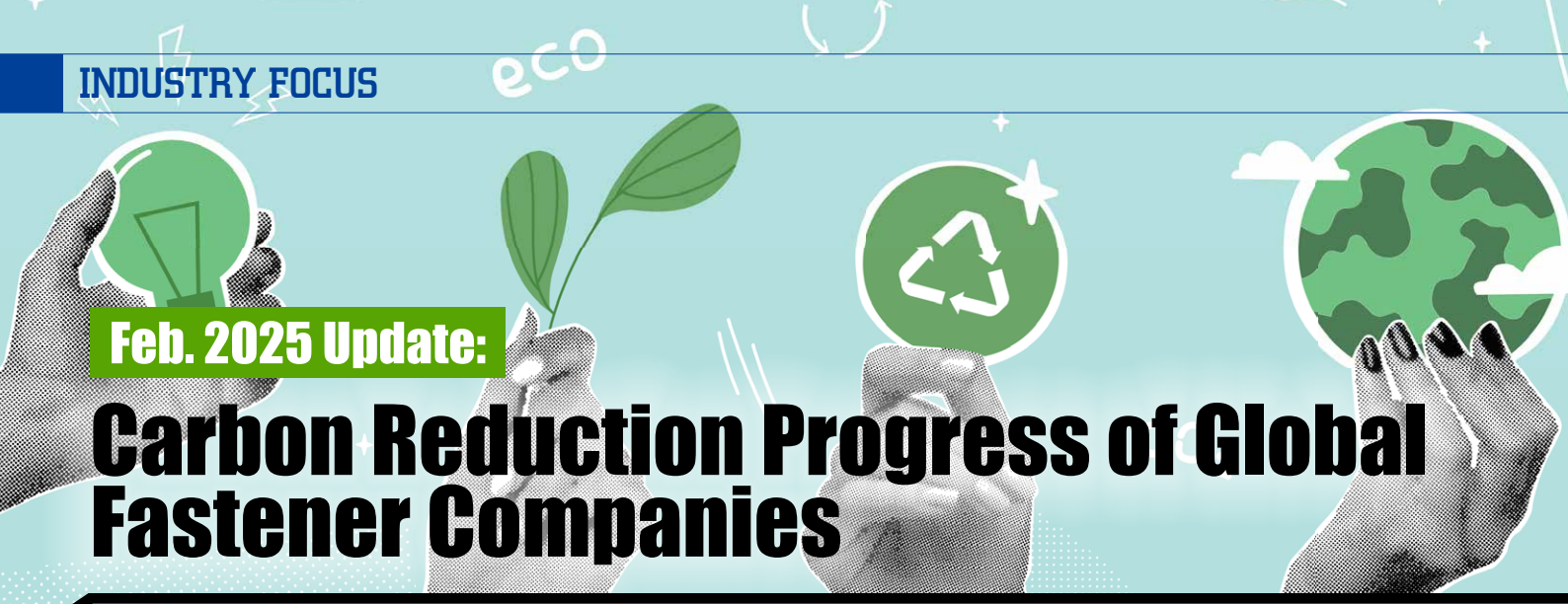

## Feb. 2025 Update:

# Carbon Reduction Progress of Global Fastener Companies

In the past 2 years, Fastener World has twice rounded up the latest carbon reduction progress of global fastener companies (Refer to Fastener World Magazine issue number 203 and 210). **So far we have been contacted by several big players of the fastener industry who hope for us to include more companies in the roundup, so we are scaling it up with a little more focus on fastener manufacturers in this sequel, while still adding a few distributors and traders that were left out in the last one, as well as wire rod manufacturers and a coating provider.**

To recap the methodologies taken in this article, **it will focus on carbon emission statistics and carbon reduction strategies.** First, it will examine carbon emissions that we can find from fastener companies. It will gather carbon emission data from their latest published ESG reports and organize it into separate tables to provide insights into their emission volumes and target-setting efforts. These tables will categorize emissions as follows: Scope 1 includes direct emissions from a company's manufacturing processes, facilities, and transportation; Scope 2 covers indirect emissions from purchased energy; Scope 3 encompasses all other indirect emissions throughout the external supply chain, including those from business travel and product life cycles. It will also present the total carbon emissions of each company.

**Furthermore, it will outline various carbon reduction measures implemented by these companies, with an emphasis on unique approaches.** This focus on distinctive methods aims to inspire readers to brainstorm and foster discussions on innovative solutions for carbon reduction.

## U.S.

### Copper State Bolt & Nut Co.

| Copper State Bolt & Nut Emission | | | |
|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2021 | FY 2022 | FY 2023 |
| Scope 1 (Estimated) | 752 | Undisclosed | 1,130 |
| Scope 2 | Undisclosed | 3,324 | 3,199 |
| Scope 1 + 2 | Insufficient data | | 4,329 |

- Supports many verticals in the energy production sector. Over 90% of Copper State's activity in this industry directly **supports green energy production**, including solar racks, solar panels, and solar tracking units. Supports production of 10 to 15 GW of electricity each year.
- Added motion detected LED lighting, solar panels (400,000 kWh generation annually), low flow toilets, xeriscape landscaping, onsite bike racks, and electric forklifts.
- **Provided reusable water bottles to over 500 employees** saving an estimated 1,000 pounds of plastic waste annually. **Consume recycled office supplies.** Created an internal employee education communication program for sustainability.

### HILLMAN®

| Hillman Emission | | | | |
|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2020 | FY 2021 | FY 2022 | 2021/2022 Change (%) |
| Scope 1 + 2 | 10,772 | 11,310 | 11,786 | +4.2 |
| Scope 3 | 1,122,431 | 1,152,205 | 1,041,959 | -9.5 |
| Sum | 1,133,203 | 1,163,515 | 1,053,745 | -9.4 |

- Completed an Environmental Materiality Assessment, using life cycle assessment (LCA) in alignment with ISO 14040 and 14044 Standards. The assessment helped identify most material environmental sustainability impacts.
- **Rolled out PowerPro line of Structural Wood Screws:** 30% faster installation reduces energy consumption.
- **Packaging material substrates are made from recyclable or recycled material content,** not permitting Polyvinyl chloride (PVC) as the substrate. Clamshell and blister packaging are constructed from recycled polyethylene terephthalate (rPET), which is 100% recyclable and reduces GHG Emissions by 79% as compared to virgin PET.

# Europe

## AGRATI

World Fastener Solutions

| Agrati Emission | | | | | Target |
|---|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2021 | FY 2022 | FY 2023 | 2022/2023 Change (%) | Reach Carbon Neutrality by 2039 |
| Scope 1 | 29,579 | 28,452 | 27,547 | -3.1 | |
| Scope 2 | 27,735 | 25,505 | 24,494 | -3.9 | |
| Scope 3 | 259,862 | 296,990 | 158,947 | -46.4 | |
| Sum | 317,176 | 350,947 | 210,988 | -39.8 | |

- **A3.5 MWh cogenerator was launched** at the Veduggio con Colzano site to optimize energy costs and reduce $CO^2$ emissions by **generating electricity and thermal energy from methane gas.**
- Installed solar panels on plant roof and on parking lot roof.

## BUFAB

- Validated and approved by the Science Based Targets Initiative.
- Conducted an annual global partnership survey where the main suppliers were asked to answer questions in key areas such as core values, supply chain development, digitalization, logistics and sustainability.
- **Engage suppliers to reduce Scope 3 emissions.** Questionnaire to partner suppliers to prepare data on sustainability – for energy, transport, material, waste, etc. – and provide feedback. **The suppliers need to reduce their greenhouse gases by 5.5 percent CO2e each year until 2031.** All direct material suppliers must sign Bufab's Code of Conduct, committing to its sustainability standards, to receive new orders. Suppliers must also show that they conduct their operations in accordance with other standards and certificates, including ISO 9001 and REACH.

## ARNOLD

BlueFastening Systems

| ARNOLD UMFORMTECHNIK Emission | | | | |
|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2021 | FY 2022 | FY 2023 | 2022/2023 Change (%) |
| Scope 1 | 4,121 | 3,784 | 3,517 | -7.0 |
| Scope 2 | 0 | 0 | 26 | Inadequate data |
| Scope 3 | 84,222 | 76,595 | In preparation | |
| Sum | 88,343 (Lacking scope 2) | 80,379 (Lacking scope 2) | 3,543 (Lacking scope 3) | |

- **Build a new technical center for heat generation using renewable energy.**
- Tool steel scrap from rolling dies is collected separately and returned to the supplier.
- Incorporated ISO 14001 and ISO 50001 requirements for environmental and energy management into quality assurance agreements with suppliers and are developing a questionnaire for smaller companies that are unable to implement these requirements.
- **Reduce global sourcing of purchased parts through in-house production or a change of supplier to safeguard the supply chain.** Use recycled steel from steel scrap. Conversion of cardboard packaging to larger dimensions to reduce packaging units. Conversion from delivery in cardboard boxes to delivery in KLT if possible. Eliminate film packaging.
- **Make the emissions of products transparent as early as the quotation phase and can suggest optimizations with the help of the specially developed $CO^2$ calculator "ACO2 Calc". Customers receive an up-to-date product carbon footprint calculation in parallel with the quotation for molded parts.**
- Build a world-class supplier base by **consolidating sourcing to 550 top suppliers and utilizing a new Supplier Management Module** for effective collaboration and risk management.

| Bufab Emission | | | | | |
|---|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2021 | FY 2022 | FY 2023 | 2022/2023 Change (%) | Target |
| Scope 1 | 2,197 | 1,968 | 2,132 | +8.3 | Commit to eliminating internal greenhouse gas emissions to zero by 2030. Reduce greenhouse gas emissions in the value chain by 55 percent by 2031. |
| Scope 2 | 2,198 | 1,860 | 1,189 | -36.0 | |
| Scope 3 | 1,246,678 | 974,111 | 841,084 | -13.6 | |
| Sum | 1,251,073 | 977,939 | 844,405 | -13.6 | |

| Nedschroef Emission | | | | |
|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY2021 | FY 2022 | FY 2023 | 2022/2023 Change (%) |
| Scope 1 | 19,652 | 18,726 | 19,174 | +2.3 |
| Scope 2 | 9,327 | 8,896 | 6,691 | -24.7 |
| Scope 3 | Undisclosed | 341,586 | 346,223 | +1.3 |
| Sum | 28,979 (Lacking scope 3) | 369,208 | 372,088 | +0.7 |

- Besides screening new suppliers, all relevant or existing suppliers are checked with respect to their environmental impact at least once a year.
- With around 50% based on blast-furnace routing (the other 50% is already scrap-based), the focus is to **reduce technical and commercial dependance on blast-furnace routing.**
- The most significant withdrawals originate from surface water, which is used to cool the manufacturing processes, and third-party water, which is used for all other purposes, e.g., drinking, washing, and cleaning.
- **No use of any natural resources, such as ores or minerals, directly in the manufacturing processes,** and the materials used for the products consist of approx. 50% of recycled material. Manufacturing scrap is sold to a third party for 100% recycling.
- Products are either delivered in plastic KLT containers, which are standardized returnable containers originally developed by the automotive industry, or in corrugated cardboard boxes.
- Install heating thermostat controls.

| Norm Holding Emission | | | | |
|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2021 | FY 2022 | FY 2023 | 2022/2023 Change (%) |
| Scope 1 | 37,878 | 38,447 | 43,557 | +13.2 |
| Scope 2 | 41,272 | 47,349 | 48,327 | +2.0 |
| Sum | 79,150 | 85,796 | 91,884 | +7.0 |

- **Developed Hexlight®, NOW®LIVETM, EXTREMELIGHT® and Hold&Drive brands that have lower carbon emission** in relation to use of reduced weight and raw material use reduction in line with Norm Fasteners Bolts sustainability goals.
- **Changed the drum design in zinc-nickel coating facility where the most electricity is consumed in Norm Coating facility.** Electric consumption saving of 19% has been achieved per product.
- Natural light is used for lighting and energy consumption for lighting during the day has been reduced to zero. **Using long lasting and maintenance-free light tubes,** 1,460 kg $CO^2$ emission has been avoided.
- Water-plated exchanges system of 8 furnaces were replaced with air cooled system in Norm Fasteners Bolts Salihli factory. These changes saved approximately 1,500 $m^3$ water each month.

| PPG Emission | | | | | Target |
|---|---|---|---|---|---|
| Unit: Million Metric Tons CO2e | FY 2021 | FY 2022 | FY 2023 | 2022/2023 Change (%) | |
| Scope 1 | 0.44 | 0.43 | 0.42 | -2.3 | Achieve a 50% GHG emissions reduction in scope 1 and 2 emissions footprint and reduce absolute scope 3 emissions by 30% by 2030. |
| Scope 2 | 0.53 | 0.54 | 0.53 | -1.8 | |
| Scope 3 | 20.42 | 19.7 | 18.54 | -5.8 | |
| Sum | 0.97 | 0.97 | 0.94 | -3.0 | |
| Emissions Intensity | 0.22 | 0.23 | 0.24 | +4.3 | |

- Entered into an agreement with Direct Energy to **purchase RECs (Renewable Energy Certificates)** generated by a wind facility located in Crockett County, Texas. The RECs cover approximately 126,000 megawatt hours (MWh) of renewable energy, which will help reduce PPG's scope 2 emissions by more than 9,400 metric tons each year.
- **Collaborated with top 20 suppliers to set expectations for reducing scope 3 emissions and evaluate proposals for emissions reduction projects using an internal tracking platform.**
- **Partner with customers to promote the use of existing products that require less energy to apply and cure and develop new products that improve this further.**
- **Replace fossil fuel derivatives with bio-based materials in some product formulations.** Resins made from renewable resources such as sugars, natural oils, and starch from corn and agricultural waste offer more sustainable alternatives without compromising the quality and performance of the final product.

RAWLPLUG®

| Rawlplug Emission | | | |
|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2022 | FY 2023 | 2022/2023 Change (%) |
| Scope 1 | 10,809 | 8,625 | -20.2 |
| Scope 2 | 18,655 | 13,986 | -25.0 |
| Scope 3 | 33,188 | 25,114 | -24.3 |
| Sum | 62,652 | 47,725 | -23.8 |

- Able to **design optimized plastic cooling systems** that reduce parts production time by up to 40% using advanced 3D printing technology.
- New on-site label printing shop uses inkjet technology, instead of the electro ink used before, to print labels three times faster, increasing self-sufficiency.
- **Investment in an electric furnace,** replacing part of the production process previously using gas-electric furnaces. Expanded Rawlplug's photovoltaic farm by a further 1.82 MW.
- **Rolled out Timber UNO, the world's first plug made from 70% wood sawdust.**
- **Implemented a patented Ice Battery System—** a collaboration with another Polish company— that stores energy during off-peak hours and reuses it during peak hours, resulting in efficient and environmentally friendly energy management.

## Malaysia

Chin Well HOLDINGS BERHAD 371551-T

| Chin Well Holdings Berhad Emission | |
|---|---|
| Unit: Metric Ton CO2e | FY 2024 |
| Scope 1 + 2 | 22,608 |

- **Has in-house waste water treatment plant** to treat the hazardous water generated before it is discharged to local water course.
- All scheduled waste generated are properly stored and transported to licensed contractor, certified by DOE for treatment or recovery. Recycling rate reached more than 85% in FY2024.
- Currently **considering the use of high efficiency motors** in the production for energy consumption. Now in the progress of installing solar panels in all its major production plants.

## India

STL® FASTENERS
STERLING TOOLS LIMITED

| Sterling Tools Limited Emission | | | |
|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2022 | FY 2023 | 2022/2023 Change (%) |
| Scope 1 | 4,745 | 5,931 | +24.9 |
| Scope 2 | 27,079 | 32,831 | +21.2 |
| Sum | 31,824 | 38,762 | +21.8 |
| Emission Intensity | 0.94 | 0.98 | +4.2 |

- **Install solar panels. Recover waste heat from the furnaces and compressors. Non-hazardous waste is sold to the authorized recyclers.**
- To reduce the wastage of water, the company has installed ETPS and STPS at some of its plants, wherein the company reuses the treated water for non-potable purposes.

## Taiwan

## boltun

| Boltun Emission | | | | | |
|---|---|---|---|---|---|
| Unit: Metric Ton CO2e | | FY2021 | FY2022 | FY2023 | 2022/2023 Change (%) |
| Scope 1 | | 379 | 394 | 440 | +11.6 |
| Scope 2 | | 16,703 | 16,026 | 15,815 | -1.3 |
| Sum | | 17,082 | 16,429 | 16,255 | -1.0 |
| Emission Intensity | Emissions/ Revenue (Ton/ Million NTD) | 4.07 | 3.77 | 3.44 | -8.7 |
| | Emissions/ Product Weight (Ton/Ton) | 0.37 | 0.46 | 0.42 | -8.6 |

- Most of the products are made of steel, but there is no iron-melting furnace for re-smelting in the factory, so the waste, scraps and offcuts are recycled by cooperative contractors.
- The finished products are placed into plastic bags before being packed into a carton, and the cartons are stacked into a pallet and packaged in the packaging straps. **The packaging materials of pallets and cartons are renewable.**
- There are central oil tanks between the forming machines and the oil circulates. The new oil will be added into the circulation depending on oil condition, then the used oil is discharged into waste oil barrel and outsourced to waste cleaning company for proper treatment. **Oil products are recycled and reused by using the concentrated tank for sedimentation to reduce the impact on environmental pollution.**
- **Use energy saving air conditioners** (5 inverter air conditioners + 1 water-cooled air conditioner) with an estimated 16,623 kWh energy saving. **Use energy saving light tubes** with an estimated 55,376 kWh saving.
- Abides by the Waste Disposal Act and entrusts the vendors approved by EPA for waste resource management of the waste generated from the manufacturing process (such as inorganic sludge, non-hazardous oil sludge, waste oil mixture, mixture of general chemical waste).


| Cayman Tong Ming Holdings Emission | | | | |
|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2021 | FY 2022 | FY 2023 | 2022/2023 Change (%) |
| Scope 1 | 1,610 | 1,487 | 1,425 | -4.1 |
| Scope 2 | 14,373 | 14,550 | 12,912 | -11.2 |
| Scope 3 | 2,728 | 2,853 | 2,840 | -0.4 |
| Sum | 18,711 | 18,890 | 17,177 | -9.0 |
| Scope 1+2 Emission Intensity | 0.1046 | 0.1050 | 0.0867 | -17.4 |

- Install solar power generation equipment. Regularly maintain pollution control equipment. Replace energy-saving transformers.
- **Implement smart energy systems** to effectively manage electricity consumption.
- Continuously replace internal combustion forklifts to reduce carbon emissions.
- Replaced electrical equipment with level-2 energy efficiency.
- **Invested in a water disposal plant (20~25% sludge reduction) for NTD 37.35 million, as well as waste oil recycling (including oil dumper and centrifuge, 5% oil consumption reduction) for NTD 20 million.**

LION 春雨集團 CHUN YU GROUP

| Chun Yu Group Emission | | | | |
|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2020 | FY 2021 | FY 2022 | 2021/2022 Change (%) |
| Scope 1 | 1,610 | 1,487 | 1,425 | -4.1 |
| Scope 2 | 14,373 | 14,550 | 12,912 | -11.2 |
| Scope 3 | 2,728 | 2,853 | 2,840 | -0.4 |
| Sum | 18,711 | 18,890 | 17,177 | -9.0 |
| Scope 1+2 Emission Intensity | 0.1046 | 0.1050 | 0.0867 | -17.4 |

- ChunYu is the only one **having the waste hydrochloric acid recycling facility** of its kind in Taiwan. The facility uses advanced calcination technology to completely decompose, recycle and reuse waste hydrochloric acid, thereby preventing secondary pollution.
- **Established wastewater treatment facilities** in 1990 to collect wastewater generated during the manufacturing process. This wastewater undergoes chemical oxidation-reduction processes to produce sludge, effectively removing pollutants. The treated clean water is then discharged into water bodies.
- Handles some hazardous waste, specifically waste acid washing liquid, through in-house treatment and reuse, as well as by commissioning licensed treatment operators for reuse.

INTAI®

| Intai Emission | | | |
|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2022 | FY 2023 | 2022/2023 Change (%) |
| Scope 1 | 180 | 165 | -8.3 |
| Scope 2 | 3,876 | 3,797 | -2.0 |
| Sum | 4,056 | 3,963 | -2.2 |
| Emission Intensity | 1.681 | 1.621 | -3.5 |

- Increase the air conditioning temperature in non-constant temperature controled process stations and promote natural ventilation.
- Implement variable frequency energy-saving control for cooling circulation water pumps.
- Raise the chilled water temperature without affecting the temperature control of the process stations.
- **Coordinate the production scheduling across different business units to consolidate operating hours, thereby reducing unnecessary standby energy consumption of the chilled water and air compressor systems.**
- Conduct daily inspections of gas valves at each workstation and promptly replace old, leaking switches to reduce the load on air compressors caused by leaks.

TA CHEN INTERNATIONAL, INC.

BRIGHTON BEST — B-RIGHT-ON — Tested, Tried and True™

RW 正道工業

TRIM® RIGHT WAY INDUSTRIAL (MALAYSIA) SDN. BHD. (Incorporated in Malaysia) (Company No. 181108-U)

| Ta Chen Stainless Pipe & Subsidiaries Emission | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Years | FY 2022 | | | | FY 2023 | | | | 2022 / 2023 |
| | Scope 1 | Scope 2 | Sub Sum | Intensity (Emissions/ Revenue) | Scope 1 | Scope 2 | Sub Sum | Intensity (Emissions/ Revenue) | Scope 1+2 Change% |
| Ta Chen Stainless Pipe Co., Ltd. (HQ) | 1,287 | 11,731 | 13,018 | 0.8924 | 1,347 | 9,762 | 11,109 | 1.1639 | -14.6 |
| Brighton-Best International (Taiwan) Inc. | Unavailable | | | | 23 | 12 | 35 | Unavailable | |
| Right Way Industrial Co., Ltd. | | | | | 577 | 2,256 | 2,833 | | |
| Right Way Industrial (Malaysia) Sdn. Bhd | | | | | 907 | 3,492 | 4,399 | | |
| Total Emissions | | | | | 2,855 | 15,524 | 18,379 | | |

- The newly established wastewater treatment plant for pollution prevention equipment is able to increase volume of wastewater treatment from 100 tons to 300 tons per day.
- **The hydraulic oil tank of the machine will use the static oil out of the filtering machine,** and the amount of hydraulic oil added to the forming machine can be significantly reduced by more than 70%.

- **The newly built factories are mainly built with steel structures, which are a type of recyclable material. New factories will have three layers of design on their rooftops, which can prevent heat conduction** and increase the comfort of the personnel.
- Packing boxes were changed from wooden boxes to iron ones and further changed to simplified packaging. Bundle the goods with webbing except for heavy products which will be secured with iron chains, moving towards the goal of container load optimization.
- **Apart from the allocating method of container for the shipments to the US warehouse, delivery date is coordinated with customers. Plan the standard volume for orders which allows to fill up a full container, raising the proportion of full containers and reducing the waste of space.**

NAFCO

| NAFCO Emission | | | |
|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2021 | FY 2022 | 2021/2022 Change (%) |
| Scope 1 | 140 | 396 | +182 |
| Scope 2 | 7,510 | 8,722 | +161 |
| Scope 3 | 30,401 | 2,793 | -90.8 |
| Sum | 38,051 | 11,911 | -68.6 |

- Install solar panels, **introduce a digital power monitoring platform (smart meters)**, use LED energy-saving light fixtures, rainwater recycling, automatic sensor faucets and water conservation measures, and incorporate waste reduction equipment.
- Promote paperless e-operations.

三星科技 SAN SHING FASTECH CORP.

| San Shing Fastech Emission | | | | |
|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2022 | FY 2023 | 2022/2023 Change (%) | Target |
| Scope 1 | 1,508 | 1,507 | -0.06 | Reach Carbon neutral by 2050. |
| Scope 2 | 16,875 | 16,039 | -4.9 | |
| Sum | 18,383 | 17,546 | -4.5 | |
| Revenue (NTD Million) | 6,375 | 5,848 | -8.2 | |
| Emissions/ Revenue (Ton/Million NTD) | 2.88 | 3.00 | +4.1 | |

- A solar power generation system has been installed on the factory roof with a capacity of 616.395 kW, expected to generate approximately 700,000 kWh of electricity for self-use each year.
- Actively collaborating with customers to **develop electric vehicle fasteners.**

OFCO INDUSTRIAL CORP. 久陽精密股份有限公司

| OFCO Emission | | | |
|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2022 | FY 2023 | 2022/2023 Change (%) |
| Scope 1 | 645 | 350 | -45.7 |
| Scope 2 | 12,000 | 7,697 | -35.8 |
| Scope 3 | 1,162 | 7,164 | +516 |
| Scope 4 | 44,451 | 22,803 | -48.7 |
| Sum | 58,259 | 38,015 | -34.7 |
| Scope 1 + 2 Emission Intensity | 0.26 | 7.46 | +2,769 |

Note: Scope 4 = Indirect greenhouse gas emissions from the organization's use of products or services.

- **Prioritize the purchase of products with carbon-reduction labels.**
- Develop low-carbon products. The production process has been adjusted to achieve carbon emissions lower than those of competitors. Working together with upstream and downstream partners to further reduce carbon emissions.
- Develop new designs to enhance material efficiency and extend dies lifespan. Modify and reuse discarded dies to effectively reduce purchasing costs.
- Used Chunghwa Telecom's 5G network to build a 4.0 smart production line to improve production efficiency and save electricity. **The production schedule follows a centralized production principle to reduce electricity consumption during trial runs.**
- The machines used for production should be utilized with the expectation of fulfilling production capacity to improve the availability of the machines, that is, centralize the production with the use of highly-efficient machines to reduce low-efficiency production.
- **Conduct an R&D project titled "Evaluation of Replacing Nut Forming Machine Motors with Permanent Magnet Motors"** to assess the energy-saving benefits of permanent magnet motors.
- **Supported the Bank of Taiwan's Green and Sustainable Term Deposit Investment Plan by depositing NTD 50 million in green and sustainable term deposits** in August 2023. The BOT will invest all of the raised funds in "Green Investment Projects" and Socially Beneficial Investment Projects."

sheh fung screws company 世豐螺絲股份有限公司

| Shen Fung Screws Emission | | | | |
|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2021 | FY 2022 | FY 2023 | 2022/2023 Change (%) |
| Scope 1 | 2,105 | 1,746 | 1,709 | -2.1 |
| Scope 2 | 9,376 | 8,651 | 7,482 | -13.5 |
| Sum | 11,481 | 10,397 | 9,192 | -11.5 |
| Organization-Specific Metrics / Revenue (NTD Thousand) | 2,859 | 2,591 | 2,323 | -10.3 |
| Emission Intensity | 0.0040 | 0.0040 | 0.0040 | 0 |

- The electroplating department has **implemented a timer to control water usage,** maximizing water conservation. Both the washing tower and cooling water tower are equipped with water level controllers.
- Improvements have been made to the heat treatment process by **adding electrostatic oil mist treatment** to reduce waste generation.
- **Priority will be given to procuring equipment that uses non-ozone-depleting substances and low Global Warming Potential (GWP) environmentally friendly refrigerants,** in order to minimize damage to the ozone layer and reduce greenhouse gas emissions.

TYCOONS

| Tycoons Group Enterprise Emission | | | | |
|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2021 | FY 2022 | FY 2023 | 2022/2023 Change (%) |
| Scope 1 | 795 | 1,726 | 1,288 | -25.3 |
| Scope 2 | 12,805 | 11,922 | 9,003 | -24.4 |
| Scope 3 | Unavailable | 1,579 | 1,274 | -19.3 |
| Sum | 13,600 | 15,227 | 11,565 | -24.0 |
| Emission Intensity (Emissions/ Product Weight) | 0.19 | 0.20 | 0.17 | -15.0 |

- **Incorporate factors such as energy conservation, water conservation, carbon emission reduction, waste reduction, and product lifespan into procurement considerations.**
- Replace fuel-burning boilers with gas-burning boilers.
- Replace factory roofing with transparent panels to increase natural light, thereby saving electricity.
- **Adopt a fully automated slag separation and recycling machine** for rapid slag separation, reducing processing costs and saving money.

燁興企業股份有限公司 YIEH HSING ENTERPRISE CO., LTD.

| Yieh Hsing Enterprise Emission | | | | | |
|---|---|---|---|---|---|
| Unit: Metric Ton CO2e | FY 2021 | FY 2022 | FY 2023 | 2022/2023 Change (%) | Target |
| Scope 1 | 32,105 | 26,403 | 16,036 | -39.2 | Reach carbon neutrality by 2050. |
| Scope 2 | 49,760 | 44,334 | 20,124 | -54.6 | |
| Sum | 81,865 | 70,737 | 36,160 | -48.8 | |
| Emissions/Revenue (Ton/Million NTD) | 11.66 | 10.36 | 7.21 | -30.4 | |

- Use low-carbon liquefied petroleum gas to reduce products' carbon footprint.
- **Develop hydrogen/ammonia combustion fuel for use.**
- **The wire pickling production line is equipped with Selective Catalytic Reduction (SCR) equipment to treat the pickling exhaust gas and reduce nitrogen oxide emissions.**
- Completed the renovation of the furnace fuel system, transitioning the primary energy sources from electricity and low-sulfur fuel oil to electricity and natural gas.
- **The "ST2-ST3 Rolling Mill Scale Blowing Improvement" implemented in the manufacturing process optimized the timing of scale blowing using electric control techniques.** ■