Lenovo Sustainability Solutions

Closing the loop: Technology's essential role in transitioning to a circular economy

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The new model for a more sustainable future

As climate change moves to the forefront of today's issues, one thing is clear: Our linear economy isn't working. We must put our collective minds and most innovative ideas to work. We must build a circular economy for the future of our planet and generations to come — an economy built on the principles of use less (reduce), use longer (reuse), use again (recycle), and make clean (regenerate).

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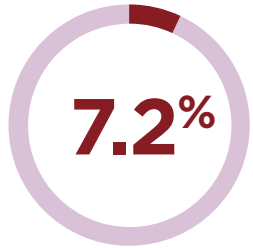
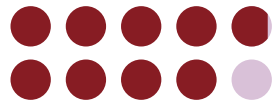
It's not an easy challenge. But the statistics are an urgent call to action. The 2023 Circularity Gap Report reveals the world is only 7.2% circular and trending downward, driven by rising extraction and waste.[1] What's more, 89% of organizations recycle less than 10% of their IT hardware,[2] resulting in over 50 million tons of e-waste dumped into the environment every year[3] — the equivalent of 1,000 laptops discarded every second. And recycling is just one aspect of the linear economy we must tackle.



Our world: only 7.2% circular and trending downward[1]



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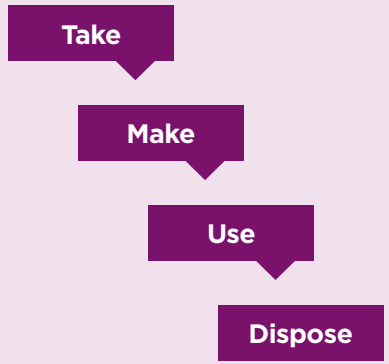
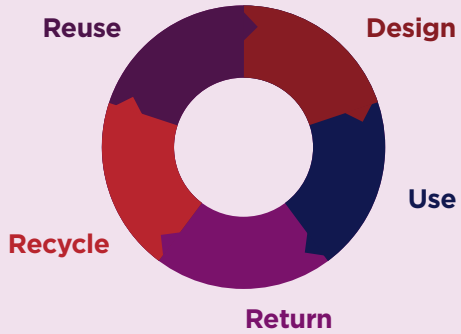
The good news is we can reverse this alarming trend.

A global circular economy will meet the world's needs with only 70% of the materials we now extract and use — moving human activity back within the safe limits of the planet.[1] Gartner predicts that by 2029, a circular economy will be the only economy.

Linear economy creates waste



Circular economy eliminates waste



The old model is old news

In the traditional linear economy, raw materials are used (and used up) to make products that end up being thrown away. There's little consideration for the economic and environmental costs of the squandering and disposal of resources. It's a take-make-waste scenario.

This model is doomed to inefficiency, falling far short of the potential use and value of most goods and services. Materials travel in one direction until they are discarded, and value comes only from producing and selling as much as possible. Natural resources and useful life are wasted, and more raw materials are needed more often.

A new model takes (circular) shape

The circular economy is a fundamental shift in vision and practice. It decouples economic growth from the use of finite resources. It's an economy where we innovate to eliminate waste before it happens, rather than addressing the consequences after the fact. It's a design-use-return scenario with key differences from the linear economy.

Recycling at the outset. In the circular economy, the end of one lifecycle becomes the beginning of the next. Rather than consuming virgin raw materials, new goods are manufactured as much as possible from recycled (or renewable) materials.

Circularity by design. One of the main pillars of circularity is repurposing goods — in many cases, disassembling them and reusing the parts or recycling the materials. Manufacturers can remove complexity and cost from this process by considering and planning for it in product design.

Value in longevity. In the circular economy, the greatest value is extracted from a resource during its useful life. The focus is on prolonging that life and, when it's ending, giving the product a second or even a third life.

Do no harm. When opportunities to reuse are exhausted, we need to make sure the materials that go to final recycling or disposal are non-toxic with minimal environmental impact. This, too, needs to be considered in the product design phase.

IT leadership is crucial

IT leaders are uniquely positioned to lay the foundation for circularity and take continuing action to support it. CIOs bring deep insight to sustainability decisions and digital innovations that promote circularity. They should have a seat at the table. And discussions should include the challenges faced by both business and technology leaders to balance the need for productivity and growth with the need to meet sustainability objectives.

Much of what's needed to support the circular economy hinges on data. No matter what their size or industry, organizations need to get a clear picture of their current carbon footprint as a baseline to establish targets and metrics. In fact, **only 43% of executives are aware of their IT footprint**.[2] Companies also need to accurately measure their ongoing energy use and emissions and calculate the environmental impact of current and potential sustainability initiatives. In addition, data is critical to comply with reporting regulations.

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The greening of the data center

The role of data in supporting the circular economy puts new demands on the data center, requiring more servers. IT's impact on carbon footprint is already significant, estimated at 4% of greenhouse gas emissions, with energy consumption increasing by 9% a year.[4] Much of that goes to power air conditioners and fans to remove server-generated heat.

Lenovo Neptune™ direct water cooling technology is a prime example of circularity-driven innovation. It cools with water, a renewable resource, and delivers 95% heat removal efficiency and up to 40% lower power consumption.[5] The closed-loop system uses a tiny fraction of the water required by evaporative cooling.

5th Gen Intel® Xeon® Scalable processors, such as those used in the Lenovo ThinkSystem™ SD650-I V3, are Intel's most sustainable data center processors ever. They support lowering the carbon footprint — and total cost of ownership — with built-in accelerators to improve performance per watt and features for managing power efficiency. The latest Intel® Accelerator engines help improve power efficiency across AI, data analytics, networking, and storage workloads. A built-in accelerator can often deliver the highest level of performance for a workload with better results than simply using more general-purpose cores. Customers can get up to 10x higher performance per watt using built-in accelerators on targeted workloads.*

Up for grabs: USD $4.5 trillion

Those opportunities have been quantified to the tune of USD $4.5 trillion by 2030[5] from emerging business models, including:

Circular inputs. Recycling returned material into new components

Sharing platforms. Facilitating "collaborative consumption" like ridesharing or coworking

Product as a service. Pay-as-you-go purchase models for goods or services

Product use extension. Take-back, re-lease, resell, recycle services

Resource recovery. Converting waste into secondary raw materials

To fully realize the value of a transition to circular production and consumption, organizations should embrace Fourth Industrial Revolution (4IR) technologies including digital technologies like AI, IoT, big data analytics, machine learning, and blockchain, among others.[6]

> The circular economy presents enormous opportunities for both large and small organizations.
>
> **Gartner**

Think big, start small, and act now

There are actions you can take throughout the technology lifecycle — or ensure that your suppliers take — to embrace sustainability, manage your carbon footprint, and support the circular economy.

Sourcing sustainably: Choose an environmentally conscious technology partner

Add circularity as a differentiating factor in your procurement process to establish your organization as circular from beginning to end of your technology lifecycles. Ask suppliers about product design, raw materials, manufacturing processes, packaging waste, and shipping methods.

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Lenovo customer spotlight: Debeka Group

Here's how one organization partnered with Lenovo to reduce waste and increase circularity.[7]

Leading German financial services company **Debeka Group** wanted to equip their field sales staff with lightweight mobile devices that would enable customer engagement and digital signatures in any location. The 15,500 high-performance, environmentally friendly Lenovo ThinkPad® X1 Yoga laptops were packaged and shipped with a focus on circularity.

By using just one cardboard box for every eight devices, they cut the environmental impact of the packaging by 87%. Using train transport rather than airfreight reduced the CO_2 emissions for shipping by 94%. And to optimize the environmental and economic sustainability of the full-service solution, Lenovo customized a service process that reduced common repair costs by up to 80% per device.

Using technology efficiently: Optimize product lifecycles and resource value

Select technology solutions made and rated for efficiency with features that let you reduce power consumption, waste, and carbon emissions. Choose service offerings that reduce downtime and help prolong device life. Consider as-a-service models to eliminate overprovisioning and better manage your employee technology footprint.

The rise of “as a service”

The as-a-service model is increasingly popular — offering solutions for hardware, software, infrastructure, security, storage, and more. It’s radically different from the ownership model and its resource efficiency is perfectly in sync with circularity. You pay only for what you need, eliminating the waste of overprovisioning and gaining the agility to scale up or down in response to your market. Device management is taken care of, as are end-of-life refurbishment, recycling, and responsible disposal.

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Partner with Lenovo for smarter circular design

From products to packaging, our designs focus on reducing waste and pollution.

Recycled content

- 248 Lenovo products are made with closed-loop post-consumer recycled content (PCC) recycled materials
- We have integrated 30% ocean bound plastic (OBP) in packaging bags, cushions, and select products

Packaging innovations

- Recycled, renewable, bio-based, and plastic-free packaging used on select products
- Reduced size, bulk packaging, and server rack integration solutions

Product energy efficiency

100% of ThinkPad® and ThinkCentre® devices and 97% of ThinkVision® monitors are ENERGY STAR® certified

67% manufacturing waste upcycled

During 2022, circular economy practices were applied to approximately 67% of Intel’s manufacturing waste streams via reuse, recovery, or recycling.

Partner with Lenovo for smarter circular use

Through innovative business models, we are optimizing the use of products and resources.

Premier Support Plus. Quick repairs, predictive and proactive monitoring, and extended battery warranty with accidental damage protection

Lenovo Asset Recovery and Recertified Services. Refurbished devices and servers

Lenovo TruScale Device as a Service. Pay-as-you-go subscription model with services included

Returning technology responsibly: Refurbish, reuse, recycle

Reduce e-waste contributions by finding programs for refurbishment/ recertification, remanufacturing, or trustworthy recycling.

Stay right-sized with as-a-service models

The **Lenovo TruScale Device as a Service** (Lenovo TruScale DaaS) subscription model is an efficient way to manage your fleet of end-user devices, optimizing resources and costs while promoting circularity. Deploy just what you need and responsibly dispose of what you don't. Supported by our suite of services, TruScale DaaS helps you prolong device usability and create a more sustainable end-to-end journey for your IT assets.

Optimize data center consumption with **Lenovo TruScale Infrastructure as a Service** (Lenovo TruScale IaaS) — a cost-efficient pay-as-you-go model that right-sizes infrastructure for demand. Take advantage of Lenovo's TruScale metering technology and the TruScale portal to monitor your infrastructure health, power consumption, and heating, and help manage utilization and costs more efficiently.

Partner with Lenovo for smarter circular return

Lenovo's take-back programs capture resources and value to keep products, parts, and materials in circulation.

Product recycling. Asset Recovery Services (ARS) program for businesses and product take-back programs for consumers

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Lenovo's commitment to circularity

Lenovo supports the transition to a circular economy. We are continuously innovating the design and delivery of our products and services with circularity in mind. Through our focus on design-use-return, we are extending the life of materials and the products we make from them and lessening the impact on the environment. We continually collaborate with our customers, suppliers, and industry partners to identify circular opportunities and help create a more sustainable future.

Lenovo is committed to achieving net-zero greenhouse gas emissions by 2050, with science-based targets validated through the Science Based Targets initiative (SBTi) Net-Zero Standard. We are the first PC and smartphone maker to have a net-zero commitment validated by SBTi.

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Join us on the journey

Lenovo equips and empowers you to pursue your environmental objectives. We meet you wherever you are on the journey — helping you navigate today's sustainability landscape and become more circular.

Contact us for a sustainability assessment.

Sources

1 Circle Economy and Deloitte, "The Circularity Gap Report," 2023
2 Capgemini Research Institute, "Sustainable IT," January 2023
3 World Economic Forum, "A New Circular Vision for Electronics," 2019
4 The Shift Project, "Lean ICT: Towards digital sobriety," March 2019
5 Lenovo internal source, 2023
6 World Economic Forum, "How can businesses accelerate the transition to a circular economy?" January 2020
7 Lenovo Customer Success Story, "Smarter modernizes insurance sales with light, flexible laptops," 2021

* Based on performance per watt gains of 1.46x to 10.6x with built-in accelerators on a range of AI, database, and networking workloads, See A19 – A25, D1, D2, D5, N16 at intel.com/processorclaims; 5th Gen Intel Xeon Scalable processors. Results may vary.

Smarter technology for all

Lenovo