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The Role of Reverse Logistics in Reinventing the Technology Product Life Cycle

Integrating Circular Economy Principles to Reduce Environmental Impact and Add Value

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$30M

By adopting circular economy strategies, Intel increased the reuse and refurbish of product returns, delivering $30M in added value in 2020.

Executive Summary

Managing electronic waste, or e-waste, such as computers, monitors, and phones is a critical sustainability challenge. As one of the world's largest and most advanced semiconductor manufacturers, Intel's focus on reverse logistics provides a notable example of how technology companies can begin reinventing the product lifecycle to reduce environmental impact and add value.

When original equipment manufacturers (OEMs) and other customers return components, a process also known as reverse logistics, Intel uses a circular economy strategy to maximize recovery value and reduce environmental impact. By restocking back to inventory, repairing, reuse as warranty spares, or extending product life through resale in the secondary market, Intel has been able to reuse and refurbish more than half of all product returns.

Working across the company, Intel's Reverse Logistics Group influences the incorporation of circular strategies in product design. With increased repairability options, extended

product warranties, and product returns data, Intel is lengthening the life of products and reducing unnecessary returns. Additionally, products that are not re-used or refurbished are sent for materials reclaim via Intel's recycle vendors.

Beyond the environmental benefits of reducing e-waste, Intel has enabled $30M in added value since the circular economy program launched in 2020.

The Growing Imperative for Circular Strategies

The circular economy encourages businesses to re-envision traditional linear product strategies and manage environmental impact from 'cradle to cradle.'

Most of Intel's products—including system level assemblies, microprocessors, and other components—are incorporated into a final product by an OEM. Major OEMs have adopted or are exploring circular initiatives and goals, in part due to increasing consumer awareness and demand.

Intel Reverse Logistics 2020 Global Asset Recovery

- 0.5%
- 24%
- 30%
- 46%

■ Reused   ■ Refurbished
■ Reclaimed   ■ Landfilled
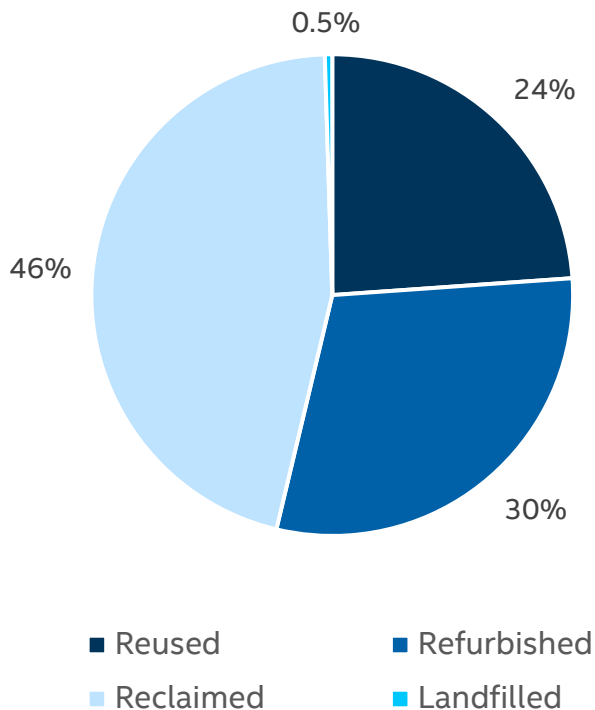
"Stakeholders have growing expectations of resilient and responsible supply chains, across the entire product lifecycle. Our 2030 RISE goals reflect a comprehensive framework to meet those demands and the circular economy strategies will enable Intel to reduce our environmental impact, extend product life, maximize re-use, open up new revenue streams, and reduce total cost of ownership – a true 'win-win' formula."

Jackie Sturm
Corporate Vice President, Global Supply Chain Operations
Intel Corporation

In the policy space, governments are also taking action. In 2019, the European Commission announced its green policy agenda, which included a legislative action to advance product sustainability – addressing circularity of design, improved product durability, repairability, upgradeability, and recyclability. New legislative measures are expected to address both product eco-design, repairability, and waste management in the next few years.

As customer expectations and regional governments begin holding manufacturers and companies accountable for the end-of-life plan of the products they sell, it is imperative that businesses reevaluate and reinvent their products to take circular economy strategies into consideration.

The progress of Intel's Reverse Logistics team demonstrates the value proposition for companies who choose to invest in circular economy strategies.

The Unique Role of Reverse Logistics in Mapping the Product Lifecycle

As one element of our environmental stewardship programs, Intel has prioritized recovery, reuse, and recycling of returned products for decades.

This focus has enabled strong results and innovative circular opportunities, while also spurring robust adoption across Intel's supply chain.

It is imperative to accurately map a product's lifecycle to identify opportunities to reuse and extend its useful life or divert products into secondary markets, thereby increasing the value captured and expanding customer channels for Intel products.

Investing in Innovative and Responsible Solutions

Intel collaborates with product groups, suppliers, and customers to reduce

Intel Reverse Logistics Product Lifecycle

By adopting circular economy strategies to maximize recovery value and reduce environmental impact, Intel has been able to reuse and refurbish more than half of all product returns.

Secondary Market

Other Industries

Refurbish

Reclaim

Manufacturing

Inventory

Customer

Diagnose

Repair

consumption of resources and extend product life. Several key initiatives in this space include:

Virtual diagnostic support: Intel works with customers to first identify potential product issues virtually to validate if a return is necessary. The virtual diagnostic support program enables faster identification of issues for the customer, such as troubleshooting, and provides solutions for next steps. The Intel Processor Diagnostics Tool, which has been downloaded more than 5 million times, is curbing the need to ship a product to a testing site – reducing the environmental impact associated with transportation – and reducing the total number of returns.

Additionally, information on the returned products are documented and analyzed to identify possible trends. Identification of common trends can facilitate proactive customer engagement to prevent future product returns.

Regional testing and repair: Partnerships with vendors in over 40 sites around the world provide Intel with an opportunity to test, repair, refurbish, and reuse repaired products while minimizing environmental impact associated with re-manufacturing a replacement product, as well as transportation to and from a central testing and repair facility. Once a product meets Intel's stringent standards, it is either classified as a replacement product or is made available for sale by the Intel Resale Corporation.

Responsible reclaim and recycling: If a returned product cannot be reused or repaired, it is either recycled or reclaimed by an Intel approved supplier, who has committed to adhere to Intel's corporate responsibility and human rights principles, and follow regulatory requirements to separate, disassemble, and sort product materials into defined categories. Base commodities, such as plastics, are resold on

global markets for reuse into a variety of manufacturing industries, and high value materials, such as copper and gold, are smelted to be reused in a variety of other industries.

Ultimately, less than 1% of returned product materials end up in landfill.
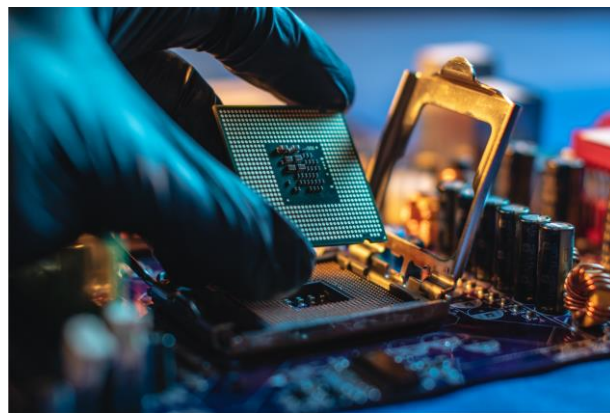
CPU Recovery

The CPU, or Central Processing Unit, is one of the most critical parts of a computer and is currently facing supply constraints across all industries. The Intel team implemented new programs to recover, test, and repurpose more returned CPUs to make them available for purchase on the secondary markets via Intel's third-party resellers. As a result of this program, Intel expects to increase the recovery rate for these products by 15%.

Additionally, the team implemented creative new methods to test and repackage CPUs to be re-purposed from their original intent and reused as inventory in other areas of Intel's supply chain. This helps offset supply constraints in warranty and spares inventories and mitigates customer impacts.

What's next for Intel

Circular strategies will continue to play an important role in achieving Intel's sustainability goals.

Over the next several years, Intel plans to expand the scope and impact of its Reverse Logistics program as it aspires to generate more than $300M in cumulative value by 2025 by optimizing reuse and recovery of returns and to remain laser focused on reducing waste and increasing the sustainability of reverse logistics packaging.

Intel believes there is more value to be gained by connecting the circularity activities across its supply chain functions. Through this effort Intel will drive greater value and create more innovative opportunities to collaborate across organizations, customers, and suppliers to advance circularity initiatives.

Encouraging Industry Action

For decades, we have worked to advance progress on complex issues together with our customers and other stakeholders. Acting alone, Intel cannot achieve the broad, societal impact to which we aspire. Our 2030 corporate responsibility strategy and goals reflect even greater ambition for ourselves, as well as a growing sense of urgency to work with others to address global challenges.

Intel's commitment to environmental sustainability has supported our efforts to manufacture some of the world's most advanced technology. This technology addresses some of the world's greatest challenges and helps to power, connect, and secure billions of devices and the infrastructure of the smart, connected world—from the cloud to the network to the edge and everything in between.

As a leader in global manufacturing, we are committed to applying our deep experience and leveraging our unique position to help our customers achieve their own sustainability goals and accelerate progress in key areas across the entire technology industry.

Intel is a world leader in the design and manufacturing of essential products and technologies that power the cloud and an increasingly smart, connected world. Learn more about Intel's corporate responsibility and supply chain responsibility efforts at www.intel.com/responsibility.