary income for workers. However, the accompanying environmental footprint also brought NT\$10.9 billion in social costs. In downstream sales of products, Innolux’ liquid crystal panel modules have brought 1.4 times the growth in output value for the four major end-use industries, totaling NT\$164 billion. However, the energy demand in the use stage of the end-use products has indirectly brought about NT\$92.5 billion in social costs, which is mainly due to the health hazards of particulate matter and heavy metals caused by the Taiwan’s coal-fired power generation systems.

In the future, in addition to improving the sustainable impact management structure, Innolux will seek opportunities to reduce environmental impacts and improve social welfare. We will also focus more on supply chain transformation and energy-saving product development to drive our impact on sustainability and create more significant positive value for society.

516.7 billion Created up-/downstream along the value chain	24,000 Supply chain job opportunities	95% Of environmental externalities occur up-/downstream
Procurement needs promote industry chain development, creating a threefold increase in economic value. Liquid crystal panel module sales created 1.4-fold increase in value for end-use industries.	Procurement needs create employment opportunities along the supply chain, creating NT\$8.9 billion in employee salaries. The electronic components industry and computer manufacturing industries accounted for the highest percentage.	Innolux strives to promote green supply chain management, as well as product energy savings and conserving materials. The environmental impacts of the supply chain and during product use highlight the importance of Innolux’s measures and its contribution to humanity and society.

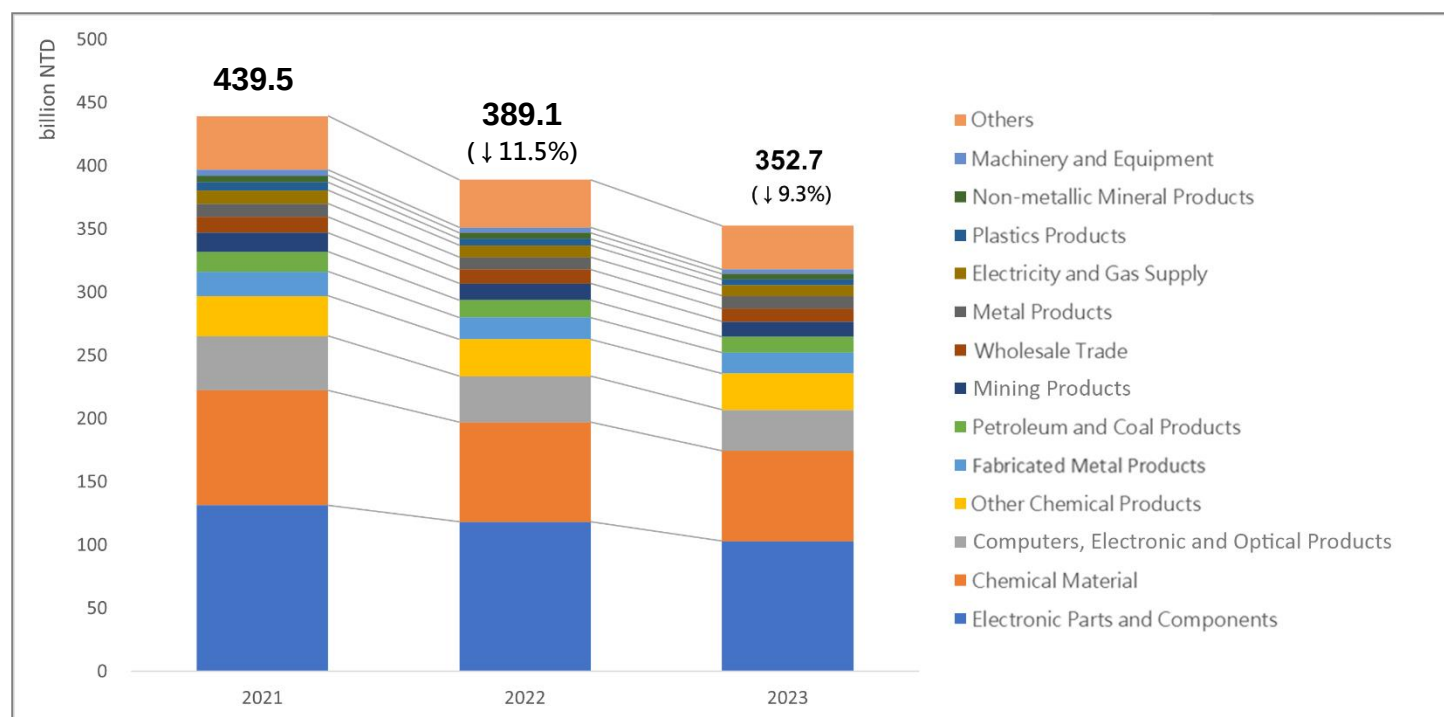
Upstream Supply Chain

Supply Chain Output Value Gained from Procurement

The mutual dependency between industries generated by economic activities is complicated. Fortunately, between the 1930s and 1940s, Nobel laureate Wassily Leontief developed an input-output model to understand the impact of purchase spending on the supply and demand structure of industry chains. The model is usually used by governments and scientific research institutions to give a monetary valuation of real financial data. This study refers to the 2016 Input-Output Tables made by the Directorate General of Budget, Accounting and Statistics, Executive Yuan.

Result

In 2023, Innolux generated approximately NT\$352.7 billion in supply chain value due to procurement needs, with electronic components making the largest contribution at 29.3%. Based on recent trends, the supply chain value generated in 2023 decreased by 9.3% from the previous year, mainly due to the decrease of 13.5% and 11.4% in procurement of electronic components and chemical products, respectively. Effective management of the supply chain is an important part of enhancing organizational competitiveness. To enhance supply chain resilience, the Company has been working closely with suppliers to not only focus on product quality, delivery, and price, but also to explore ESG sustainability issues and trends with suppliers. The hope is to work together to improve sustainability performance and create sustainable value. Meanwhile, qualified suppliers are also encouraged to adopt the ISO 9001:2015 quality management systems, ISO 14001:2015 environmental management systems, and ISO 45001:2018 occupational safety and health management systems, and other related international certification standards to enhance their sustainable competitiveness and become significant partners to Innolux.

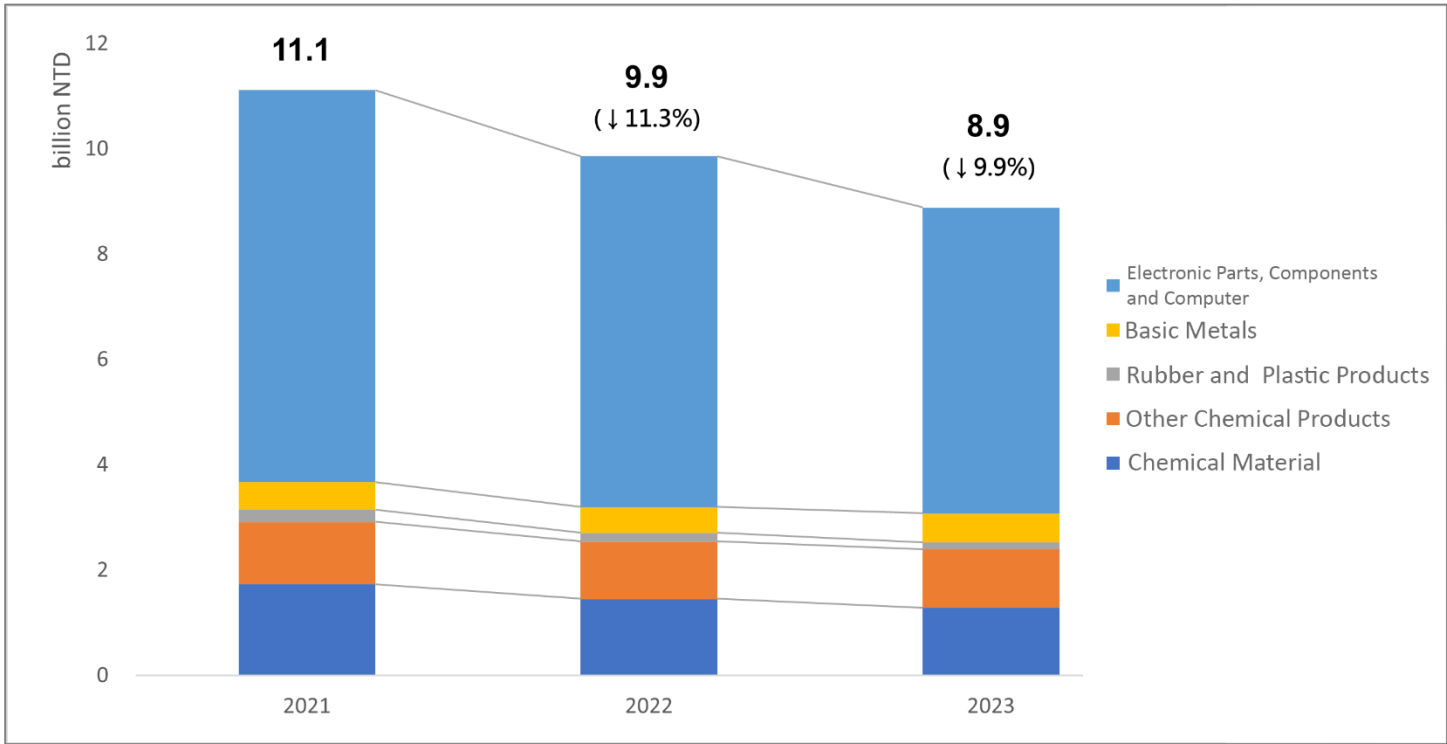


Salaries for Supply Chain Employees

In the input-output analysis model, all input elements of the supplier's production and service process (direct) and its upstream (indirect) are included in the calculation and allocated according to the changes in final demand caused by the company's activities (VBA, 2021), through which the direct and indirect inputs (e.g., employee recruitment and payroll expenses) required by the whole industry chain to satisfy the changes in final demand brought about by procurement demands can be analyzed.

Result

In 2023, Innolux’s procurement demands created approximately 24,000 supply chain jobs, generating NT\$8.9 billion in social external benefits for workers, with the largest contribution coming from the 65.4% share of the electronic components and computer manufacturing industry. Judging from the trend in recent years, the employment earnings of supply chain workers generated by the demand for procurement decreased by 9.9% from the previous year.

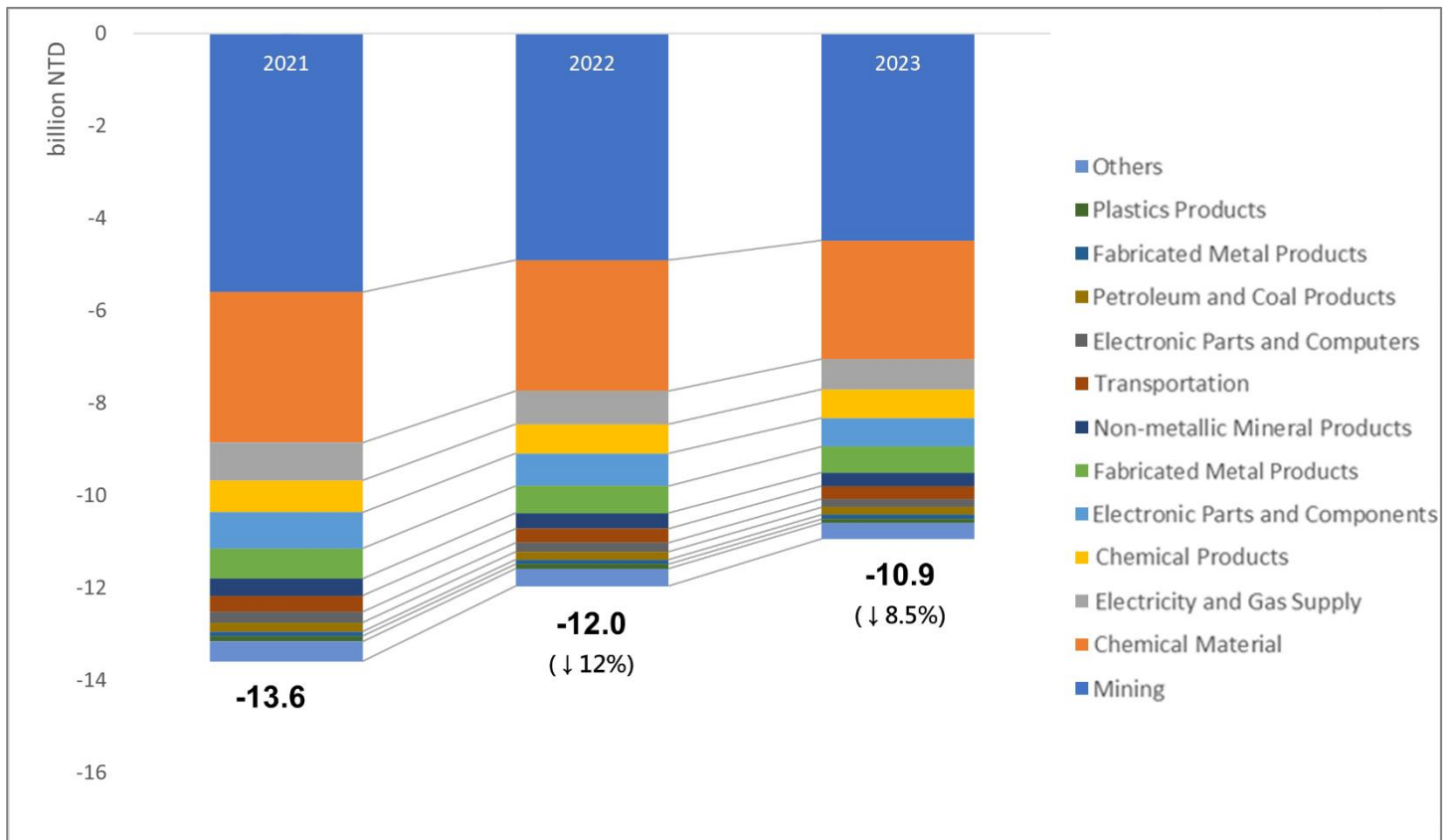


Environmental Footprints Derived from the Supply Chain

Environmentally Extended Input Output Analysis (EEIO) is a simple but comprehensive approach to assess the relationship between economic consumption activities and environmental impacts (Kitzes, 2013). In order to understand the relationship between purchase spending and environmental impacts in various industries, this study adopts the EEIO methodology and analyzes the public data released by the Directorate General of Budget, Accounting and Statistics and the Bureau of Energy to understand the pollutant emissions caused by each unit of output value in various industries. Pollutant emissions include greenhouse gases, water contamination (COD), waste (incineration), and air pollution (PM_{2.5}, NO_x, SO_x, NMHC, Pb). This study will then plug in the valuation factor to evaluate the resulting social costs.

Result

In 2023, Innolux's procurement demands along the supply chain caused environmental externalities that incurred a social cost of approximately NT\$10.9 billion, which was mainly attributable to the upstream mining of raw materials for electronic components and computer-related products, accounting for 40.9% of the total, followed by the environmental footprint from the production process of chemical-related products, which accounted for 23.5% of the total. Environmental externalities derived from the supply chain decreased by 8.5% compared to the previous year.

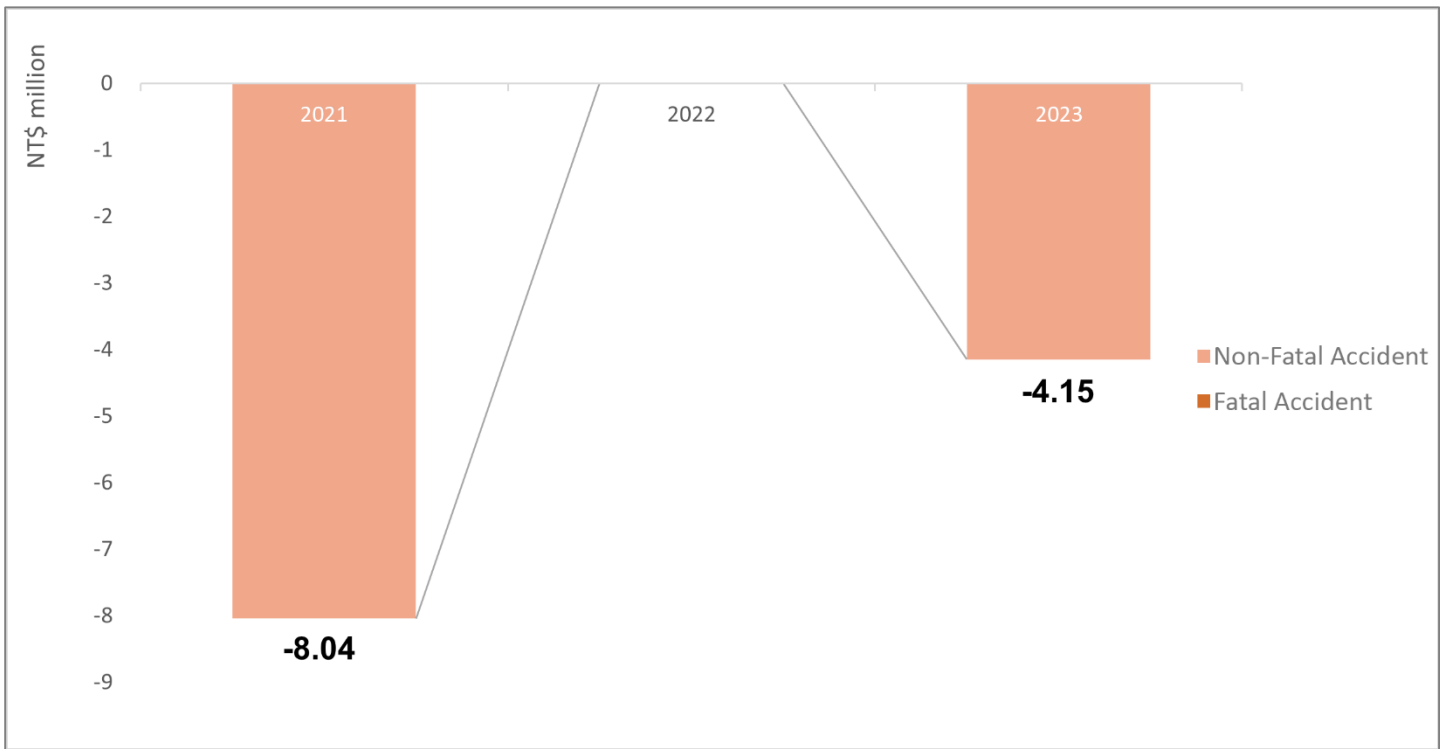


Social Costs from Occupational Accidents among Contractors

A contractor is any person with an Innolux contract that also works in an area managed by Innolux; this includes those under labor outsourcing contracts. Social costs from injuries and fatalities in the workplace are included in this study. For further explanation, please refer to "[Social Costs from Employee Accidents](#)".

Result

In 2023, contractor occupational accidents resulted in a loss of 202 workdays, generating a social cost of NT\$4.15 million. Innolux has established comprehensive mechanisms for environmental health and safety management for our contractors, and all contractors are required to comply with the Contractor Management Regulations. Before entering construction sites, personnel should complete health and safety training provided by contractors and be fully informed of workplace hazards for a better grasp of the workplace environment, hazards and risks, and necessary precautionary measures. For high-risk operations, Innolux cooperates with contractors to complete risk identification and analysis reports, and emergency response plans. The hope is to minimize the likelihood of accidents and facilitate a better and more harmonious workplace. Innolux has also set the goal of controlling the frequency rate (FR) of disabling injuries to ≤ 0.25 by 2024. Additionally, Innolux is able to manage construction applications through the contractor’s website, which includes personnel and construction information verification during entry and exit, in order to ensure the safety of the working environment and construction personnel.



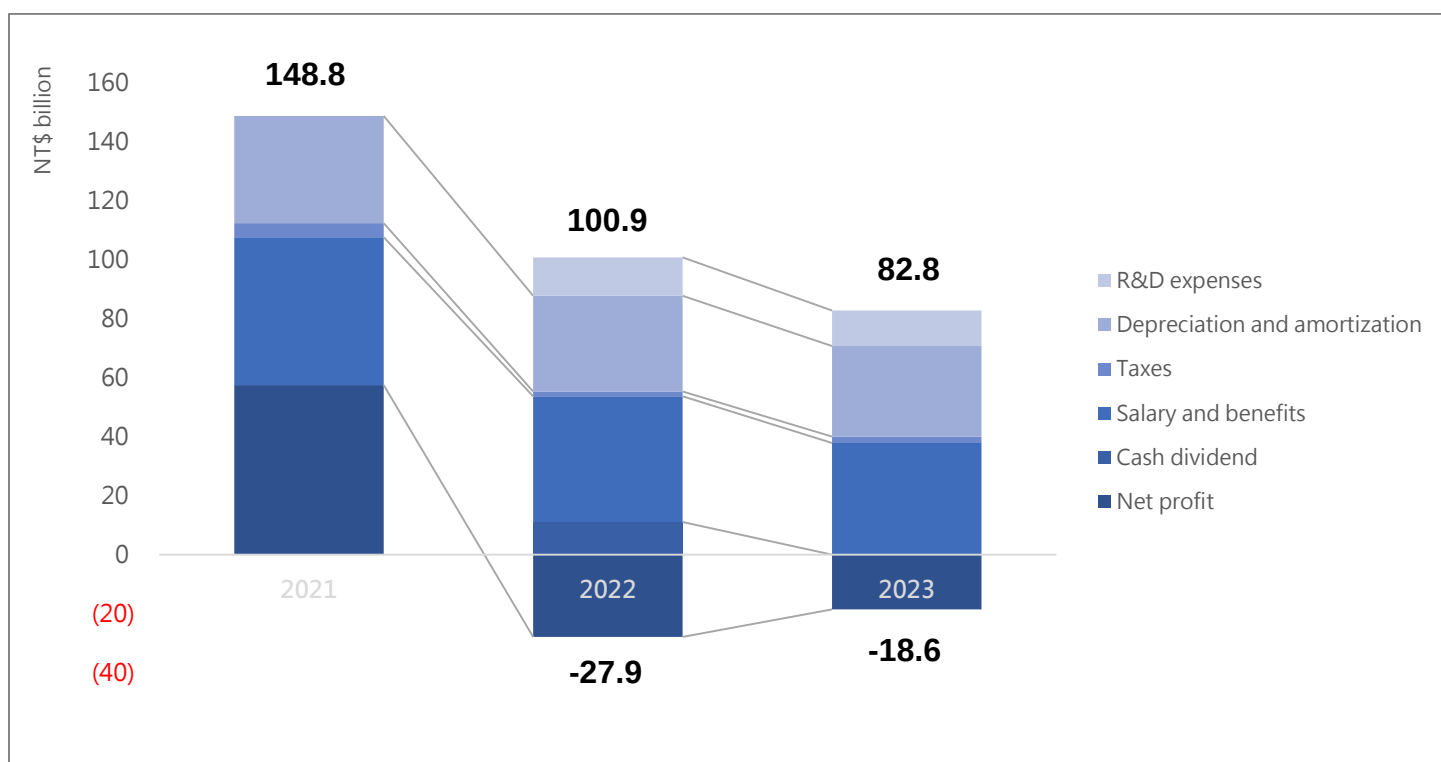
Production and operations

Direct Economic Contribution

The Gross Value Added (GVA) method evaluates the difference between inputs and outputs of the business operation process and takes into account original inputs and public expenditures. These economic activities bring benefits to various stakeholders, including net operating profits, employment costs, and tax payments. Thus, GVA can be used to understand the contribution of an enterprise to the well-being of stakeholders (VBA, 2021). This study applies the financial profit and loss data in Innolux's annual reports to evaluate profits created in the operating process for stakeholders, including net operating profit (customers/shareholders/investors), remuneration and benefits (employees), tax (government), and depreciation and amortization (suppliers).

Result

In 2023, Innolux generated a total of NT\$211.7 billion in operating revenue, with a net loss of NT\$18.6 billion after tax due to the conservative consumer market caused by uncertainties such as interest rate hikes and inflation. A gross value-added (GVA) income of NT\$82.8 billion was generated for stakeholders from income tax, employee remuneration, R&D investment, depreciation, and amortization. Looking forward to 2024, panel makers will continue to control capacity utilization to curb panel supply and accelerate the bottoming out of prices. With the inventory levels of panel makers and brand name makers gradually recovering to healthy levels, the market sentiment will gradually shift from oversupply to balanced supply and demand.

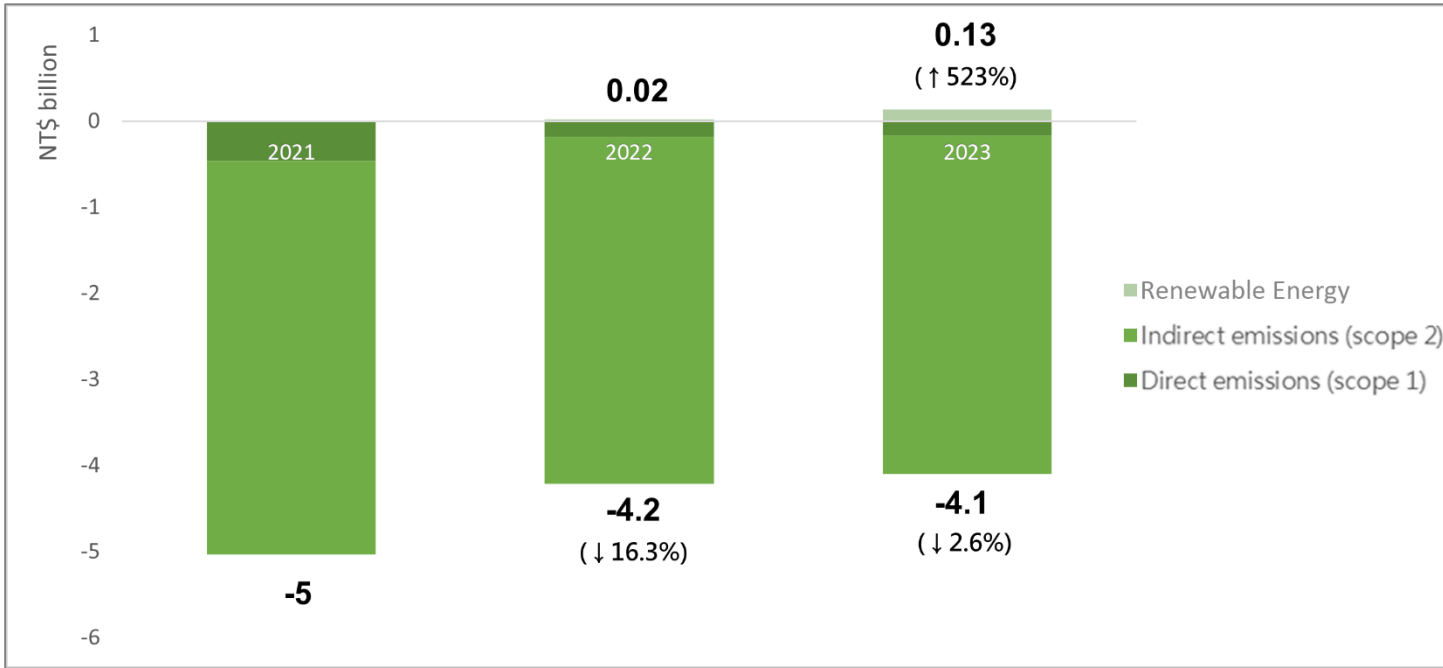


Social Costs from Greenhouse Gases

Greenhouse gas (GHG) is a gas that absorbs and emits radiant energy, causing heat to be trapped in the Earth’s surface and troposphere, thereby resulting in greenhouse effects. The Intergovernmental Panel on Climate Change (IPCC) lists seven principal classes of GHGs, namely, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulphur hexafluoride (SF₆), nitrogen trifluoride (NF₃), various hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). This study uses the Social Cost of Carbon (SCC) developed by the US Environmental Protection Agency (US EPA, 2016) as the valuation factor per unit of greenhouse gas emissions. SCC refers to the social costs of long-term damage to the global economic system caused by climate change, including the economic loss of property, damage to human health caused by physical disasters, and the economic cost of energy transformation to avoid warming, etc., The study converts the future damage costs into a present value at a discount rate (2.5%, 3%, 5%)². The median of 3% was used in this study.

Result

In 2023, Innolux’s direct (Scope 1) and indirect (Scope 2) GHG emissions from production and operation will total 2.59 million tCO₂e, generating a carbon cost of approximately NT\$4.1 billion. The main impact comes from indirect GHG emissions from Scope 2 energy use, which accounted for 95.8%. Trends in recent years reveal that the social cost of carbon derived from production and operations decreased by 2.6% compared to the previous year, with Scope 1 and Scope 2 decreasing by 4.5% and 2.6%, respectively. In order to achieve net-zero emissions, Innolux finds it imperative to effectively improve energy efficiency and accelerate energy transformation. Through process optimization, the introduction of local scrubbers, the use of renewable energy, the enhancement of energy efficiency, and the expansion of resource recycling, Innolux expects to reduce greenhouse gas emissions and lower the environmental impact. Innolux brought in 130 million kWh of renewable energy in 2023, bringing external benefits of NT\$130 million on the environment.



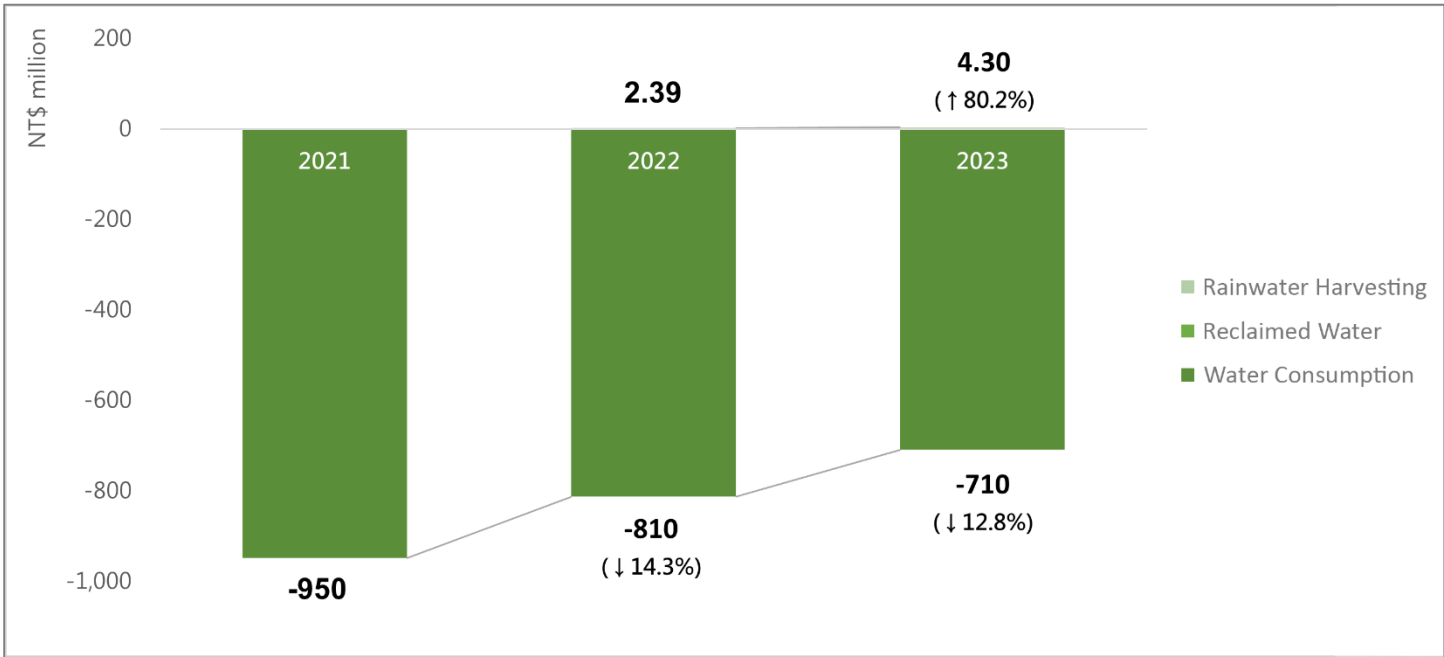
² A high discount rate means that people are willing to pay more attention to short-term rather than long-term benefits (Yan, 2014).

Social Costs from Water Consumption

Generally, three main types of water use exist for human needs, namely, domestic, agricultural, and industrial (UNEP, 2016). According to Bayart et al. (2010) and Kounina et al. (2013), excessive freshwater consumption will lead to irrigation water scarcity and will subsequently result in health degradation from malnutrition. Malnutrition may result from waterborne diseases that reduce nutrient absorption (WWAP, 2009; Boulay et al., 2011). This study assumes that the water consumed by business operations would directly impact the water available for domestic and agricultural uses. Thus, we estimate the environmental externality derived from damage to human health using the characterization factors (CFs)³ according to UNEP/SETAC (2017), which determine the impact of water scarcity on human health, and the value of a statistical life (VSL).

Result

In 2023, Innolux's production and operational processes consumed a total of 15.92 million tonnes of water resources, resulting in approximately NT\$710 million in social costs, a 12.8% decrease from the previous year. This reduction is primarily due to the implementation of 15 water conservation improvement projects, with an investment of approximately NT\$100 million, which contributed to water savings of 602,000 tonnes. To continue advancing various wastewater recycling and water reduction measures and to strengthen water resource management, Innolux's FAB 6 plant became the first to pass the ISO 46001:2019 Water Efficiency Management Systems certification in 2023. By integrating systematic conservation and adaptive management mechanisms, the Company has improved water resource use efficiency. In 2023, Innolux introduced 570,000 tonnes of recycled water and 600,000 tonnes of rainwater harvesting, resulting in NT\$4.3 million in external benefits on the environment.



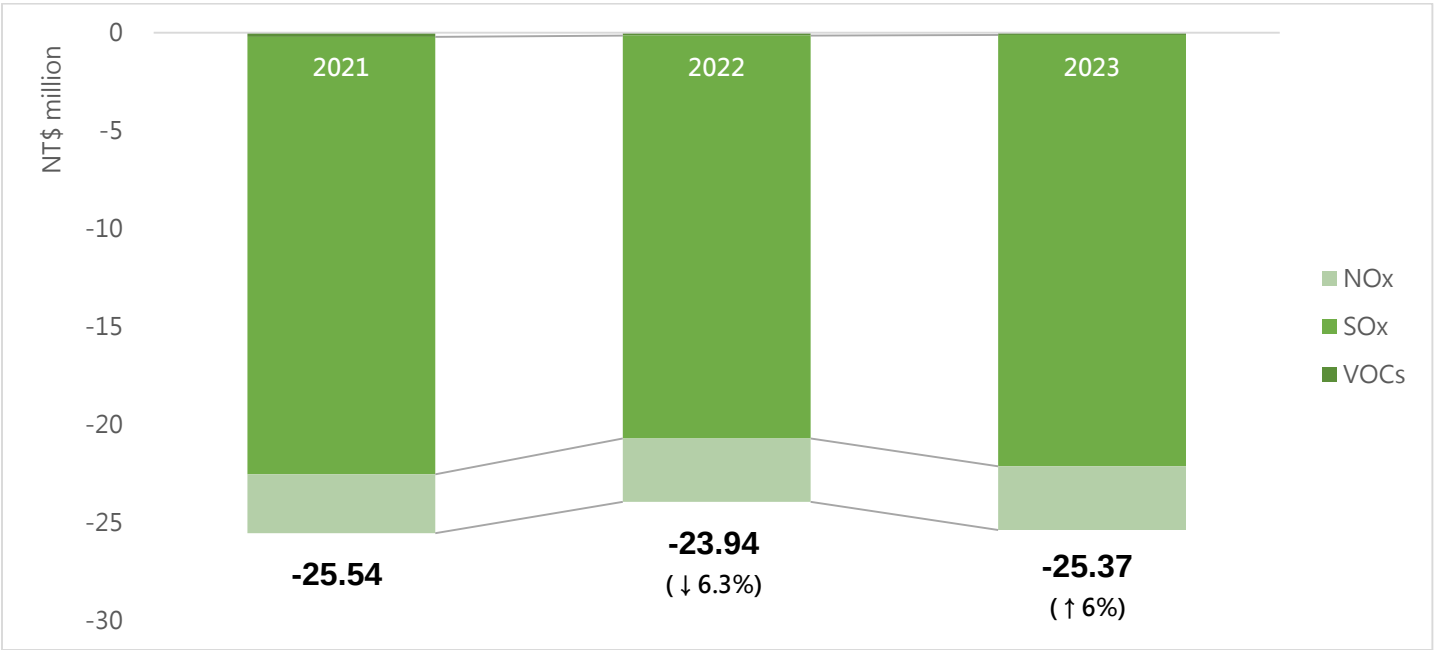
³ Refers to changes caused by resource depletion and pollution, such as increased concentration of particulates in the air, that affect human health or the ecosystem.

Social Costs from Air Pollution

Air pollution that produces primary and secondary aerosols in the atmosphere can have a substantial negative impact on human health (WHO, 2006; HEIMTSA, 2011; Burnett et al., 2014; Lelieveld et al., 2015). The majority (94%) of the social cost of air pollution comes from illnesses and mortalities. The rest is from visibility, agricultural losses, and recreational value (Muller & Mendelsohn, 2007). This study examines the volatile organic compounds (VOCs), nitrogen oxides (NOx), and sulfur oxides (SOx) produced during production and operations. Innolux refers to guidelines provided in RIVM (2017) and UNEP/SETAC (2017) regarding the characteristic factors of the impact of fine particulate matters (PM_{2.5}), photochemical ozone formation, and toxic substances generated from air pollutants after second-order reaction on human health. The social cost of air pollution-related health damage was calculated based on VSL.

Result

In 2023, 87 tonnes of VOCs, 48 tonnes of SOx, and 34 tonnes of NOx were emitted as a result of Innolux’s operations, resulting in a social cost of approximately NT\$25.37 million due to air pollutant emissions, 86% of which was attributable to SOx emissions. Based on recent trends, the social cost of air pollution has increased by 6% compared to the previous year. In order to ensure that VOCs comply with local regulations and emission standards, Innolux has continued to improve air pollution prevention and control equipment, spending a total of NT\$13.1 million to implement two projects in the Tainan and Ningbo plants in 2023. The rotary zeolite concentrators in FAB3 and FAB4 were replaced at the Tainan plant, which has increased the efficiency of VOCs removal to 92%. The Foshan Plant abides with Guangdong’s local regulations, the “Volatile Organic Compounds Emission Standards for Stationary Pollution Sources,” and is newly equipped with organic gas waste treatment facilities. Pollutants are sorted into organic, acidic, alkaline, and particulate wastes, contained, and then collected during transport. They are then subsequently controlled with air pollution prevention and control facilities according to their physical and chemical characteristics. In addition, Innolux abides by local regulations of operating locations when implementing practices in pollutant equipment operation records, maintenance operations, raw/flammable material operation records, declarations, regular inspections, and emission standards.

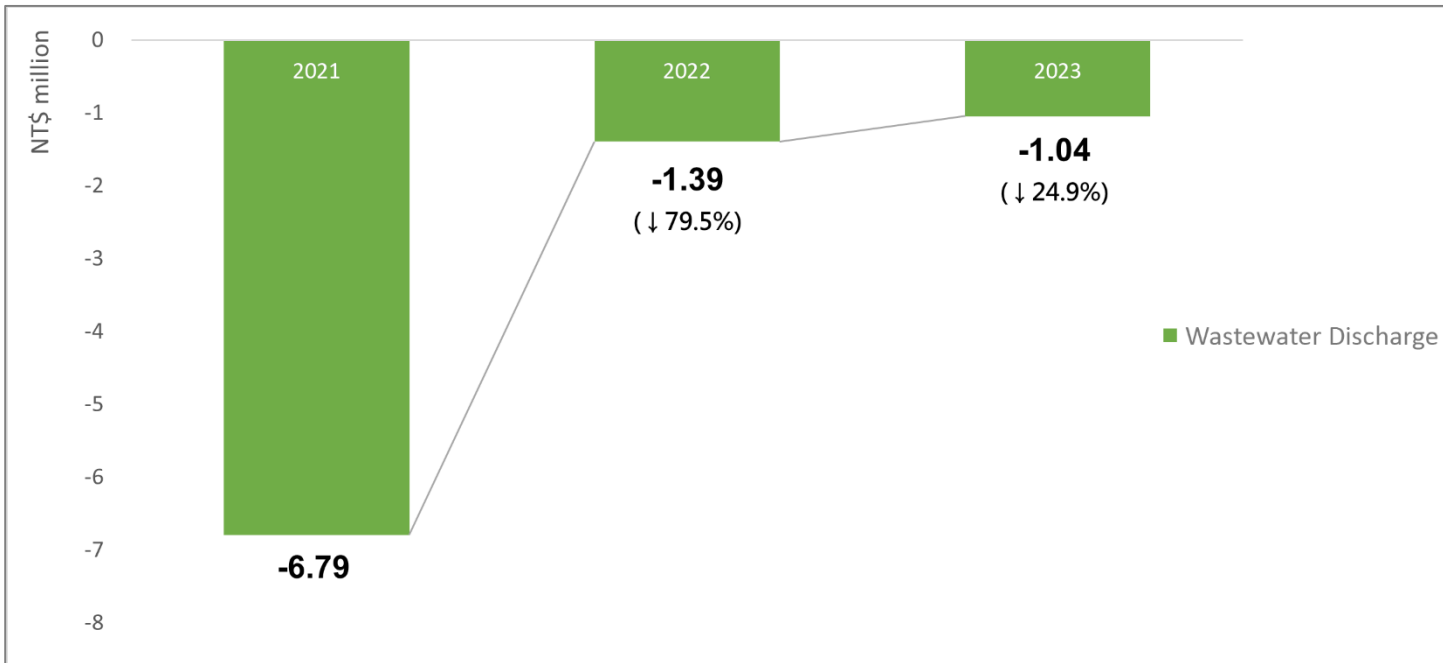


Social Costs from Wastewater Discharge

The anaerobic digestion process in industrial wastewater treatment generates methane (CH₄), the amount of which is determined by degradable organic matter, temperature, and treatment system. This study adopts the evaluation method defined by the 2006 IPCC Guidelines and takes the chemical oxygen demand (COD) in wastewater as an indicator to calculate the amount of greenhouse gas emissions generated from wastewater treatment and further calculate the social costs derived therefrom. CO₂ emissions from the wastewater treatment process are considered a biological factor, hence excluded from the evaluation.

Result

In 2023, a total of 9.97 million tonnes of wastewater was generated from Innolux’s operations, generating a social cost of NT\$1.04 million, a decrease of 24.9% compared to the previous year, mainly due to the reduction of Chemical Oxygen Demand (COD) in process wastewater and the increase in process water recycling rate. The total process water recycled amounted to 267.5 million tonnes, with a 97.6% recycling rate – Innolux’s best result in years. Innolux focuses on the reduction of overall pollutants in wastewater management. By improving the wastewater discharge classification system and establishing a wastewater discharge characteristic monitoring system that evaluates water recycling and reuse, Innolux turns waste into reusable resources and enhances the efficiency and performance of wastewater treatment facilities.

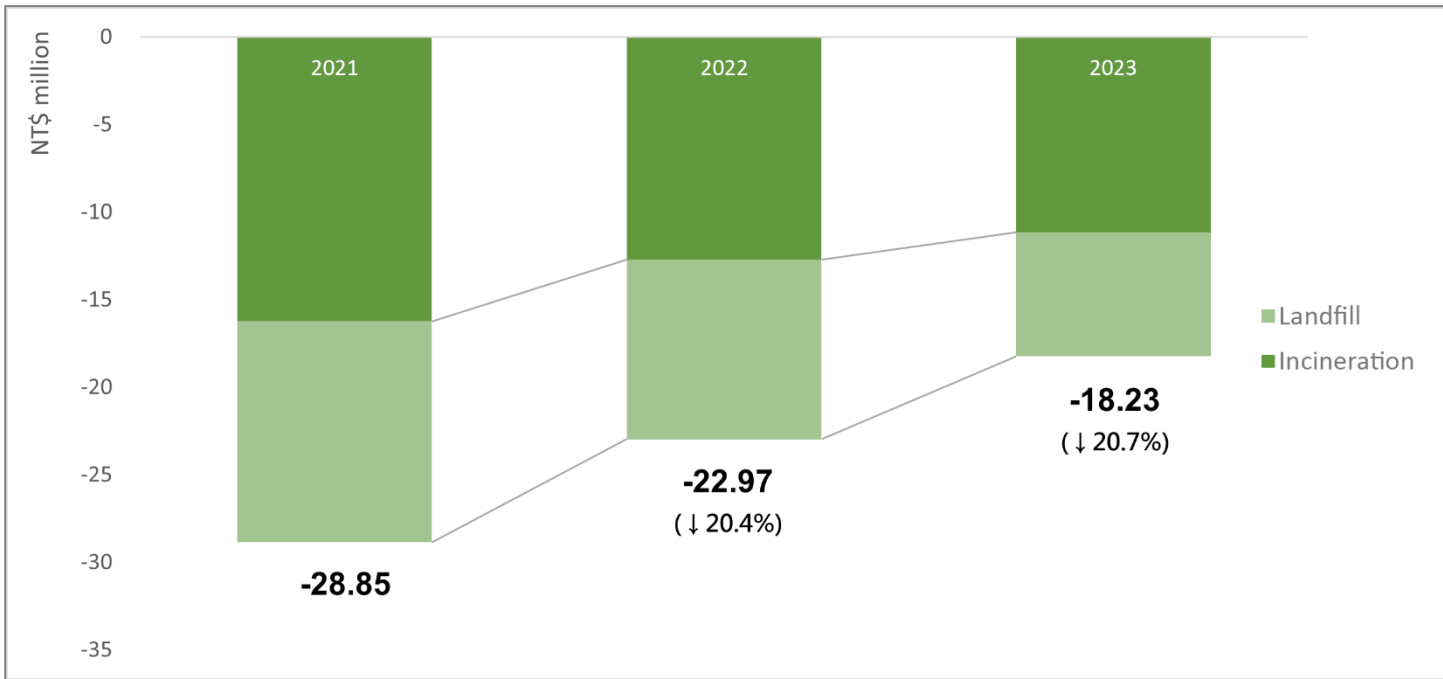


Social Costs from Waste Treatment

Waste incineration produces a wide variety of air pollutants. PM, NOx, SOx, dioxins, and heavy metals are particularly important, as they can have considerable societal consequences (e.g., causing cancer or loss of intelligence via developmental harm) (EXIOPOL, 2009; PwC UK, 2015). This study refers to data from actual inspections of 24 waste incinerators in Taiwan and the USEtox database to calculate the emission coefficient of various air pollutants and their impacts on human health. The social costs of related health damage were calculated based on VSL. Both incineration and decomposition in landfills generate greenhouse gases. Based on the management table for greenhouse gas emission coefficients and the national greenhouse gas emission inventory report issued by the Environmental Protection Bureau, this study calculates the greenhouse gas emissions generated from the waste treatment and the social costs derived therefrom. Considering the complexity of recycling technologies and the difficulty in obtaining related data, waste recycling is excluded from the evaluation.

Result

In 2023, the amount of waste generated from Innolux’s production and operation processes that was disposed of via incineration and landfill was 6,199 tonnes and 445 tonnes, respectively. The resulting social cost was approximately NT\$18.23 million. Based on trends in recent years, the social cost of waste disposal decreased by 20.7% compared to the previous year, mainly due to the promotion of waste reduction at the source and the results of resource utilization. In addition to the continuous promotion of process optimization and source reduction, Innolux also works with upstream and downstream external partners to maximize resource efficiency through resource regeneration, recycling, re-design, and extended use. This creates a win-win situation through waste reduction and recycling of raw materials, allowing Innolux to realize a circular economy and create value.

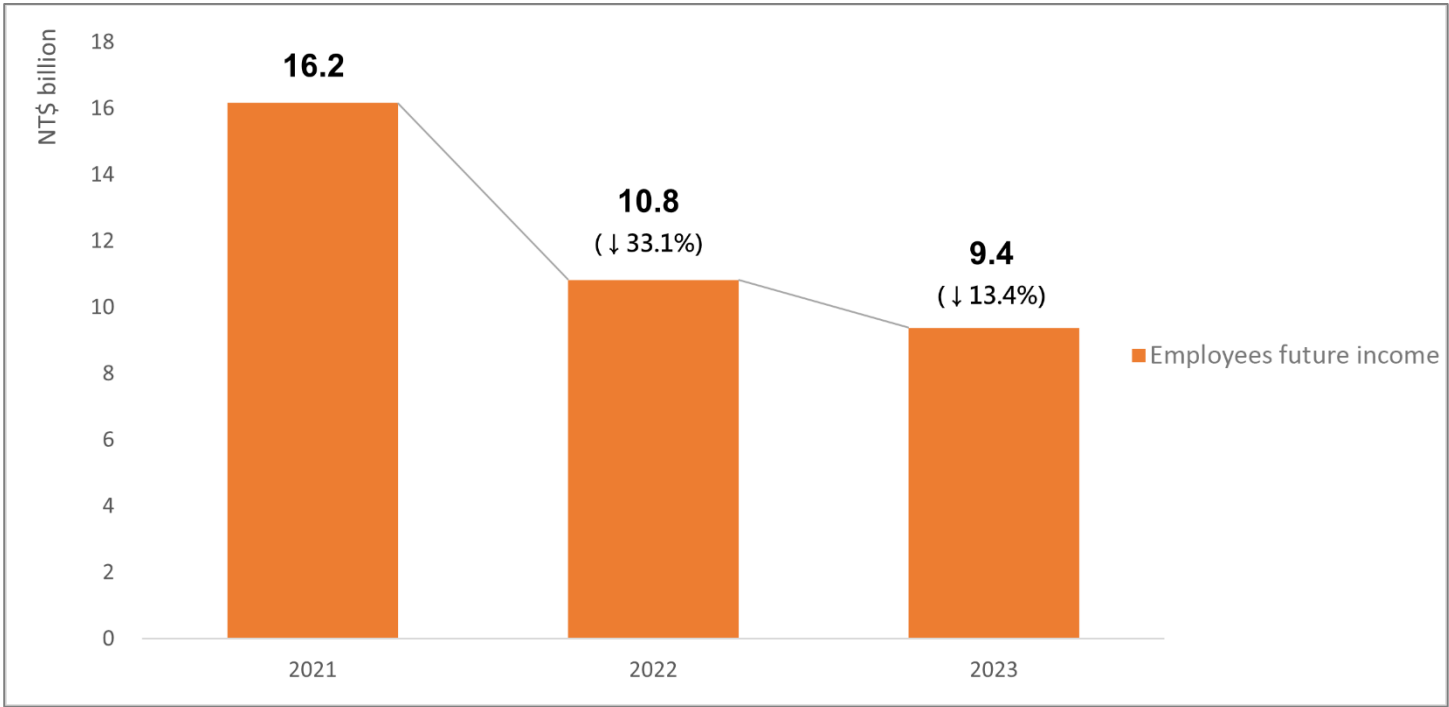


Future Income Generated from Employee Training

Employee experience and skills are of utmost importance to the Company’s long-term development. Enhanced employability also leads to better compensations for employees, further increasing their quality of life and purchasing power. This study refers to the methodology of Ecomatters (2016) and considers the average compensation, average raise percentage, retirement age, inflation conversion factors, and job-related remuneration development percentage to estimate the average annual growth of future returns created by employees’ growing experiences and skills throughout their careers.

Result

In 2023, Innolux’s growth in future returns from professional development for employees was NT\$9.4 billion, a decrease of 13.4% compared to the previous year, which is mainly due to the decrease in the number of employees. Innolux has taken into consideration factors such as industry competitiveness, the overall economy, and corporate sustainability, and has reviewed the salary structure of the electronics industry through local surveys to ensure that we offer competitive market salaries. In addition to a fixed salary, Innolux also offers festival bonuses, educational travel stipends, etc., as well as incentive bonuses and other flexible remunerations. Overall compensation is based on company operations, team and individual performances, and includes flexibility for different duties. Compensation does not differ due to race, ethnicity, color, nationality, gender, sexual orientation, gender identity, physical disabilities, marriage, pregnancy, age, political orientation, religion, and other identity factors. The hope is to attract and retain talents that will work with Innolux to create better performances and greater profits.

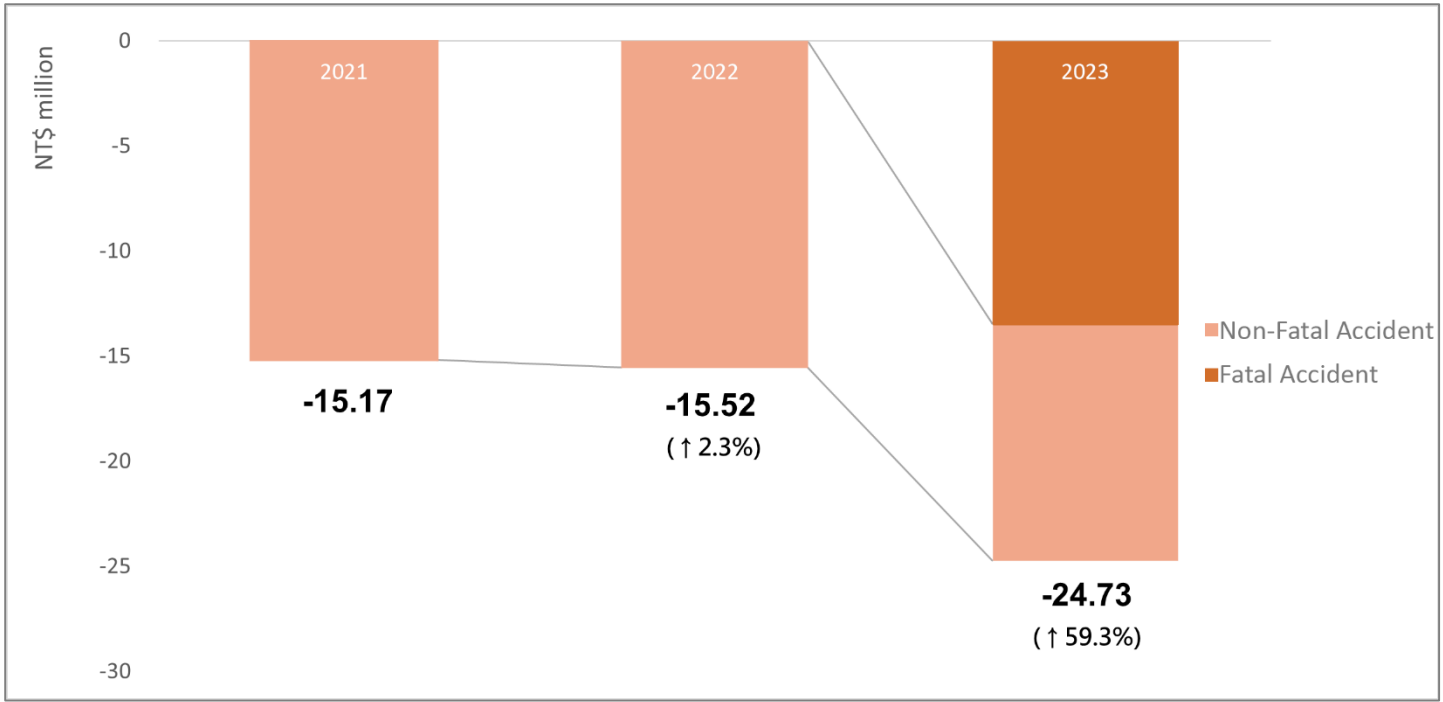


Social Costs from Employee Occupational Accidents

While performing their duties, employees may experience occupational accidents that cause illnesses, injuries, disabilities, or deaths from the architecture, machines, equipment, raw materials, substances, chemicals, gases, steams, dust, and other operational or occupational hazards. The UK Health and Safety Executive (HSE, 2020) study states that the social costs derived from employee occupational accidents include financial and human costs. Financial costs included a loss in productivity, medical and recovery expenses, administrative and legal fees, salary, and insurance claims. Human cost refers to the individual's willingness to pay to reduce the risks of occupational injuries or death. This study includes disabling injuries and deaths in the evaluation. The financial costs include production losses and compensations for occupational accidents. Innolux refers to the labor costs defined by Ho Chun Chieh (2005) and Tsao Chang Cheng (2013) to calculate the financial losses resulting from willingness to pay (WTP) to prevent occupational accidents and death by occupational injury deaths. Noting the complexity involved in the methodology required for the consideration of occupational diseases, they are excluded from the evaluation.

Result

In 2023, Innolux had one death and 548 lost workdays due to occupational accidents, resulting in social costs of approximately NT\$24.73 million. This resulted in a 59.3% increase from the previous year, mainly due to the fatality. Through the electronic system for accident management and improvement, Innolux analyzes the statistics and causes of occupational accidents in employees and contractors by applying hazard source management for risks to strengthen intrinsic safety. Innolux also rolls out risk management practices through the “horizontal roll-out system” to other plants to avoid workplace accidents.

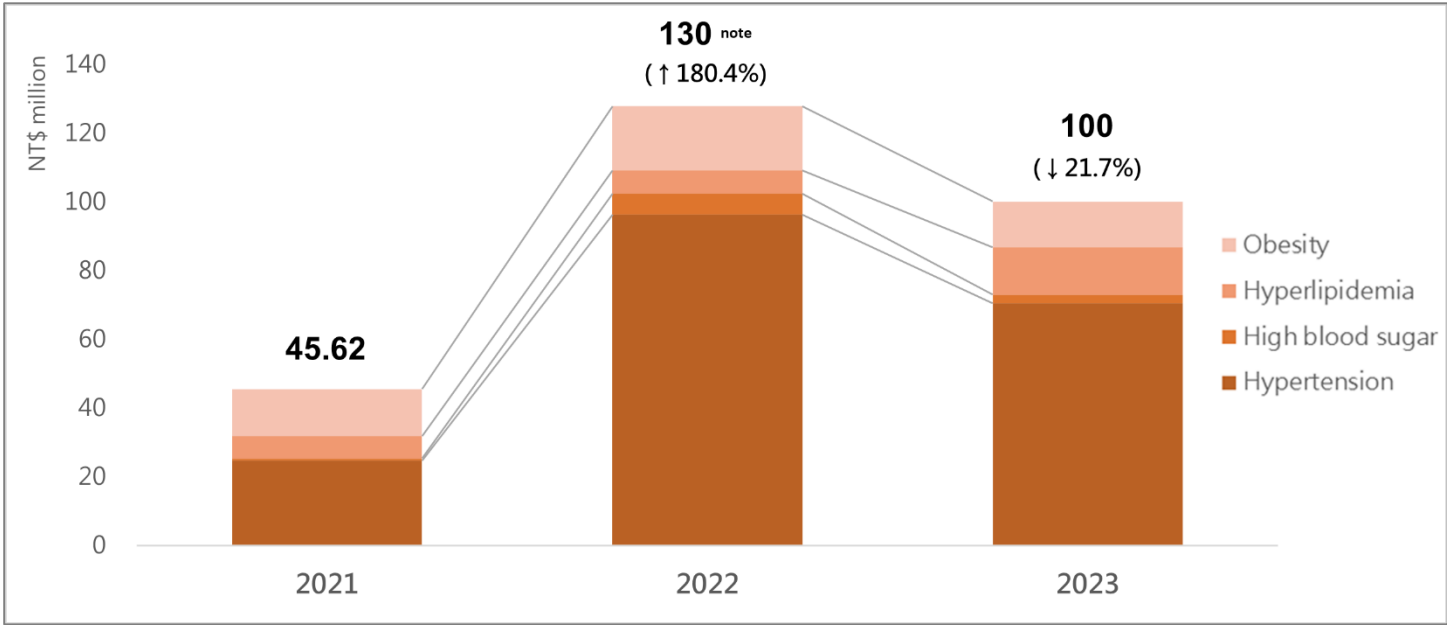


Medical Costs Avoided from Health Promotion

According to statistics from the Ministry of Health and Welfare, cardiovascular diseases have always been the top three on the list of top 10 causes of death in Taiwan. Epidemiologists view hypertension, high cholesterol, diabetes, and obesity as potential causes of cardiovascular diseases (Anderson et al., 1991). The World Health Organization (WHO, 2008) stated that harmful work conditions would lead to a series of harm to the employees' health. In particular, 50% of the increased risk of cardiovascular diseases is related to stress at work (Marmot, 2004; Kivimäki et al., 2006). Chieh-Hsien Lee (2010) illustrated the attributing risk factors of hypertension, high cholesterol, diabetes, and obesity that may lead to cardiovascular diseases and applied the Travel Cost Method to discuss the economic benefit of eliminating cardiovascular diseases. Based on the aforementioned methodologies, this study calculates the derivative medical cost from reducing or avoiding risks of cardiovascular diseases in employees by offering regular health checkups, personalized health management, and various activities to promote employee health.

Result

In 2023, the economic benefits generated by reducing cardiovascular diseases in Innolux employees through regular health checkups and health management measures were approximately NT\$100 million, which is a decrease of 21.7% from the previous year. Employee health and mental wellbeing is valued at Innolux, and the company organizes health promotion activities such as health lectures, sports events, and free clinic sessions, and encourages every employee to find their own balance between work and life. Individual health information is integrated across the digital health management system and mobile app management tools. This is combined with personalized health-management advice and advocacy for health awareness to create a happy and healthy workplace.



Note: The data in this report has been corrected as the number of people affected with high blood pressure, high blood sugar, and high cholesterol in the 2022 health check was misreported.

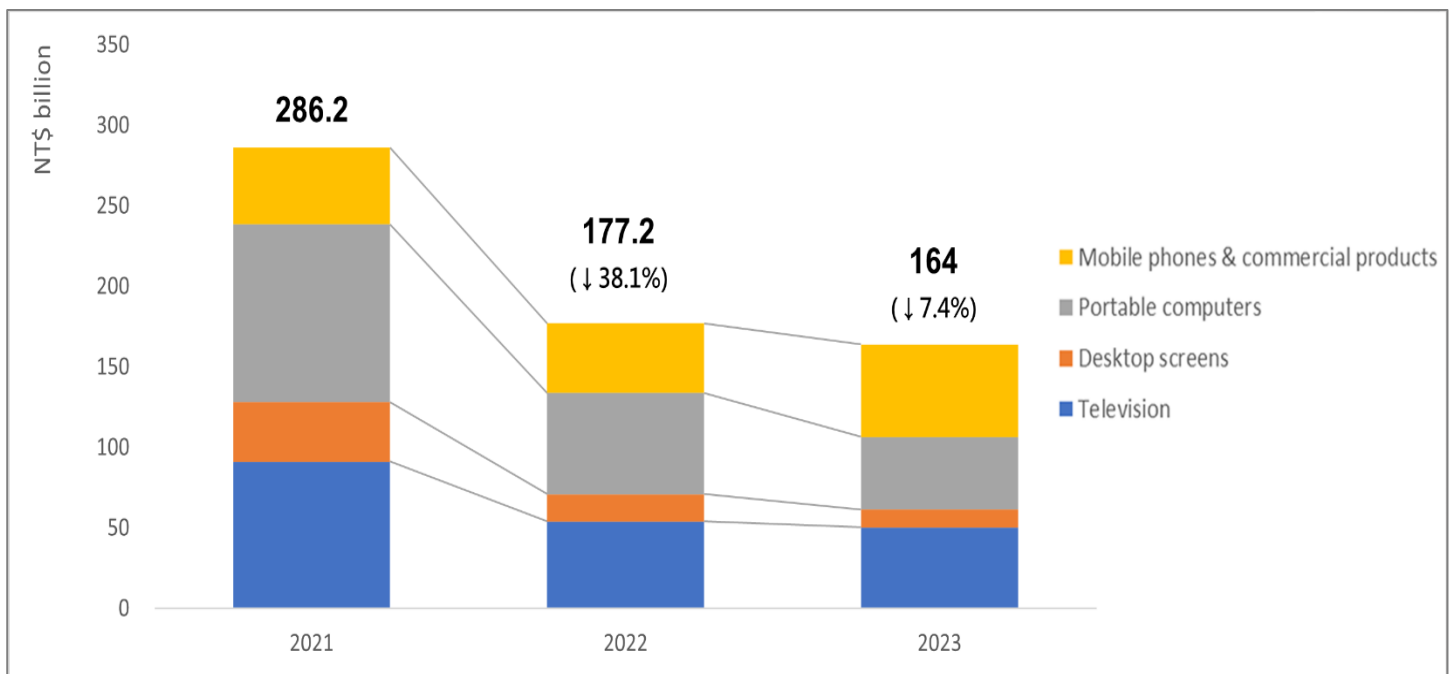
Downstream Product Sales

Client Industry Output Enhanced by Product Sales

Innolux's main product is TFT-LCD monitors in all sizes primarily used in LCD TVs, billboards, desktop security monitors, laptops, tablets, cellphones, portable audio/video players, wearable devices, automotive monitors, medical devices, X-Ray applications, display panels, and touch modules for industrial, aviation, and educational use. The Company's product sales translate into business growth for customers. Since Innolux is not the only supplier to customers, this study focuses on sales in four main industries of terminal TFT-LCD applications (including television, desktop screens, portable computers, mobile phones, and commercial products). Sales prices and the relationship between supply and demand of the client industry's output value are considered to assess the indirect economic values created from the product sales process.

Result

In 2023, Innolux's TFT-LCD product sales indirectly generated NT\$164 billion in output value for its client industries, a decrease of 7.4% from last year. Adhering to the core concept of "More than Panel," Innolux has been undergoing a cross-industry transformation. In addition to continuing to cultivate the panel industry, which will improve costs, increase yields and gross margins, and stabilize market share, Innolux has also been actively pursuing new areas, moving into fields such as medical, automotive, and semiconductors. The goal is to provide customers with complete solutions through horizontal technological integration and expansion of product functionality.

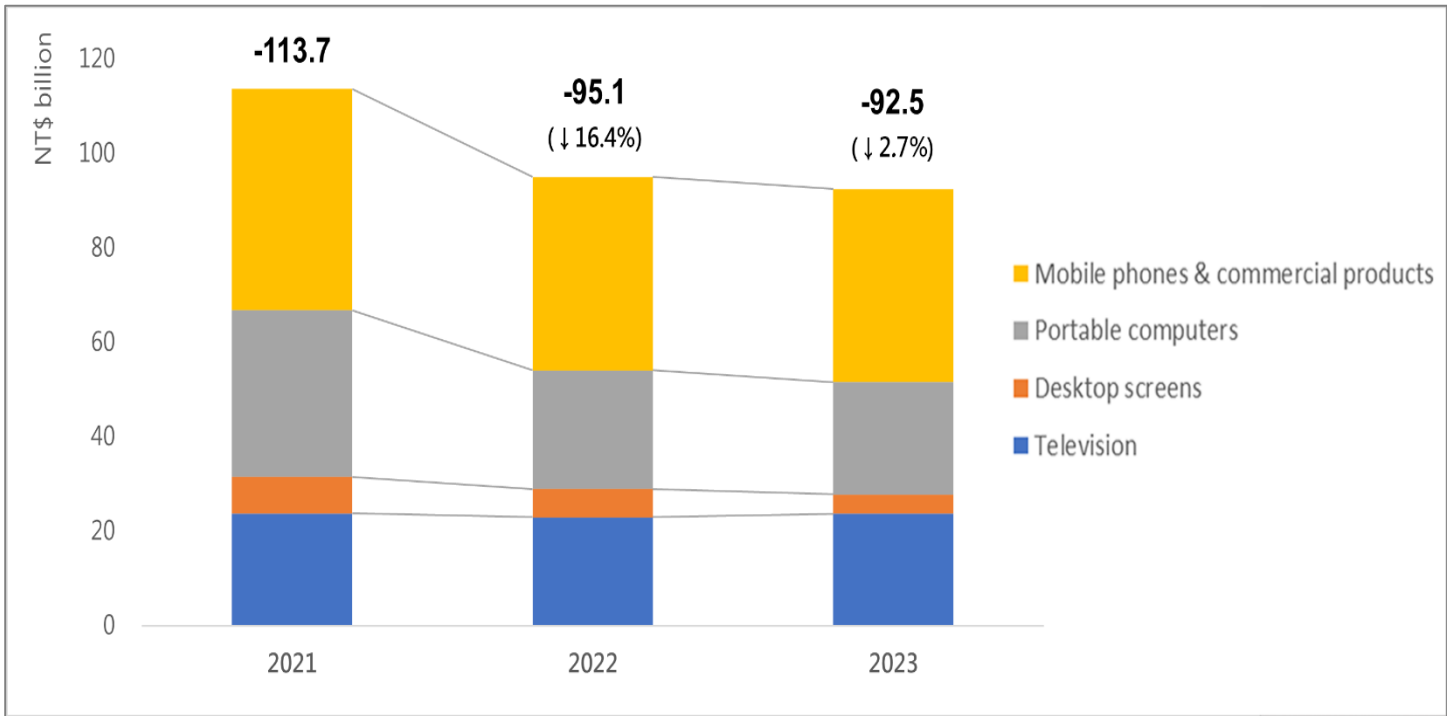


Social Costs from the Product Use Stage

In the varying terminal applications of TFT-LCD products, the energy consumption during product use phases leads to environmental externalities including greenhouse gas emissions, air pollution, wastewater, waste, and resource consumption. Based on the average energy consumption of each terminal application and the product category rules (PCR), this study calculates the energy consumption of TFT-LCD products during the product life cycle according to end product use scenarios and service life, and the social costs are determined accordingly.

Result

In 2023, the end-use products of Innolux’s TFT-LCD line resulted in a social cost of NT\$92.5 billion due to product usage – a decrease of 2.7% from the previous year. In the hope of developing and producing eco-friendly green products, Innolux will continue with the core concepts of non-toxicity, energy-saving, material-saving, and commit to green product design based on the product lifecycle. Innolux will take into account key elements of sustainable manufacturing in every aspect of the process – from the selection of raw materials, manufacturing, transportation, product use, to final disposal or recycling. In our strive for lower carbon emissions and low resource consumption, Innolux will minimize the environmental impact, meet customer expectations for sustainable products, and contribute to environmental sustainability.



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