Case Study

Manufacturing
Edge Computing

Modernizing and Automating Sustainable Manufacturing at Scale

Powered by Intel Inside®, Orisol enabled Pou Chen Group to achieve zero growth in greenhouse gas emissions by 2025 and to target a 46.2% reduction by 2030.

At a Glance

- Intel-powered automation cut energy use, eliminating 457,353 kilograms of CO_2 emissions annually.[3]
- Solutions developed by Orisol
  - » N-series: Eco-Smart Carbon-Tracking Stitching Machines
  - » R-series: Robotic Cementing Machines
  - » U-series: Ultrasonic High Frequency Machines
  - » T-series: Turn Tongue Solution Machines
  - » TFS: Molding Application
  - » AM: 3D Printing Solution
  - » AICS: Advanced Intelligence Control System
  - » FEMS: Factory Energy Management System
  - » ESMP: Eco Sustainable Management Platform (ISO 50001/ISO 14064-1/ISO 14067 compliant filing)
- Intel edge processors enabled real-time carbon tracking.
- Intel processors enabled robotic systems to reduce chemical usage by at least 50%.
- The Intel partnership is a replicable model for sustainable global manufacturing.

A conventional sneaker has a carbon footprint of roughly

30 lbs of CO_2

That's the equivalent of keeping a 100-watt light bulb lit for a week.

Executive Summary

Pou Chen Group (PCG)—the world's largest branded athletic and casual footwear manufacturer and ranked a Top 3 "Best ESG" company for institutional investors[1]—is committed to improving footwear manufacturing systems so that they positively contribute to a more sustainable world. Taking 2019 as the base year, the group aims to achieve "zero growth" in greenhouse gas emissions by 2025 and targets a 46.2% reduction by 2030.

To meet this challenge, PCG and Orisol[2] partnered with Intel to integrate solutions and automated machinery powered by Intel® Core™ processors and OpenVINO™ toolkit. Together they introduced eco-smart carbon-tracking N-series stitching machines; U-series ultrasonic high-frequency machines (for no-sew uppers); R-series robotic cementing machines; T-series turn tongue solution machines; TFS machines for molding application; AM machines for 3D printing solution; Factory Energy Management Systems (FEMS); Advanced Intelligence Control Systems (AICS); and Eco Sustainable Management Platform (ESMP)—tools that significantly modernize operations while advancing sustainability.

The utilization of Intel's solutions and technologies has demonstrated crucial and sustainable production practices that have successfully scaled across global manufacturing industries.

The Challenge

Traditionally, footwear manufacturing is highly complex and labor-intensive. Each year, an estimated 24 billion pounds of shoe waste is produced[4,5], much of it laden with chemicals and adhesives that further complicate recycling efforts.

The environmental burden of shoe manufacturing extends beyond solid waste. A conventional sneaker has a carbon footprint of roughly 30 pounds of CO_2, the equivalent of keeping a 100-watt light bulb lit for a week[6]. In light of climate change and government regulation of carbon emissions and waste management, companies in this sector are actively seeking solutions that reduce waste, energy consumption, and emissions while maintaining the speed, scale, and flexibility that global production demands.

As the world's largest footwear manufacturer and the only traditional footwear company ranked in Taiwan's top 1% of manufacturers, PCG was committed and obligated to lead the industry and its community to reduce its environmental impact. Addressing these demands required a fundamental transformation of production processes. With hundreds of millions of shoes produced annually, even incremental improvements in efficiency or materials can translate into massive global impact. The scale of the problem demanded equally scaled innovation with solutions for machineries powered by Intel® Core™ processors and software systems.

Solution

To confront the complexity of footwear manufacturing, climate change, and growing waste, Orisol and PCG embraced Intel technologies that deliver automation, digitalization, efficiency, and measurable sustainability outcomes across PCG's global operations.

As part of an ongoing collaboration, Intel works with both Orisol and PCG to enhance shoe manufacturing equipment and processes. The organizations commenced the effort to improve sustainability by deploying carbon-tracking capabilities on their solutions, including the eco-smart N stitching machine series, R-series advanced robotic cementing solution, advanced intelligence control system (AICS), AM-series 3D printing solution, U-series no-sew application solution, and other automation processes. Powered by Intel® Core™ processors and the OpenVINO™ toolkit, the product family lines are capable of processing Computer-Aided Design (CAD) files and program instructions at high speed, enabling precise and automated processes.

With FEMS and Orisol machines, factory shop floors can not only monitor energy usage per floor, but can also monitor energy consumption per equipment thanks to Intel's advanced processors. In particular, the eco-smart N machine series and R-series robotic cementing machines are equipped with meters that calculate carbon tracking directly at the edge before data is sent out, enabling emissions to be reported on every single pair of shoes produced. This edge-computing architecture also supports dashboards that monitor all-level electricity consumption and adjust dynamically to production needs via FEMS. Furthermore, the machines output data together with other required parameters that can be fed directly to the ESMP application. In turn, the ESMP can automatically compile and generate ISO 14064-1 and ISO 14067 compliant reports with ease.

A Closer Look at PCG/Orisol Solutions

Results

Smarter Energy Use with FEMS Dashboards

Utilizing the Intel-enabled Factory Energy Management System (FEMS) Dashboards, supervisors and managers can obtain granular visibility into energy usage across the plant. PCG was able to identify energy-intensive processes and reduce waste. Furthermore, instead of running all compressors at full capacity, Orisol uses AICS to identify hot zones of consumption and deploy control units that optimize high-energy consumption processes, ensuring power is only consumed where needed.

By using Orisol solutions, PCG can eliminate

457,353 kilograms of carbon emissions on an annual basis.[3]

Turning Sustainability Data into Actionable Insights

Because of the connectivity and reliability of consistent Intel-powered machines, Orisol can offer ESMP application service for the automatic compilation and generation of carbon-tracking sustainability reports (e.g., ISO 14064-1/ISO 14067), which can help factories eliminate tedious, manual processes, avoid errors, and produce better, more accurate, and faster compliance reports. Altogether, the integration of Intel's hardware and software solutions allows Orisol to track carbon emissions of every pair of shoes produced, thereby optimizing energy use.

> **The Intel® Core™ processor establishes the computational backbone for PCG's sustainability drive, turning traditionally resource-heavy processes into measurable environmental and efficiency gains.**

Cutting Chemical Waste by at Least 50%

Adhesives are another key component of the shoe manufacturing process. Unfortunately, this essential ingredient is a source of volatile organic compounds (VOCs). To reduce human exposure to these pollutant chemicals, Orisol deployed Intel-powered cementing machines that utilize robotic arms to automate the application of adhesives. This innovation reduced chemical usage by at least 50% and eliminated manual handling. It also helped the company make progress on its sustainability goals, further lowering energy consumption and reducing environmental impact.

Fast, Efficient, and Reliable for Mission Critical with TSN over Wi-Fi

Flagship models ONS-5035NXT (part of N-series stitching) and R-NXT (part of R-series robotic assembly) feature Time-Sensitive Networking (TSN) over IEEE 802.11 (Wi-Fi 6) and are powered by Intel® Core™ processors with AX610 chipsets. They provide precise, low-latency communication for mission-critical operations in order to support workplace hazard prevention and safety alarms.

Solution Ingredients

- Intel® Core™ processors
- OpenVINO™ toolkit
- Solutions developed by Orisol
  - » N-series: Eco-Smart Carbon-Tracking Stitching Machines
  - » R-series: Robotic Cementing Machines
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Results at a Glance

- 457,353 kilograms of CO_2 emissions eliminated annually.[3]
- Automated emissions reporting helped reduce energy consumption up to 913,026 kWh.[3]
- At least 50% less chemical usage in cementing process.

Conclusion

By implementing Orisol's footwear solutions together with Intel's hardware and software foundation, PCG can achieve relevant modernization that allows the company to improve transparency, productivity, ethical business practices, and corporate governance.

This collaboration demonstrates how edge computing and advanced automation can directly address industry-wide challenges of waste, emissions, and labor dependency, creating a replicable model for sustainable production at scale.

Where to Get More Information

Discover more ways you can drive manufacturing transformation with Intel.

intel × ORISOL × pcg 寶成國際集團 POU CHEN GROUP

[1] Yue Yuen. Investor Relations. Retrieved October 22, 2025, from https://www.yueyuen.com/en/investor_relations.html
[2] Orisol (founded in Israel) specializes in automation and digitalization solutions for footwear manufacturing and holds ISO 50001, ISO 14064-1, and ISO 14067 accreditations.
[3] Carbon emission and reduced energy consumption data is based on 2024 implemented machines and solutions and corresponding country electrics and carbon rate.
[4] Production and disposal of footwear around the world. (2024, December 31). KicksReboot. https://kicksreboot.com/production-and-disposal-of-footwear-around-the-world
[5] 2022 GotSneakers Impact Report. (2022, December). GotSneakers. https://gotsneakers.com/wp-content/uploads/2024/12/2022_IMPACT_REPORT.pdf
[6] Footwear's (carbon) footprint. (2013, May 22). MIT News. https://news.mit.edu/2013/footwear-carbon-footprint-0522