DESIGN for ENVIRONMENT
REPORT · 2021

Electronics Product
Stewardship Canada

Message from Electronics Product Stewardship Canada, (EPSC)

Electronics Product Stewardship Canada (EPSC) is pleased to present its 13th Design for Environment Report, which showcases advances in delivering on a circular approach to the design of products and use of materials.

EPSC members are leading electronics manufacturers who continually improve their products and operations. This includes design of products, material sourcing, product performance, responsible end of life management as well as managing energy used in manufacturing and in the use of products.

Innovative consumer electronics that are lighter, smaller and more energy efficient, are enabling consumers to reduce their material footprint when using their favourite devices. Over the past 20 years, manufacturers have reduced material use in electronic products by half. While the number of electronic products in our homes has increased, home energy consumption from these products has decreased 25%.[1]

In addition, consumers across Canada have better access to recycling than ever before. Provincial regulations for managing end of life electronics vary. This lack of harmonization makes recycling unnecessarily complex and expensive. We support collaborative approaches between governments, industry, and consumers with harmonized provincial regulations.

We hope that the information contained in this report is useful in illustrating how we make, use, and responsibly manage electronics at the end of their useful life.

Shelagh Kerr,
President & CEO, EPSC

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Reducing Weight of Electronics Put on Market

Canadian households are producing less e-waste, thanks to innovation. Smartphones are also cameras, MP3 players and portable navigation systems. Flat-panel TVs are more than 50% lighter than the old CRT glass TVs. Laptops have replaced desktop computers. Streaming services can replace CD, MP3, DVD and Blu-ray players. New products are also smaller and lighter.

Thirty years of data from the University of Rochester in New York state, show that the volume of e-waste put on the market is decreasing. We see this across Canada as well with twenty years of experience in electronics recycling programs.

Households now produce about 10% less electronic waste by weight than they did at their peak in 2015. [2]

As manufacturers strive to make their products more environmentally friendly, a key design focus is to reduce product size and weight. This conserves raw materials and lowers greenhouse gas emissions during the materials extraction, manufacturing, and transportation phases of a product's life.

After reassessing the gold plating requirements in components, **Apple's** printed circuit boards for the iPhone 12 now have 50 percent less gold plating than the prior generation. Apple uses recycled material where possible – including 100 percent certified recycled gold on the plating of select circuit boards for iPhones. By reducing the total amount of steel in the iPhone 11 Pro enclosure, Apple lowered the product's weight and saved nearly 10,000 metric tons of steel in 2020. [3]

Canon is making efforts across a wide range of product types to make its products smaller and lighter to help reduce the consumption of resources in the form of raw materials.

Households now produce about 10% less electronic waste by weight than they did at their peak in 2015.

Canon's Initiatives and Their Relation to Sustainable Development Goals (SDGs) Targets

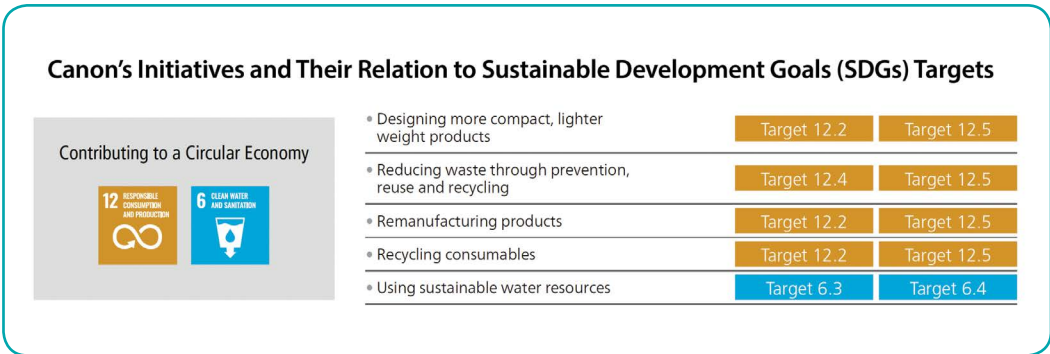| Contributing to a Circular Economy		
• Designing more compact, lighter weight products	Target 12.2	Target 12.5
• Reducing waste through prevention, reuse and recycling	Target 12.4	Target 12.5
• Remanufacturing products	Target 12.2	Target 12.5
• Recycling consumables	Target 12.2	Target 12.5
• Using sustainable water resources	Target 6.3	Target 6.4

Figure 1 - Canon has organized their overall (lifecycle) target, product targets and operational site targets in alignment with the UN's sustainable development goals

New RF lens products, the RF600mm F11 IS STM and RF800mm F11 IS STM, are the world's lightest weight super-telephoto single-focal-length lens of their respective focal lengths. These products achieve a significant weight reduction of approximately 70% compared to previous lenses. [4]

HP shipped 24 million units of personal systems products in molded fiber packaging, eliminating 2,997 tonnes of hard-to recycle expanded plastic foam. This included Thin Client, consumer and commercial displays, desktop and notebook workstations, and commercial All-in-One products in fiber-based packaging. By reducing the cushion density on the LaserJet M227 multifunction printer, HP decreased plastic foam use by 15% and will eliminate more than 26 tonnes of plastic yearly. In 2020, HP eliminated plastic ties on keyboards and mice for desktop units. This change avoided the use of 25.5 million plastic ties, equal to 2.8 tonnes of polyethylene plastic and 3 tonnes of steel wire.[5]

Not only are products getting lighter and using less material, the packaging that electronics are shipped in is also being reduced in weight.

IBM product packaging engineers redesigned the packaging for its z14 and z15 mainframe computers in 2019. The new crate is designed with less wood, reducing weight by 27% from the previous version. This change will save an estimated 140 metric tons of material annually. In addition, because the crates are designed to be robust, Canadian shippers can reuse them, typically for five shipments. This reuse is estimated to help avoid the purchase of an additional 136 metric tons of crates.[6]
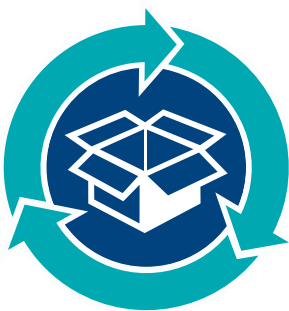
Microsoft has a target of 100% recyclable packaging by 2030 and elimination of single-use plastics by 2025. The recyclability of Microsoft's packaging portfolio was 88% and plastic constituted 7.7% of its packaging materialuse at the end of 2020. For Surface devices specifically, its recyclability of packaging was 95% by material type. Microsoft is developing programs to drive to 100% recyclability by 2030.[7]

Reducing Materials of Concern

Electronics manufacturers are making steady progress in their efforts to design new products and manufacturing processes that reduce or eliminate the need for various materials of concern. The results of these efforts are significant reductions in the generation of hazardous waste.

Canon engages in various initiatives at its operational sites to reduce emissions of controlled chemical substances, including reducing the consumption and re-use of them through improvement of production processes. Total emissions of controlled chemical substances in 2020 amounted to 372 tons, a year-on-year decrease of approximately 18%, which was achieved through ongoing measures to promote re-use. Facility closures associated with COVID-19 also contributed to the decrease.[8]

Samsung Electronics has replaced packaging materials in all products with sustainable materials. In 2020, all plastic packaging materials for portable Solid State Drives (SSDs) were replaced with paper, and by 2022, all packaging materials for consumer SSDs will be converted to paper or recycled·biomaterials.[9]

Microsoft has operated carbon neutrally since 2012. Like many companies, Microsoft's neutrality commitment relied on investing in offsets that paid others to not emit carbon, instead of removing carbon dioxide. The science and the social and economic impacts of climate change drove their conclusion that carbon neutral alone is not enough, leading to Microsoft's carbon negative commitment in 2020. By 2030 Microsoft will be carbon negative and, by 2050, Microsoft will remove from the environment all the carbon the company has emitted either directly or by electrical consumption since it was founded in 1975.[10]
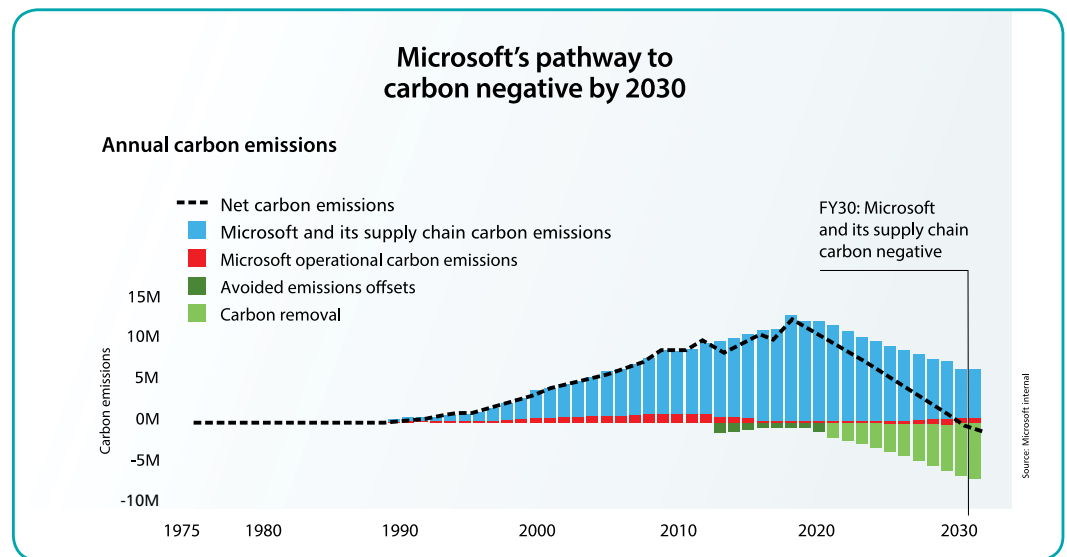

Figure 2 - Microsoft's pathway to carbon negative by 2030

Reuse Products to Extend Their Lifespan
Refurbishment Activities

To enhance the sustainability of the electronic devices and equipment they produce, members of EPSC are taking steps to enhance the durability and reuse of their products.

With each new product, **Apple** strives to improve on the durability of the prior generation. The iPhone 12 with Ceramic Shield has a transparent ceramic cover glass that has four times better drop performance than the previous generation. It's an innovation that contributes to the durability of each device, minimizes the need for replacement parts, and helps retain product value that customers can access through trade in. This advancement enhances durability, and each improvement is one more step in an ongoing journey to creating even more durable products.[11]

__Apple__ collects devices for refurbishing through a number of programs including Apple Trade In, the iPhone Upgrade Program, AppleCare, and a corporate Hardware Reuse Program. In 2020, it sent 10.4 million devices to be refurbished for new users.

Canon pursues product-to-product recycling – in other words, recycling used products into new ones. Canon has emphasized such initiatives as closed-loop recycling of toner and ink cartridges and the remanufacturing of office multifunction devices – collecting them post-use and making them into products with good-as-new quality. As of the end of 2020, Canon's collection program was operational in 35 countries and regions worldwide and the total volume of cartridges that had been collected up to the end of 2020 reached 2,510 tons.[12]

3D printing facilitates on-demand manufacturing of spare parts, with the potential to transform the parts supply chain and support extended product use. Using **HP** Multi Jet Fusion technology, HP is ramping up spare parts production. This enables HP to provide spare parts to customers all over the world at low volumes and low cost, extending the life of HP products.[13]

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Progress in 2020

41%
circular by weight[2]
(this equals the sum of the three metrics below)

34,200 tonnes
of recycled content plastic used in HP products and packaging (4% of total materials use)[3]

100,800 tonnes
of recycled fiber in HP brand paper and packaging (11% of total materials use)

248,300 tonnes
of certified sustainably managed fibre in HP brand paper and packaging (26% of total materials use)

Regenerate natural systems
Partnering to actively strengthen the natural systems that sustain life, with a focus on tackling ocean plastic pollution and protecting and restoring global forests.

Keep products and materials in use
Designing products for long life, offering service-based solutions that improve customer value and decrease environmental impacts, and recapturing products and materials at end of service for repair, reuse, and recycling.

We have shifted to a system where we

Design out waste and use materials responsibly
Increasing materials efficiency, using more recycled content, and replacing materials of concern.

Create a net zero carbon future
Improving product energy efficiency to reduce customers' energy consumption and decrease product use carbon and water footprints.
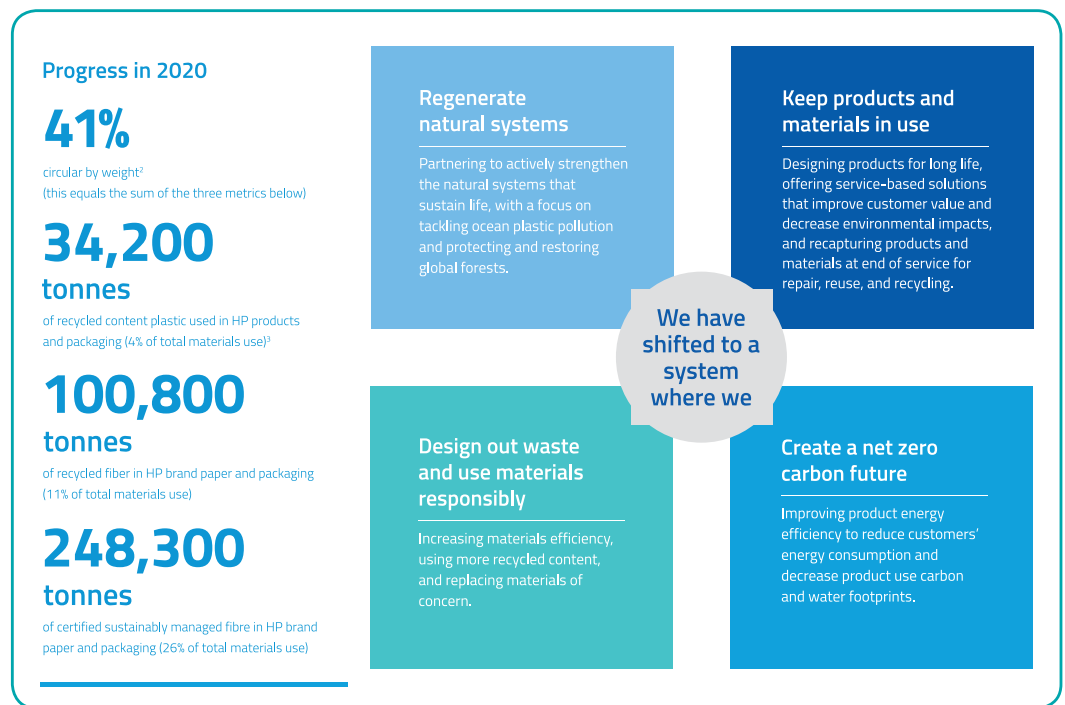
Figure 3 - HP's four key strategies for advancing a circular and net zero economy

Compared with transactional sales, a Life Cycle Analysis conducted in 2019 shows that DaaS reduces GHG emissions by 25%, improves resource efficiency by 28%, decreases ecosystems impacts by 28%, and reduces human health impacts by 29% for a notebook PC. These improvements are mainly due to keeping PCs in use for multiple life cycles, which avoids manufacturing of additional devices and extends the useful life of high-value materials.[14]

Dell works with suppliers to recover rare-earth magnets from hard drives and reuse the material in new hard drives, fostering the circular economy across the industry.[15] Dell's circular hard drives initiative includes a closed-loop recycled aluminum solution. Continued partnership with Reconext and Seagate puts aluminum from old Dell enterprise drives into the base plate of new hard drives in Dell products. In the initial pilot effort, 24,000 drives with closed-loop recycled aluminum were used in select OptiPlex 7090 Small Form Factor and Mini Towers. Aluminum is among the top five most commonly used materials in Dell Technologies products. This innovation moves both Dell and the industry closer to circular metal supply chains.

Lenovo is growing the use of closed-loop recycled plastics from electronics, with 103 of its products now using this material. Lenovo began using Closed Loop (CL) Post-Consumer Recycled (PCR) materials in a server application for the first time in 2020 in the company's ThinkSystem SR950.[16]

Recycle

Across Canada in 2020, the consumer electronics industry collected and diverted from landfill, close to 100,000 tonnes of end-of-life electronics for recycling.

Product Design for Recyclability

A ton of discarded electronics could contain up to 800 times more gold than a ton of gold ore.[17]

Gold, silver, palladium, and other valuable materials are concentrated in e-waste. Urban mining, in the form of recycling e-waste, can reduce the need to mine metals. The way we all consume resources in the traditional economy has waste as its ultimate end product. But the stuff we throw away is immensely valuable.

Recycling resources is a key aspect of a circular economy. The companies represented by EPSC are evolving their operations to contribute to a circular economy. Products are being assembled with more and more recycled content, and they are being designed so that they can be more easily disassembled and recycled at the end of their useful life. By designing their products to facilitate recycling, manufactures are making a significant contribution to promoting and sustaining a circular economy.

Microsoft Introduced a variety of new Xbox Wireless Controllers built using post-consumer recycled (PCR) materials. They are also partnering with suppliers to see how plastic waste recovered from our oceans, waterways and beaches can be processed and used in consumer products.[18]
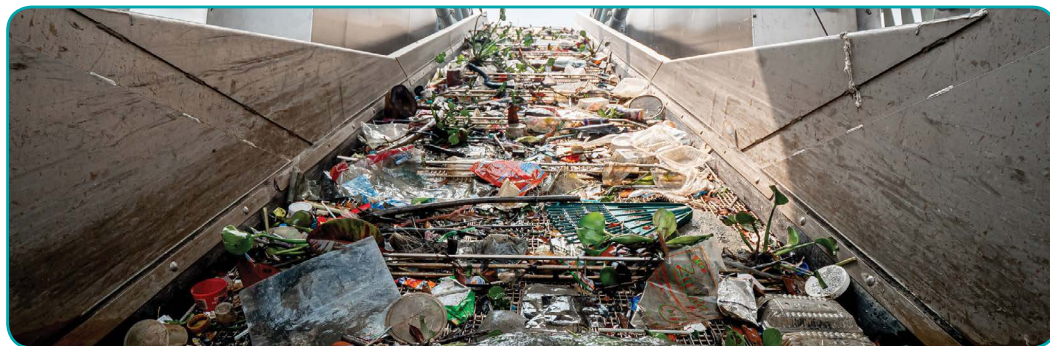
Microsoft is partnering with suppliers to see how plastic waste recovered from our oceans, waterways and beaches can be processed and used in consumer products

ICI on recycle +

Manufacturers are also working to improve recycling and resource conservation during the manufacturing process.

The government agency RECYC-QUÉBEC's ICI on recycle + program, elite-level certification was awarded to **IBM** Canada's Bromont facility. This certification recognizes the implementation of water reduction and reuse projects that decreased annual water consumption.[19]

Samsung have applied recycling technology to produce crude copper (97%) by extracting copper from wastewater sludge that was previously disposed in a landfill and are currently developing technology to extract tungsten from dust extracted in clean rooms. Samsung also developed technology to recycle crushed Epoxy Molding Compound (EMC), which is created during the semiconductor packing process, as a plastic raw material to help improve efforts in waste recycling.[20]

Dell is mapping the use and supply of priority materials within their product portfolio to better understand how materials are used, how much recycled content is in products and how Dell can shift to more recycled or renewable content. Initial priority materials include plastics, steel, aluminum and copper, which all appear frequently in Dell products.[21]

To maintain the flow of resources in the growing circular economy, manufacturers are constantly increasing the amount of recycled content in their products as functionality allows.

Apple has worked to increase recycled cobalt - doubling the amount of recycled material used in 2020 from the previous year. The cobalt from recycled iPhone batteries is being returned to the general market.[22]
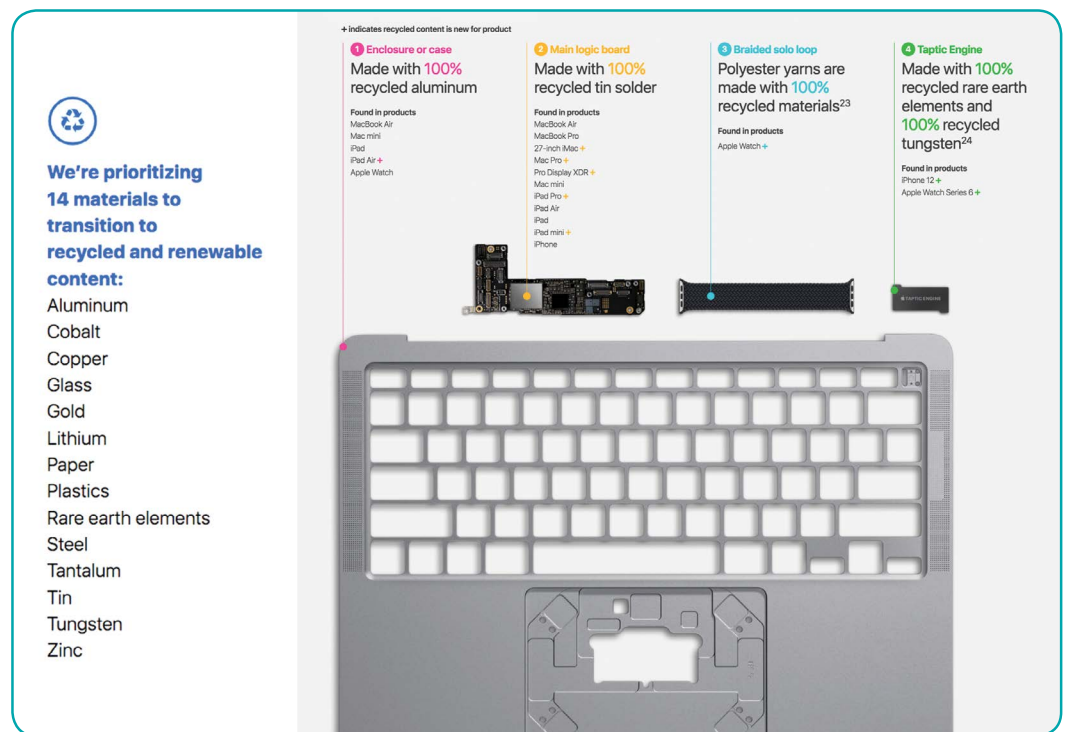

Figure 4 - Apple's product environmental features

TCL

TCL uses materials that are recyclable in its products.[23]
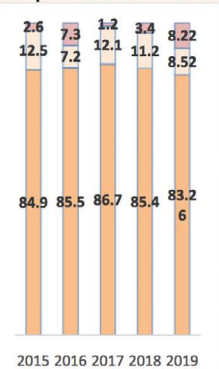
Figure 5 - TCL's use of recycled and recovered materials

Recycled Plastics

The federal government is taking action to reduce plastic pollution, working with provinces, territories, businesses, and the Canadian Council of Ministers of the Environment on an action plan to implement the Canada-wide Strategy on Zero Plastic Waste.

Panasonic

Panasonic will use approximately 15,200 tons of recycled resin in its products in 2021.[24]
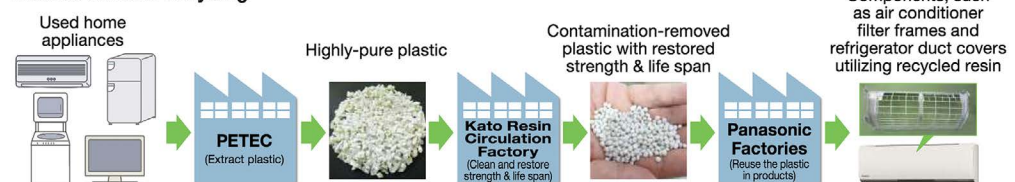

Figure 6 - Panasonic's resin recycling

In 2020, **Lenovo's** use of plastics containing recycled content was approximately 5.9 million kilograms (gross) with net Closed Loop-Post Consumer Recycled plastic of approximately 4 million kilograms. These numbers reflect Lenovo's decreasing use of plastics overall resulting from successful efforts to make products thinner and lighter.[25]

Cisco's goal to decrease use of virgin plastics by 20% by 2025 (2018 base year) is on track. Accomplishments in 2020 include the launch of select models of the IP phone 8800 series and the Webex Room Kit Plus using 100% post-consumer recycled (PCR) plastic resin.[26]

Sony's Sustainable Oriented Recycled Plastic (SORPLAS) began use in 2011 as a flame-retardant recycled plastic made possible by a proprietary compounding technology that combines an original, non-halogen and non-phosphorus flame retardant, itself produced using a Sony-developed process, and waste plastics (polycarbonate resin) from various sources in an optimal blend. Thanks to Sony's novel flame-retardant, which makes it possible to impart flame-retardancy by the addition of a very small amount, less than 1% of total content, SORPLAS not only surpasses conventional flame-retardant plastics in terms of durability, flame-retardancy and recyclability, but also achieves an outstanding utilization rate of up to 99% waste plastics. The effective utilization of SORPLAS has been shown to reduce CO_2 emissions in product manufacturing by up to 80%.[27]

SONY®

In 2020, the Sony Group used some 18 thousand tons of recycled plastic in its products.

Sony has used a cumulative total of approximately 113 thousand tons of recycled plastic from fiscal 2014 through fiscal 2020 to meet its target of reducing the amount of virgin oil- based plastics used per product unit. In 2021 and beyond, Sony will expand its use of recycled plastic and promote initiatives to reduce the amount of plastic packaging per product unit by 10% and eliminate plastic packaging from newly-designed small products.

In 2020, the Sony Group used some 18 thousand tons of recycled plastic in its products. This amount consisted of approximately 55% recycled plastic content from scraps and other waste materials generated from manufacturing by the Sony Group and other companies, and approximately 45% post-consumer recycled plastic content from used products, containers, and other sources.[28]

Samsung uses recycled plastics in various product lines ranging from refrigerators to washing machines, air conditioners, TVs, monitors, and mobile chargers. The company uses more than 30,000 tonnes of recycled plastics annually, including Post Consumer Materials (PCM) - plastics recycled from e-waste. In 2020, Samsung used approximately 31,000 tonnes of recycled plastic, bringing the total amount of recycled plastics used in product manufacturing to 276,000 tonnes since 2009. In 2020, Samsung's Consumer Electronics Division used a total of 25,000 tonnes of recycled plastic and will continue to expand usage.[29]

Cumulative Use of Recycled Plastics[1] (Unit: 10,000 tonnes)

Year	Amount used in the calendar year	Cumulative use
2018	3.9	21.4
2019	3.1	24.5
2020	3.1	27.6

1) Cumulative from 2009
● Amount used in the calendar year ● Cumulative use

Figure 7 - Samsung Electronics' expanding use of recycled plastics

CISCO™

Cisco launched the Webex Room Kit Plus using 100% post-consumer recycled (PCR) plastic resin.[26]

Since 2008, **Canon** has taken 40,220 tons of plastics from used products for recycling as raw materials, while another 31,938 tons of products and parts were reused directly.

The primary material of Canon toner cartridges is the high-impact polystyrene (HIPS) used primarily for the housing. HIPS can be used repeatedly to make new toner cartridges, a unique feature of Canon's closed-loop recycling process.[30]

Innovation

A successful transition from a wasteful linear economy to an environmentally friendly circular economy cannot be made without significant innovation. From design to manufacturing to shipping, the members of EPSC are finding innovative ways to reduce the environmental impacts of their products and the packaging they use.

Development and Use of New Sustainable Materials

Cellulose fiber can be derived from various natural resources, such as wood residues from forest thinning and other organic wastes, and it is now drawing attention as a resource with low environmental impact.

In 2019, **Panasonic** developed a composite polypropylene (PP) resin containing plant-derived cellulose fiber as an additive. They have also succeeded in developing a technology for blending resin with more than 55% cellulose fiber to produce white products in 2020. More new products will be developed with this technology, focusing also on developing new recyclable resources.[31]

Lenovo

The low temperature solder process reduces CO2 emissions by using less energy and heat in the process, reduces manufacturing fallout and improves the long-term product reliability. As of 2020/21, the Company has shipped 22.7 million laptops manufactured with the LTS process. This has resulted in a total reduction of 4,740 metric tons of CO2 emissions.

Lenovo implemented a break-through low temperature solder (LTS) manufacturing process used in PC manufacturing operations in 2017. Lenovo continues its drive towards manufacturing innovation to support a circular economy and is looking for opportunities to expand low temperature solder lines to additional platforms, which may include display, servers, desktop, and workstation products.[32]

Packaging is another area where companies are making major changes to enhance sustainability of their products. The amount of packaging is being reduced as products become smaller and lighter. More and more packaging is being made with recycled materials and is being designed for easy recycling to support a circular approach.

TCL is making environmentally friendly upgrades to its packaging.[33]

Environmental performance of products

In order to reduce the impact of waste packaging material which can be recycled and re-used to minimize the impact on environment, we took a serious measures in 2019:

1. Replace the high-quality boxes with ordinary box to reduce the weight of cardboard.
2. Replace plastic with environmental protection paper for wedge.
3. Choose the package material with sustainable resource (for cardboard and paper)
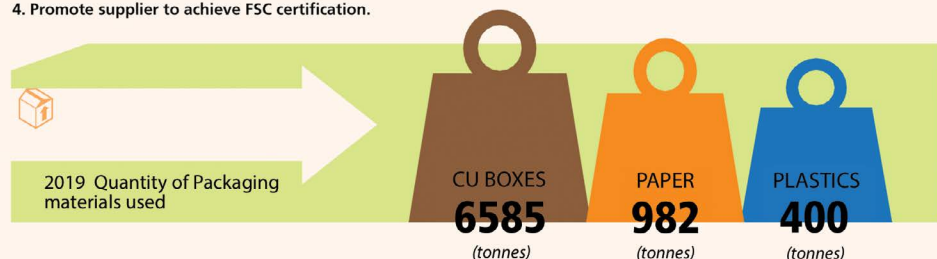4. Promote supplier to achieve FSC certification.

2019 Quantity of Packaging materials used

CU BOXES	PAPER	PLASTICS
6585 *(tonnes)*	982 *(tonnes)*	400 *(tonnes)*

Figure 8 - TCL's packaging upgrades

Cisco's goal is to reduce foam used in Cisco product packaging by 75% as measured by weight by 2025 (2019 base year). In 2020, Cisco reduced their use of foam in product packaging by 11.5% against the 2019 base year.[34]

Product Energy Use to Help Reduce Carbon Footprint

Design changes being made to electronic products are helping reduce greenhouse gas emissions at every stage of a product's life cycle.

Samsung has developed a solar cell powered remote control that charges itself through sunlight or indoor lighting using embedded solar cell panels, rather than requiring single-use batteries. The remote comes with the 2021 QLED product lineup. It is designed to use minimal energy – a 86% reduction compared to other remote controls – while receiving additional needed power from solar cells. Power consumption reduction is equivalent to the effect of reducing 6,000 tonnes of greenhouse gas emissions (based on seven years, an average life cycle of TV products).[35]

SAMSUNG

Samsung has developed a solar cell powered remote control that charges itself through sunlight or indoor lighting using embedded solar cell panels, rather than requiring single-use batteries.

Samsung's SolarCell Remote

Canon achieved its target of improving lifecycle CO2 emissions per product by an average 3% per year, recording an average improvement of 4.6% between 2008 and 2020. The COVID-19 pandemic meant that the rate of improvement was less than in the previous year, but the target was nevertheless met thanks to ongoing initiatives affecting the whole product lifecycle, including energy-saving measures at operational sites and in product design. The cumulative reduction since 2008 amounts to 41.3%.[36]

*In late 2013, **Dell** launched a science-based target initiative (SBTI) approved goal to reduce the energy intensity of Dell's entire product portfolio by 80% (2012-2021).*

In late 2013, **Dell** launched a science-based target initiative (SBTI) approved goal (the first of its kind in our industry) to reduce the intensity of Dell's entire product portfolio by 80% (2012-2021). In this last year of reporting against this goal, Dell recorded a reduction of approximately 76.7% compared to the 2012 baseline. Dell will source 75% of its electricity from renewable sources across all Dell Technologies facilities by 2030 and 100% by 2040. Dell will also partner with direct material suppliers to reduce greenhouse gas (GHG) emissions by 60% per unit revenue by 2030.[37]

The use of renewable energy for manufacturing is another way EPSC members are reducing their GHG emissions. Renewables are essential in the effort to decarbonize our economy and mitigate some of the effects of climate change.

Panasonic has six Zero-CO2 emission factories around the world. Their Belgian facility has installed wind power generation systems.[38]

Other Zero-CO2 manufacturing sites include Japan (2), Brazil, Central America and, in April 2021, **Panasonic** opened its first Zero CO2 factory in China.[39]

Panasonic Energy Belgium installed a 100-meter-tall wind power generation system in its factory and switched all procured electricity to 100% renewable energy sources.
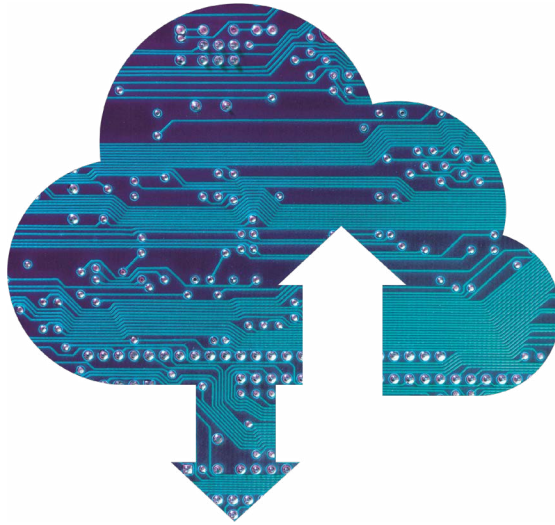
IBM has implemented nearly 1,400 energy conservation projects delivering energy savings of 145,500 megawatt hours. It also procured 59.3 % of the electricity consumed across its global operations from renewable sources, surpassing its previous goal of 55 % by 2025, five years early.[40]

Current approaches to capturing emitted CO2 work, but they are energy-intensive and costly. **IBM**'s Future of Climate initiative is creating a cloud-based knowledge base of existing methods and materials and applying AI to help scientists identify molecules to consider for CO2 capture and separation.

To make their products more sustainable, manufacturers are also encouraging the companies in their supply chains to reduce GHG emissions by switching to renewable energy.

Most of **HP's** GHG emissions are from operations related to the energy used to power HP facilities. HP's global operations produced 171,000 tonnes of Scope 1 and Scope 2 CO2 e emissions during 2020. HP's goal is achieving net zero GHG emissions across the HP value chain by 2040, beginning with our Supplies business achieving carbon neutrality by 2030, reducing HP value chain GHG emissions 50% by 2030 and reaching carbon neutrality in HP operations by 2025.[41]

GHG emissions associated with **HP** product use equaled 15,800,000 tonnes of CO2 e in 2020, 35% of HP's overall carbon footprint. The decrease of 13% in absolute emissions from product use compared to 2019 was due to a 7% combined decrease in personal systems and printer electricity consumption of models shipped in 2020.[42]

*Last year, **IBM** unveiled the Power 10 processor, available in IBM Power Systems starting in the second half of 2021. The new 7 nanometer (nm) technology is expected to deliver up to a 3x improvement in energy efficiency over its 14 nm predecessor.[43]*

One of **IBM's** product energy efficiency goals is to improve the computing power delivered for each kilowatt-hour of electricity consumed for new server products as compared to equivalent, previous-generation products. In 2019, IBM released the IBM z15TM, which uses 20-30 percent less power than a comparably configured IBM z14® and improves computing power delivered for each kilowatt-hour of electricity consumed by 31%. Last year, IBM unveiled the Power 10 processor, available in IBM Power Systems starting in the second half of 2021. The new 7 nanometer (nm) technology is expected to deliver up to a 3x improvement in energy efficiency over its 14 nm predecessor.[43]

In 2020, **Apple** made clear gains with work on integrated circuits and boards and flexes – components that have been prioritized because they are carbon-intensive. Integrated circuits perform vital functions in electronic devices, yet require significant energy to manufacture. With the Apple M1 chip, Apple has created a more efficiently designed chip tailored to the needs of Mac devices. Switching to the Apple M1 chip for the Mac mini reduced the energy needed to use the device and drove down the overall carbon footprint by 34%.[44]

Many **Apple** products utilize aluminum as a signature material – it is strong, durable, and enhances the longevity of devices. But the current smelting process for producing aluminum used by manufacturers around the world is carbon-intensive. For the first time, aluminum smelted with a direct emissions-free process is being used in production of the 16-inch MacBook Pro. This innovation, called Elysis, is the result of a joint venture of two aluminum manufacturers. The venture aims to commercialize patented technology that eliminates direct greenhouse gas emissions from the traditional smelting process.

Apple and the governments of Canada and Quebec have joined with the founders of Elysis to invest in research and development of the technology. Part of this funding is being used to construct a new facility in Quebec. Once finished, this R&D facility will significantly scale the carbon-free smelting technology, making this high performance, low-emissions material available commercially.[45]

Sony has adopted the target of reducing annual energy consumption from product use, by 30% by 2020 compared to the 2013 level. To achieve this, Sony is working to incorporate energy-saving features in a wide range of product categories. In 2019, annual energy consumption per product was 52% lower than in 2013.[46]

An excellent way to judge the energy efficiency of an electronic product is to see if it has been certified by a recognized standard such as **ENERGY STAR or EPEAT.**

Microsoft has achieved the highest possible rating, EPEAT Gold, for the Surface Laptop 3, Surface Pro X, Surface Go 2, Surface Pro 7+, and Surface Laptop Go in Canada.[48]

The Federal Government's Shared Service Canada (SSC) requires globally recognized ecolabels in its procurements, such as the Green Electronic Council's flagship Electronic Product Environmental Assessment Tool (EPEAT) and Energy Star. This is an excellent way for governments to support design for the environment efforts by business.[47]

EPEAT, managed by the Green Electronics Council, is the leading global ecolabel for the IT sector that awards points based on sustainability categories such as product substance management, materials selection, energy use and packaging.

Microsoft has achieved the highest possible rating, EPEAT Gold, for the Surface Laptop 3, Surface Pro X, Surface Go 2, Surface Pro 7+, and Surface Laptop Go in Canada.[48]

In recognition of its energy efficient products, sustainable packaging and its take-back and recycling programs, **Samsung** received an **ENERGY STAR** Partner of the Year - Sustained Excellence Award in 2020, its eighth time since 2013.[49]

The average household owns 24 consumer electronics products, which are responsible for 12 percent of household electricity use. ENERGY STAR certified products provide all the functionality as standard products but use less energy, reducing their impact on the environment.

Figure 9 - Energy Star program impacts

IBM was a charter member of the ENERGY STAR computer program in 1992 and continues to qualify eligible products to its criteria. In 2020, IBM had four POWER9-based servers eligible for ENERGY STAR and all were certified. In addition, three storage products were certified to ENERGY STAR.[50]

HP has 38 Gold and 268 Silver EPEAT-registered products in more than 19 countries – more than any other company in the IT industry. HP has 664 ENERGY STAR certified personal systems products – more than any other manufacturer – and 93% of its printers are ENERGY STAR certified.[51]

Electronics Product
Stewardship Canada

Electronic versions of this report along with previous years' reports can be accessed at www.epsc.ca

ENDNOTES

1. Consumer Technology Association 2019 Sustainability Report. https://www.cta.tech/sustainability-report/

2. The evolution of consumer electronic waste. https://onlinelibrary.wiley.com/doi/epdf/10.1111/jiec.13074 https://thehill.com/opinion/energy-environment/536768-electronic-waste-in-the-us-is-changing

3. Apple Environmental Progress Report 2021. https://www.apple.com/environment/pdf/Apple_Environmental_Progress_Report_2021.pdf

4. Canon Sustainability Report 2021. https://global.canon/en/csr/report/pdf/canon-sus-2021-e-14.pdf

5. HP Sustainable Impact Report 2020. https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c07539064

6. 2020 IBM and the Environment Report. https://www.ibm.com/ibm/environment/

7. Microsoft 2020 Sustainability Report. https://www.microsoft.com/en-us/corporate-responsibility/sustainability/report

8. Canon 2021 Sustainability Report. https://global.canon/en/csr/report/pdf/canon-sus-2021-e-14.pdf

9. Samsung Electronics 2021Sustainability Report. https://images.samsung.com/is/content/samsung/assets/global/our-values/resource/2021_Sustainability_Report.pdf 8. Sony Corporation. (2018). CSR Report. Retrieved from: https://www.sony.net/SonyInfo/csr_report/environment/products/ghg.html

10. Microsoft 2020 Environmental Sustainability Report. https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/

11. Apple Environmental Progress Report 2021. https://www.apple.com/environment/pdf/Apple_Environmental_Progress_Report_2021.pdf

12. Canon 2021 Sustainability Report. https://global.canon/en/csr/report/pdf/canon-sus-2021-e-14.pdf

13. HP Sustainable Impact Report 2020. https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c07539064

14. HP Sustainable Impact Report 2020. https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c07539064

15. Dell Progress Made Real FY20 Social Impact Report. https://corporate.delltechnologies.com/en-ca/social-impact/advancing-sustainability/sustainable-supply-chain/environment.htm

16. Lenovo 2020/21 Environmental, Social and Governance Report

17. https://corporate.delltechnologies.com/en-ca/social-impact/advancing-sustainability/sustainable-products-and-services/circular-design.htm

18. Microsoft 2020 Environmental Sustainability Report. www.microsoft.com/en-us/corporate-responsibility/sustainability/report#primaryR4

19. IBM Environment Report 2020. https://www.ibm.com/ibm/environment/annual/IBMEnvReport_2020.pdf

20. Samsung 2021 ESR Report. https://images.samsung.com/is/content/samsung/assets/global/our-values/resource/2021_Sustainability_Report.pdf

21. Dell Progress made Real FY20 Social Impact Report. https://corporate.delltechnologies.com/en-ca/social-impact/advancing-sustainability/sustainable-supply-chain/environment.htm

22. Apple Environmental Progress Report 2021. https://www.apple.com/environment/pdf/Apple_Environmental_Progress_Report_2021.pdf

23. TCL 2019 ESG Report. https://www.tcl.com/content/dam/tcl-html/TCT-Service/mobile/index/2019%20ESG%20report.pdf

24. Panasonic 2021 Sustainability Report. https://www.panasonic.com/global/corporate/sustainability/pdf/sdb2021e-eco.pdf

25. Lenovo 2020/21 Environmental, Social and Governance Report. https://investor.lenovo.com/en/sustainability/reports/FY2021-lenovo-sustainability-report.pdf

26. Cisco 2020 CSR Report. https://www.cisco.com/c/en/us/about/csr.html#~highlights

27. Sony https://www.sony.ca/en/electronics/sorplas-recycled-plastic

28. Sony Sustainability Report 2021. https://www.sony.com/en/SonyInfo/csr/library/reports/SustainabilityReport2021_E.pdf

29. Samsung Electronics Sustainability Report 2021. https://images.samsung.com/is/content/samsung/assets/global/our-values/resource/2021_Sustainability_Report.pdf

30. Canon 2021 Sustainability Report. https://global.canon/en/csr/report/pdf/canon-sus-2021-e-14.pdf

31. Panasonic 2021 Sustainability Report. https://www.panasonic.com/global/corporate/sustainability/pdf/sdb2021e-eco.pdf

32. Lenovo 2020/21 Environmental, Social and Governance Report, https://investor.lenovo.com/en/sustainability/reports/FY2021-lenovo-sustainability-report.pdf

33. TCL 2019 ESG Report. https://www.tcl.com/content/dam/tcl-html/TCTService/mobile/index/2019%20ESG%20report.pdf

34. Cisco 2020 CSR Impact Report. https://www.cisco.com/c/m/en_us/about/csr/esg-hub/impact-report/supply-chain/circular-economy.html

35. Samsung Electronics Sustainability Report 2021. https://images.samsung.com/is/content/samsung/assets/global/our-values/resource/2021_Sustainability_Report.pdf

36. Canon 2021 Sustainability Report. https://global.canon/en/csr/report/pdf/canon-sus-2021-e-14.pdf

37. Dell Progress made Real FY20 Social Impact Report. https://corporate.delltechnologies.com/en-ca/social-impact/advancing-sustainability/sustainable-supply-chain/environment.htm

38. Panasonic annual Report 2020 https://www.panasonic.com/global/consumer/battery/primary_batteries/sustainability.html

39. https://news.panasonic.com/global/press/data/2021/04/en210406-5/en210406-5.html

40. IBM Environment Report 2020. https://www.ibm.com/ibm/environment/annual/IBMEnvReport_2020.pdf

41. HP 2020 Sustainable Impact Report. HP Sustainable Impact Report 2020. https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c07539064

42. HP 2020 Sustainable Impact Report

43. IBM and the Environment Report 2020. https://www.ibm.com/ibm/environment/annual/IBMEnvReport_2020.pdf

44. Apple Environmental Progress Report 2021, https://www.apple.com/environment/pdf/Apple_Environmental_Progress_Report_2021.pdf

45. Apple Environmental Progress Report 2021, https://www.apple.com/environment/pdf/Apple_Environmental_Progress_Report_2021.pdf

46. Sony Sustainability Report 2021. https://www.sony.com/en/SonyInfo/csr/library/reports/SustainabilityReport2021_E.pdf

47. https://www.canada.ca/en/shared-services/corporate/publications/2021-22-departmental-plan/supplementary-tables/departmental-sustainable-development-strategy-2020-23.html

48. Microsoft 2020 Sustainability Report. www.microsoft.com/en-us/corporate-responsibility/sustainability/report#primaryR4

49. Samsung Electronics Sustainability Report 2021. https://images.samsung.com/is/content/samsung/assets/global/our-values/resource/2021_Sustainability_Report.pdf

50. https://www.ibm.com/ibm/environment/products/energystar.shtml

51. HP Sustainable Impact Report 2020. https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c07539064

**Electronics Product
Stewardship Canada**

About EPSC

EPSC represents the interests of electronics manufacturers for innovation in enhanced end-of-life solutions for electronic products in Canada.

EPSC members have shown environmental leadership by working with stakeholders to create effective environmental stewardship programs across Canada, by investing in design improvements to their products and processes, and by establishing standards for the responsible handling of end-of life electronics.

Responsible electronics manufacturers are members of EPSC:

Board Members
- Apple Canada Inc.
- Canon Canada Inc.
- Cisco Systems Canada Inc.
- Dell Canada Inc.
- HP Canada Co.
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- Samsung Electronics Canada Inc.
- Sony North America
- TCL North America

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Sustainability Reports from EPSC members can be found at www.epsc.ca