

2024 TCC Group Holdings Sustainability Impact Valuation Report

Quantitative Evaluation of the Value Chain

TCC Group Holdings (hereinafter referred to as “TCC”) is a green environmental engineering company fully focused on addressing the complex relationship between human civilization and nature. Since 2018, TCC has actively promoted a "carbon reduction and green growth" strategy through three core businesses: low-carbon construction materials, resource recycling, and green energy. Guided by a human-centered philosophy, we foster diverse cross-domain and cross-age integration. Through four major drivers—stable financing, carbon competitiveness, AI innovation and electrification, and diversity and inclusion—we drive our low-carbon transition, build global competitiveness, and lead our suppliers, employees, and clients in building sustainable resilience toward our 2050 net-zero goal.

The year 2024 marked TCC's official transition to a group holding company, with its English name changed to TCC Group Holdings. In 2025, the group established nine major business groups: Cement and Environmental Protection (Europe-Africa, Asia), Cement and Energy Storage (Europe-Africa), Charging and Storage (Europe, Asia), Battery Energy, Asset Management, Energy for Social Transformation, and Investment Businesses. Our operations and project sites have expanded from Taiwan and Mainland China to 14 key markets, including Türkiye, Europe, West Africa, the United States, and Australia.

The scope of this report covers all global operating locations of the Cement and Environmental Protection (Europe-Africa, Asia) business group. We display the coverage rate of individual indicators in our overall operational activities, with environmental indicators calculated by revenue proportion and social indicators by employee count. Additionally, we used 27 impact indicators to assess both the positive and negative effects of environmental and social externalities. We expanded our social analysis this year by adding new social externality indicators like job opportunities, internal promotions, and harassment. We also deepened our supply chain assessment, providing a more detailed analysis of the environmental and social externalities that arise from geographical differences.

TCC Creates NT\$124.8 Billion in Sustainable Impact, Progressing Toward a Net Positive Business Model

This evaluation shows that in 2024, TCC's value chain activities—across its three major areas of supply chain, company operations (social), and sustainable products and services—brought a total positive impact of **NT\$124.8 billion** to external stakeholders. Of this, 89% came from the supply chain, where procurement **drove NT\$106.6 billion in value, created 74,000 jobs, and provided NT\$4.9 billion in income for workers**. In terms of company operations' social impact, TCC Group's employees come from 46 different countries. Our global operations have created job opportunities for local communities, reducing the unemployment rate and generating **NT\$190 million** in incremental wages. The group also offers comprehensive cross-functional training programs and a robust internal transfer system, which generated **NT\$220 million** in salary growth for employees' career development. In addition, employee benefits and family-friendly support that exceed legal requirements **provided NT\$5.39 million in financial and non-financial support**, helping staff better balance their work and personal lives. For sustainable products and services, TCC helped clients reduce carbon emissions by **1.05 million metric tons of CO₂e** in 2024, **creating NT\$1.7 billion in carbon reduction benefits**. This not only helped clients achieve their net-zero goals but also drove the low-carbon transition of their industries.

At the same time, our operational activities brought an estimated negative impact of NT\$104.3 billion on the environment and society. This was mainly due to GHG emissions from our production processes (54%) and from air pollution and GHG emissions within the supply chain (30%). To mitigate this, TCC is fully implementing AI technology, entering a new digital and smart industrial revolution with smart mining, optimized cement processes, quality control, and real-time monitoring of on-site equipment and green energy efficiency. We are also continuously investing in the R&D of new low-carbon materials, technologies, and products, and are committed to reducing the environmental impact of our product manufacturing. We actively conduct full life cycle management and adopt international management systems. As a result, revenue from our low-carbon products increased from 41.9% in 2023 to 57% in 2024. In our operations, we have set environmental management goals for energy and water efficiency, waste reduction, and GHG emissions. For our supply chain, we assess a supplier's sustainability risks before collaboration, and we also provide existing partners with guidance and resources to help them build their own sustainability resilience.

Methodology based on UN, ISO International Standards, and Harvard Business School

The value of corporate sustainability should not be measured by financial figures alone. TCC's operational processes not only rely on inputs like natural resources, raw materials, energy, and labor but also generate both positive and negative impacts on the environment and society. In 2023, TCC piloted the Impact Measurement & Valuation (IMV) management tool to comprehensively quantify the changes our business activities bring to the well-being of stakeholders from an external perspective. We transform these impacts into the easily understandable financial language of "NTD-equivalent value." This not only allows stakeholders to intuitively understand TCC's social and environmental contributions but also provides more diverse and forward-looking insights for corporate decision-making. This mindset helps TCC drive a "Net Positive" business model, with the goal of maximizing positive benefits and minimizing negative impacts.

TCC's methodology follows protocols and standards from the Natural Capital Protocol, Social & Human Capital Protocol, ISO 14008: 2019, Harvard Business School's Impact-Weighted Accounts (IWA), and the Value Balancing Alliance (VBA). We use the Impact Pathway to analyze the intersection of economic, environmental, and social issues from our upstream supply chain and production operations to our downstream products and services. Based on a Profit and Loss (P&L) management mindset, we incorporate the externalities of costs (negative) and benefits (positive), converting the changes and impacts our business activities have on stakeholder well-being into a consistent monetary unit.

For the supply chain, TCC uses an Input-Output model to analyze how procurement drives up output and creates jobs and income for workers across the entire industrial chain. We also address accompanying environmental issues by using a hotspot analysis to identify industries and regions with significant impacts, which are then factored into our procurement strategy. For products and services, TCC is committed to a low-carbon transition, using Life Cycle Assessment (LCA) to analyze the carbon reduction benefits that our sustainable products and services bring to clients, helping them achieve their net-zero goals.

Sustainability Impact Pathway

Internal Perspective		External Perspective				
Operational Inputs/Outputs	→	What Has Changed	→	Who is Affected	→	Monetary Valuation of Impact
Resources used in operational activities (e.g., raw materials, energy, and human resources) and their direct outcomes (e.g., pollutant emissions, number of beneficiaries, and energy-saving benefits).		Operational inputs and outputs indirectly cause or contribute to changes in human well-being. For example, training programs that equip employees with professional skills enhance employability, while air pollution can lead to respiratory diseases.		Stakeholders whose well-being is affected— internal and external employees, shareholders/investors, customers, suppliers, the environment, and society.		Using a profit and loss (P&L) approach, it can be seen that the impact of operational activities on stakeholders is quantified in monetary terms, referred to as sustainability impact valuation.

Analysis Results

Supply Chain

- TCC's procurement drove **NT\$106.6 billion** in value for the supply chain, mainly concentrated in Taiwan and Mainland China. In terms of industry category, the contributions of the mining, petroleum, and coal products industries were the most significant.
- We created 74,000 jobs in the supply chain and generated **NT\$4.9 billion** in income for workers, primarily from supply chains in Taiwan and Mainland China. In terms of industry category, the contributions from the mining, petroleum and coal products, construction engineering, and land transportation industries were the most significant.
- The environmental footprint generated by the supply chain's supply-demand processes also resulted in **NT\$31.3 billion** in social costs, primarily from supply chains in Taiwan and Mainland China. In terms of industry category, the contributions of the water transportation, petroleum and coal products, non-metallic mineral products, and mining industries were the most significant.

TCC manages its supply chain with two key strategies: "sustainable supplier management" and "localized and green procurement." We obtained our ISO 20400 certification in 2025 and refer to the UN Global Compact's Sustainable Supply Chain Guidance to assess supplier risks. We also provide diverse training resources to build sustainability resilience. In 2024, we held workshops to guide suppliers on carbon inventory and reduction. We also host two annual sustainability governance workshops to help high-risk suppliers, especially SMEs, establish sustainable systems. Our annual Supplier Convention is a platform to communicate our sustainability initiatives.

At the 2024 Supplier Convention, we officially established the "Green Value Chain Alliance." The alliance includes 19 key partners from Taiwan and Mainland China, who have committed to completing product carbon footprints by 2025 and achieving a 10% carbon reduction by 2030. TCC continues to use high standards to evaluate and assist suppliers in building responsible business models, aiming for long-term, mutually beneficial partnerships.

|| TCC Operations

- **Workplace Diversity and Equal Opportunity:** Our global operations created jobs in local communities, reducing unemployment and generating **NT\$190 million** in incremental wages for workers.
- **Talent Cultivation and Development:** Comprehensive training programs drove skill and employability growth for employees, creating **NT\$220 million** in salary growth benefits for their career development.
- **Employee Care:** We provide leave benefits and family-friendly support that exceed legal requirements, enabling employees to achieve a better work-life balance and providing them with **NT\$5.39 million** in financial and non-financial support.
- **Environmental Management:** We implemented solutions for alternative raw materials, fuels, and energy, as well as water recycling, and energy and water savings, which generated **NT\$11.2 billion** in environmental benefits.
- **Workplace Health and Safety:** Occupational accidents for employees and contractors resulted in **NT\$60.18 million** in social costs. This was primarily due to four fatal accidents involving contractors at our plants in Taiwan and Mainland China. To ensure contractor safety on-site, TCC established "Contractor OHS and Environmental Management Rules," mandating OHS compliance. All contractors must sign a "Safety and Health Responsibility Commitment" and complete OHS education upon entry, also completing "Workplace Environmental Hazards Notice" and "Notification." For our employees, we provide continuous health and safety training to enhance their occupational safety awareness and have introduced digital and AI-assisted systems to help manage occupational safety with the goal of achieving "zero injuries."
- **Environmental Management:** While focusing on our core business, the environmental footprint from energy and resource consumption and pollutant generation resulted in **NT\$73 billion** in social costs. The scope of this report has been expanded to include our overseas cement business for the first time. The increase in environmental data compared to previous years resulted in a higher social cost. In 2024, in addition to updating our 2050 global cement and concrete business net-zero pathway, TCC and our overseas cement business have both passed the SBT 1.5-degree net-zero target setting and are actively continuing carbon reduction. After identifying industry characteristics, emission scales, and reduction opportunities, we selected four categories—"Upstream Transportation and Distribution," "Downstream Transportation and Distribution," "Purchased Goods and Services," and "Fuel and Energy-related Activities"—to set our 2030 short-term reduction targets for Taiwan and Mainland China cement plants. We also set long-term 2050 targets for our overall Scope 3 emissions based on the SBT 1.5-degree methodology.

TCC is committed to reducing the environmental impact of its product manufacturing processes by following five major environmental management procedures. We actively conduct full life cycle management and adopt international management systems to identify improvement opportunities. We have set environmental management goals for energy efficiency, water resource efficiency, waste reduction, air pollution control, and GHG emissions, and we have developed specific action plans. We also provide environmental education to employees to raise their sustainability awareness and management capabilities. We use multiple channels—such as our sustainability e-newsletter, Supplier Convention, and product promotions and releases—to communicate our environmental protection policies and requirements to all internal and external stakeholders (including employees, clients, related companies, suppliers, and investors). In our production, manufacturing, transportation, and service processes, we effectively manage our environmental impact. During M&A due diligence, we examine the company's management policies and legal records to ensure no

violations of environmental regulations.

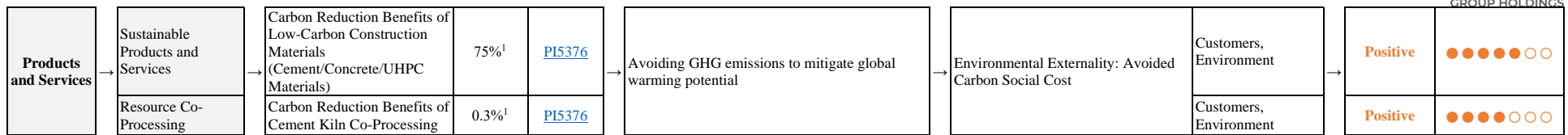
|| Products and Services

In 2024, TCC helped clients reduce carbon emissions by 1.05 million metric tons of CO₂e, creating NT\$1.7 billion in carbon reduction benefits. This not only helped our clients achieve their net-zero goals but also drove low-carbon transition across the industry.

- **Sustainable Products and Services:** Our low-carbon cement, concrete, and UHPC materials helped clients reduce carbon emissions by **960,000 metric tons of CO₂e**, bringing **NT\$1.6 billion** in carbon reduction benefits.
TCC's low-carbon construction material product line—low-carbon cement, concrete, and UHPC—integrates R&D, process, and application innovations to offer clients sustainable material solutions. Concurrently, TCC actively dialogues with regulators to drive construction industry decarbonization, accelerating the cement industry's green transformation. In April 2025, the Global Cement and Concrete Association (GCCA) released the world's first Low Carbon Rating (LCR) standard. TCC's cement products across Taiwan, Mainland China, Türkiye, Portugal, and West Africa all meet the low-carbon cement standard. Notably, TCC is the only company in Taiwan to be certified for both low-carbon cement and concrete. TCC continues to advance its carbon reduction technologies and has formed a Low-Carbon Construction Pioneer Alliance with construction partners. The alliance is committed to the early adoption of low-carbon products like Portland Limestone (IL) cement and concrete, actively driving sustainable construction through concrete actions.
- **Resource Co-Processing:** The co-processing technology used in cement kilns helped clients reduce carbon emissions by 92,000 metric tons of CO₂e, bringing NT\$150 million in carbon reduction benefits.
At TCC's Hualien Hoping Plant, we use high-temperature co-processing technology in our cement kilns, combined with the gasifier at our DAKA Renewable Resource Recycling Center (RRRC), to help Hualien process industrial waste. RRRC can also handle up to 200 metric tons of daily household waste, using the heat generated during the process to partially replace fuel. Additionally, TCC's cement plants in Mainland China have a combined daily capacity of over 600 metric tons of household waste, which serves as an alternative fuel and mitigates the issue of methane emissions from waste accumulation. TCC is also actively developing construction waste treatment services to recycle concrete from demolished buildings. According to a research report by the World Business Council for Sustainable Development (WBCSD), cement kilns, with an average temperature exceeding 1,300°C, can break down dioxins that incinerators are unable to process. They can also convert most human-generated waste into renewable resources that substitute for cement's raw materials and fuels, thereby reducing both carbon emissions and fossil fuel consumption.

TCC Sustainability Impact Roadmap

Cause of the Impact	Material Issue Management	Input / Output			Outcome	Impact		Valuation			
		Impact Drivers	Coverage	IRIS Metrics		Impact Indicator	Stakeholders	Impact Level			
Supply Chain	Sustainable Supplier Management	Payment to Suppliers for Procurement	37% ¹	PI5478	Drives the supply-demand relationship across the industrial chain Creates job opportunities in the supply chain	Social Externality: Boosted Supply Chain Output Value	Society	Positive	●●●●●●●●		
					GHG emissions from the supply chain increase global warming potential	Social Externality: Worker Wage Income	External employee	Positive	●●●●●○○○		
					Air pollutant emissions from the supply chain lead to an increase in environmental pollutant concentrations	Environmental Externality: Caused Carbon Social Cost	Environment	Negative	●●●●●○○○		
	Climate Actions and Net-Zero Emissions/ Green Energy and Energy Storage/ Resource Co-Processing		GHG Emissions	76% ¹	OI1479	GHG emissions contribute to global warming potential	Environmental Externality: Caused Loss of Health and Ecosystems	Environment	Negative	●●●●●○○○	
			Power Generation by Waste Heat Recovery (self-generated and consumption)	76% ¹	OI2496	Avoiding GHG emissions to mitigate global warming potential		Environment	Positive	●●●●●○○○	
			Renewable Energy (self-generated and consumption)	76% ¹	OI2496			Environment	Positive	●●●●●○○○	
			Equipment & Process Enhancements (Energy Conservation Projects)	37% ¹	OI6697			Environment	Positive	●●●○○○○○	
			Alternative Clinker	76% ¹	OI5951			Environment	Positive	●●●●●○○○	
			Alternative Raw Materials	76% ¹	OI5951			Environment	Positive	●●●●●○○○	
			Alternative Fuels	76% ¹	OI5951			Environment	Positive	●●●●●○○○	
		Water Resources Management	Water Resources Withdrawal and Consumption	76% ¹	OI0263		Water scarcity leads to food shortages and waterborne diseases	Environmental Externality: Caused Health Loss	Environment	Negative	●●●●○○○○
			Process Recycled Water	76% ¹	OI4015				Environment	Positive	●●●○○○○○
			Rainwater Harvesting and Reuse	37% ¹	OI1927		Prevents water extraction from causing water pressure on nearby communities		Environment	Positive	●○○○○○○○
Water Conservation Projects	37% ¹		OI4015		Environment		Positive		●○○○○○○○		
Pollution Control and Management	Wastewater Discharge	76% ¹	OI0386	Wastewater discharge leads to an increase in environmental pollutant concentrations	Environmental Externality: Caused Loss of Health and Ecosystems	Environment	Negative	●●●○○○○○			
	Air Pollution Emissions	76% ¹	-	Air pollutant emissions lead to an increase in environmental pollutant concentrations		Environment	Negative	●●●●●○○○			
	Waste Disposal	76% ¹	OI6192	Incineration and landfilling generate air pollutants and GHG emissions		Environment	Negative	●●○○○○○○			
	Workplace Diversity and Equal Opportunity	Number of Employees	63% ²	OI3160		Creates job opportunities for the community, reducing the unemployment rate	Social Externality: Created Incremental Worker Wages (new)	Internal employee, Society	Positive	●●●●●○○○	
		Hours in Education and Training	86% ²	OI7877		Employees gain professional skills and enhance their employability through training	Social Externality: Future Career Salary Growth Potential	Internal employee, Society	Positive	●●●●●○○○	
Internal Position Replacement		54% ²	OI6995	Employees gain opportunities for internal promotion and job transfers	Social Externality: Salary Growth from Job Promotions (new)	Internal employee	Positive	●○○○○○○○			
Employee Care	Employee Support Programs	10% ²	OI2742	Leave and benefits that exceed legal requirements, balancing employees' quality of life	Social Externality: Brought Work-Life Balance (new)	Internal employee	Positive	●●○○○○○○			
Workplace Health and Safety	Employee Occupational Accidents	87% ²	OI3757	Impact on workers' mental and physical well-being, and healthcare expenses	Social Externality: Caused Loss of Health and Productivity	Internal employee	Negative	●●○○○○○○			
	Contractor Occupational Accidents	87% ²	OI3757			External employee	Negative	●●●○○○○○			
Human Rights Protection	Harassment and Workplace Bullying	87% ²	OI9077	Mental and physical trauma leads to healthcare costs and long-term loss of quality of life	Social Externality: Caused Loss of Health and Future Well-being (new)	Internal employee	Negative	●●○○○○○○			



Monetary Value (Thousands NTD)	Impact Level
>100,000,000	●●●●●●●●
10,000,000-100,000,000	●●●●●●○
1,000,000-10,000,000	●●●●●○○
100,000-1,000,000	●●●●○○○
10,000-100,000	●●●○○○○
1,000-10,000	●●○○○○○
0-1,000	●○○○○○○

- Note 1:** Coverage refers to the percentage of TCC's total operational activities represented by the data sources for each impact indicator. Indicators marked with a percentage are calculated using the proportion of revenue.
- Note 2:** Coverage refers to the percentage of TCC's total operational activities represented by the data sources for each impact indicator. Indicators marked with a percentage are calculated using the proportion of employees.
- Note 3:** IRIS (Impact Reporting & Investment Standards) is a standardized metrics framework developed by the Global Impact Investing Network (GIIN) to measure a company's social, environmental, and economic performance, enhancing the comparability of impact investments.
- Note 4:** An externality is a positive or negative impact on human well-being caused by the interdependent interaction between TCC's business activities and various types of capital, without the company directly gaining a benefit or bearing a cost.
- Note 5:** The increase in supply chain output value is calculated using an Input-Output Model, which includes the economic benefits derived from the supply-demand effect of procurement (positive), the creation of job opportunities and wage income (positive), and the accompanying environmental issues (negative). Reference sources include the OECD Input-Output Table (2018), EXIOBASE 2, and the UNICEF database.
- Note 6:** Environmental externalities are calculated using the Environmental Profit and Loss (EP&L) methodology, which considers the carbon social cost, human health loss costs, and ecosystem damage costs derived from greenhouse gases, air pollution, waste, and water consumption (negative), as well as the environmental benefits brought by energy-saving processes, green building expansion, renewable energy and recycled water deployment, and product energy-saving designs (positive). Reference sources include US EPA (2016), OECD (2012), and CE Delft (2018).
- Note 7:** Issues such as incremental wages for workers from providing job opportunities (positive), increased income and salary growth from internal promotions (positive), work-life balance from employee support programs that exceed legal requirements (positive), and loss of health and future well-being caused by harassment and workplace bullying (negative) are calculated by referencing the Impact-Weighted Accounts (IWA) methodology from Harvard Business School.
- Note 8:** The social cost of occupational accidents is calculated by considering workers' willingness to pay to avoid accidents and the healthcare resources invested in such events (negative). The methodology references UK HSE (2017).
- Note 9:** The future salary growth benefit from employee training assesses the average annual expected value of a colleague's future career salary development. This is based on professional skills and knowledge gained from company training programs, which not only enhance productivity but also lead to better employability. The methodology references VBA (2021).
- Note 10:** Downstream products and services analyze the carbon reduction benefits of low-carbon construction materials for clients (positive) from a Life Cycle Assessment (LCA) perspective and reference US EPA (2016) to estimate the avoided carbon social cost.
- Note 11:** Considering differences in economic conditions across countries, the monetized value coefficients are adjusted using Gross National Income (GNI) per capita measured by Purchasing Power Parity (PPP). Inflation and exchange rates are also considered to align the time boundary to a monetary value based on 2021. The methodology references OECD (2012) and PwC UK (2015).