Microsoft

Devices Sustainability at Microsoft

Fiscal Year 2019

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1 Introduction and our sustainability approach

Message from Panos

Products are a reflection of the people who make them and the people who use them. It's why as a team we put our heart and soul into building products that are of the highest quality and experience and why we continually push to reduce the impact our products have on the planet. As we grow our Devices business, we're also growing our efforts to use more renewable resources, hold suppliers to higher ethical and labor standards, and reduce our carbon footprint. We know these are big goals, but the passion and commitment of our customers and our team have driven incredible results year over year including the highlights you see below:

- We exceeded our **2020 target for packaging recyclability** of ≥80 percent by 7.6 percentage points.
- Microsoft certified 825,000 CarbonNeutral® Xbox consoles. We are the **first company to certify carbon neutral gaming consoles**.
- Microsoft Devices set a **Science Based Target for Scope 3 carbon reductions to be achieved by 2030**.

Knowing how important it is to our customers and our planet to make great products that serve our global communities, we are committed to providing transparency about the sustainability of our devices. In this report, we make our sustainability policies, challenges, and practices clear and available to everyone through the Microsoft Corporate and Social Responsibility Reports Hub.

How we relate to each other and our understanding of our customers and the world around us are all a part of the passion and drive that goes into our products. Looking forward, the passion you all have for sustainability will help us push these efforts even further in the modularity, repairability, and recyclability of our devices, in helping advance our supplier's energy efficiency, and in broader efforts to help us build a responsible supply chain.

Thank you for grabbing an oar and continuing to work towards a more sustainable future.

Panos Panay
Chief Product Officer

Panos Panay
Corporate Vice President, Microsoft Devices

GRI STANDARDS DISCLOSURE: 102-14

Devices sustainability innovation and highlights: FY19

Microsoft Devices has a longstanding commitment to increase the sustainability of our products and supply chain. Our mission to empower every person and every organization on the planet to achieve more, pushes us to create technologies that can positively impact people, communities, and organizations. Microsoft Devices designs, manufactures, and sells Surface computers, Xbox gaming and entertainment consoles, other intelligent devices, and related accessories. Through our direct efforts and partnerships, Microsoft Devices' sustainability performance progressed in FY19 in the areas of environmental and social responsibility, ethics, and innovation.

3 GOOD HEALTH AND WELL-BEING

2018 World's Most Ethical Companies

2019 WORLD'S MOST ETHICAL COMPANIES® WWW.ETHISPHERE.COM

TOP3 Leading Companies

RESPONSIBLE sourcing network

TOP2 Leading Companies
- Workers voice

TOP3 Leading Companies
- Commitment and governance

TOP3 Leading Companies
- Remedy

KNOWTHECHAIN

Microsoft Devices product safety management system received letter of assurance from a third-party independent reviewer that it conforms to ISO 10377-2013

5 GENDER EQUALITY

100%
New Suppliers
screened using social accountability criteria

Workers' Voice Hotline Extended to:
153 Factories in FY19

6 CLEAN WATER AND SANITATION

Ensured appropriate testing and availability of safe drinking water at factories

Increased water-use efficiency of factories in Tier 1 suppliers

Implemented water balancing and provided support to suppliers to achieve local water consumption standards

@77%

Engaged hardware suppliers in **Carbon Disclosure Project (CDP)** Water Security questionnaire with 77% of suppliers responding

7 AFFORDABLE AND CLEAN ENERGY

401,238 kWh

The Microsoft-sponsored solar panel system at its largest supplier generated 401,238 kWh of energy

Used advanced voltage reduction technology to improve energy efficiency of our Xbox consoles

8 DECENT WORK AND ECONOMIC GROWTH

pact

Continued partnership with Pact

to end child labor in tin and cobalt mines located in the Democratic Republic of Congo (DRC)

Delivered capability-building programs to 21 suppliers in Taiwan to improve factory labor management in mitigating human trafficking and forced labor

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

JUST capital

#1 Most environmentally friendly company

RESPONSIBLE sourcing network

#1 in Conflict Minerals reporting

Application Software category

ISO 14001-certified

Extended scope of environmental management system to include design and development of devices and Irish operations

Transparency at the design stage

Evolved product design tools to quantify the environmental impacts and end-of-life costs of design decision, including material selection.

Safer chemicals methodology

Used GreenScreen® for Safer Chemicals methodology to assess chemicals used in Microsoft products for chemical hazards and to identify safer alternatives

92% Paper/fiber-based packaging used

7.6% Margin recyclable packaging target surpassed

We exceeded our packaging 2020 end-of-life target of ≥80% recyclable by 7.6%
Australian Packaging Covenant Organisation (APCO) 2019 Annual Report

APCO AUSTRALIAN PACKAGING COVENANT ORGANISATION 2019 Annual Report

- Leadership in packaging sustainability: **ADVANCED**
- Outcomes leading to direct improvement in packaging sustainability: **BEYOND BEST PRACTICE**
- Operations for improving packaging sustainability: **LEADING**

SmartWay U.S. Environmental Protection Agency

2018 SmartWay Excellence Award

EPA's highest recognition for demonstrated leadership in freight supply chain energy and environmental performance

13 CLIMATE ACTION

Microsoft earns A List for Climate and Water

Science-Based Targets

Climate advocates

Of the 83% of Devices hardware suppliers that responded to the Microsoft CDP survey to provide information on their greenhouse gas (GHG) emissions, 33% reported having set a **Science-Based Target to reduce their GHG emissions**

2018 SEAL Business Sustainability Award for Organizational Impact

Celebrating leadership and commitment to sustainable business practices

Microsoft recognized as a leader at the Wal-Mart Supplier Summit for setting a SMART GHG goal, sharing it publicly, and reporting avoided emissions in the most recent reporting year

Scope 3 carbon reduction target set

Microsoft Devices set a Scope 3 carbon intensity target to be achieved by 2030

825K certified CarbonNeutral® Xbox consoles

We are the first company to use a combined investment in energy-efficient design, renewable energy credits, and carbon offsets to mitigate the estimated GHGs associated with the complete lifecycle[1] of gaming consoles

Customized packaging reduces carbon emissions

We launched specially designed bulk packaging for our commercial partners. This packaging is tailored to the specific needs of this important channel and is significantly lighter than conventional packaging, using fewer materials and reducing carbon emissions due to distribution efficiencies

14 LIFE BELOW WATER

Focused on water management

Our audit program confirmed supplier water management programs include:

Water monitoring
Water conservation
Wastewater treatment
Water contamination prevention

[1]*Lifecycle emissions are calculated using a third-party-certified lifecycle assessment (LCA). Learn more in the Sustainability Product Lifecycle section of this report.*

3.8M lbs recycled

In 2018, we redirected 3.8M lbs from landfill by recycling e-waste

RANKED

#6

Corporate Responsibility Magazine's 100 Best Corporate Citizens 2019

GLOBALLY RANKED

Sixth

Forbes 2018 World's Most Reputable Companies for Corporate Responsibility 2018

302 Environmental regulations reviewed

for relevance to the Microsoft Devices supply chain worldwide

For more information on our alignment with these goals in our commitment to sustainability, see the UN Sustainable Development Goals (SDGs) section of this report.

Microsoft Devices value chain sustainability

Microsoft Devices integrates sustainability into our business strategy across our value chain. This sustainability report follows our product lifecycle and covers the period of July 1, 2018 through June 30, 2019 (FY19).

Our Sustainability Approach

Sustainable Product Lifecycle

Raw Materials Sourcing

Responsible Sourcing and Manufacturing

Sustainable Packaging and Distribution

The Customer Use Phase

End-of-Life Management

The Microsoft Devices organization

The mission of Microsoft Devices (Devices) is to build extraordinary products that create and complete magical experiences to empower every person and organization to achieve more. The division is responsible for the ideation, compliance, design, development, sourcing, manufacturing, packaging, and distribution of the company's hardware, packaging, and related software products. Functionally organized within the Experiences and Devices business, we operate in more than 100 countries. Panos Panay, Microsoft Chief Product Officer, leads Devices and is the executive sponsor of our sustainability programs.

Our sustainability programs are designed and managed by a wide span of experts—industrial designers, environmental sustainability specialists, regulatory program managers, product and packaging engineers, manufacturing managers, sourcing category managers, distribution program managers, policy experts, attorneys, auditors, sustainability reporting and communications experts, our suppliers, and others. In FY19, the Safety, Compliance, and Sustainability (SCS) organization supported their efforts. SCS's mission is to enable Microsoft access to markets by ensuring flawless product compliance while promoting our company values through ethical sourcing, safety, and sustainability.

GRI STANDARD DISCLOSURES: 102-1, 102-2, 102-3, 102-4, 102-9, 102-10, 102-18, 102-46

Governance

The Regulatory and Public Policy Committee of the Microsoft Board of Directors has oversight authority over regulatory and citizenship issues, including Devices sustainability.

Scale of the organization

Total number of employees in Microsoft Devices organization	Total number of directly contracted Devices supplier facilities	Number of different products shipped in FY19 (Surface devices, gaming consoles, augmented reality products, and accessories)
2,503	**423**	**89***

*Excluding variants and SKU bundles

Our sustainability approach

Our commitment to sustainability

In Devices, sustainability is key to our mission and at the core of how we do business. We use the word "sustainability" in its broadest sense reflecting our people, values, and intention to address the environmental, social, and economic needs of all people, and encompassing all the programs that support these aspirations.

In April 2019, Brad Smith, Microsoft's President, announced steps the company is taking to "do more" to reduce its carbon footprint, noting that "we'll continue to keep our house in order and improve it, while increasingly addressing sustainability challenges around the globe by engaging our strongest assets as a company—our employees and our technologies."

To anchor these efforts, we embed sustainability requirements directly into the roles, responsibilities, and business practices of the Devices organization and partners. We ensure our teams and suppliers meet our requirements and aspirations through active engagement. We also collaborate with non-governmental organizations (NGOs) and industry associations to address broader sustainability challenges facing the electronics and other industry sectors.

GRI STANDARDS DISCLOSURE: 102-12, 102-16

Devices' Environmental Principles

Conserve, reuse, and recycle.
Where feasible, we conserve natural resources through the procurement and use of recycled and renewable materials, efficient use of energy, repair and refurbishing products, and participation in product recycling programs.

Reduction and disposal of wastes.
At our facilities, we reduce and, where possible, eliminate waste through the reuse of materials, source reduction, and recycling. All waste is handled and disposed of through safe and environmentally responsible methods.

Sustainable products.
Our environmental policies and practices aim to protect, conserve, and sustain the world's natural resources, as well as our customers and the communities in which we live and operate. We use Microsoft digital technology to increase our environmental sustainability. Our products and services also enable our customers to protect and conserve natural resources.

Continually improve our performance.
We set objectives and targets to ensure continuous improvement in our environmental performance and management systems. We value employee contributions to our initiatives. We regularly review aspects of our business activities and assess our programs, practices, and goals to evaluate our progress. We proactively manage environmental risks and opportunities to identify areas where further improvements can be made. We collaborate with our suppliers to ensure that they share the same level of commitment to the continuous improvement of their environmental performance.

Responsible sourcing of raw materials.
We are committed to the responsible sourcing of raw materials as stated in our Responsible Sourcing of Raw Materials policy. By collaborating with people, industry groups, and NGOs, we strive to establish responsible practices in the harvesting and extraction of raw materials used in our products.

Demonstrate responsibility to our stakeholders.
We engage our stakeholders concerning our objectives and targets, and we periodically communicate our progress to our Board, shareholders, customers, and members of the public.

The principles and frameworks we follow

Our principles are shaped and guided by objective recommendations, frameworks, and standards published by leading international organizations and experts.

Microsoft sustainability principles

Microsoft Environmental Sustainability Commitment

Microsoft focuses environmental sustainability work in the six areas where we believe we can have the greatest positive impact—carbon, energy, water, ecosystems, packaging, and product lifecycle.

Microsoft Global Human Rights Statement

Our commitment to human rights is consistent with the United Nations Guiding Principles (UNGPs) on Business and Human Rights and guides our supplier Social and Environmental Accountability (SEA) programs.

Microsoft Supplier Code of Conduct

Devices expects its suppliers to embrace our Standards of Business Conduct, which is our corporate framework for guiding employee ethics and integrity, by complying with and training their employees on the Microsoft Supplier Code of Conduct.

Microsoft Responsible Sourcing of Raw Materials policy

Adopted in FY14, this policy formalizes our values and approach to responsible upstream sourcing at the far reaches of our supply chain.

Microsoft Devices Product Safety Principles

Product safety, quality, and ease of use are cornerstones for all Microsoft products. Our goal is to provide quality products that are safe for their intended use. Our dedication to product safety is inherent to our business.

UN Sustainable Development Goals

Our commitment to sustainability is in line with current global initiatives. The 2016 Sustainable Development Goals (SDGs)—accepted by the UN General Assembly (193 nations)—call for several bold breakthroughs by the year 2030 across 17 goals aimed at improving people's quality of life, protecting the environment, and fostering equitable growth. To implement the 2030 agenda for sustainable development, a robust follow-up and review mechanism was developed and submitted for adoption by the United Nations Statistical Commission at its 48th session in March 2017.

Our industry is an essential enabler of all 17 SDGs and more than half of the 232 SDG indicators. Devices has an important role in ensuring we deliver solutions that accelerate this transformation.

Digital solutions for 21st century challenges

Improve people's quality of life

Digital solutions provide better access to education for 450 million people.

Foster equitable growth

Digital solutions could generate over $11 trillion in economic benefits per year by 2030.

Protect the environment

Digital solutions can enable a 20 percent reduction of global carbon dioxide equivalent (CO_2e) emissions by 2030.[2]

Our FY19 contribution toward achieving the UN Sustainability Goals

This table (available for download) highlights some of our contributions in FY19 to the SDGs and the ways that we are creating shared value. By focusing on value creation, we can grow our business and innovate while solving environmental and social problems.

[2] *smarter2030.gesi.org/*

UN Global Compact

Microsoft endorsed the UN Global Compact (UNGC) in 2006. The UNGC is a voluntary initiative that seeks to advance universal principles on human rights, labor, environment, and anticorruption through the active engagement of the corporate community, and in cooperation with civil society and representatives of organized labor. Over a decade later, Microsoft remains firmly committed to the 10 principles underlying the UNGC. Each year, we communicate the progress we have made in meeting the UNGC principles.

Global Reporting Initiative

Microsoft Devices also follows the Global Reporting Initiative (GRI) Sustainability Reporting Standards for empowering sustainable strategies. The GRI Standards provide a set of internationally recognized indicators covering social, economic, and environmental impacts. This standardized reporting framework originated from a collaboration of experts representing stakeholders from business, labor, investors, NGOs, accountancy, academia, and other groups.

We seek to adopt sustainable practices and integrate sustainability disclosures, as supported by the GRI Standards, into our core ways of working. FY19 Devices programs and activities are mapped to the GRI Standards for transparency and credibility across our wide range of stakeholder groups. Relevance is determined by analyzing the material aspects of our operations. (For more information, see the Materiality assessment section of this report.) For detailed GRI Standards referenced in this report, please download our GRI Standards Index.

Integrating SDGs, Global Compact principles, and GRI in our reporting

The linkages between the GRI Standards and Sector Disclosures and the relevant SDG indicators were analyzed and published by the GRI, the UNGC, and the World Business Council for Sustainable Development (WBCSD).[3] We have used this guidance to map our FY19 contributions to the SDGs and our FY19 GRI Standards disclosures throughout this report using the SDG icons and GRI disclosure references.

Example:

GRI STANDARDS DISCLOSURE: 308-1, 408-1

For more information on our contributions to the SDG indicators, please download our SDG table.

[3] *SDG Compass: Linking the SDGs and GRI. SDG Compass: Linking the SDGs and GRI*

Our compliance model

Our compliance model provides an end-to-end system for managing the myriad of cross-jurisdictional legal and market requirements and voluntary measures related to Devices sustainability and integrating them into our business operations. The model follows the International Organization for Standardization (ISO) management systems approach, including ISO's requirement for continual improvement. Our interpretation of continual improvement applies a growth mindset approach to our sustainability thinking.

Requirements

Managing the regulatory complexity presented by a global and multichannel supply chain requires a proactive approach. Experts assess emerging global trends, proposed regulations, policies, and stakeholder expectations in the areas of energy, labor rights, environmental compliance, health, product safety, and other requirements. To stay abreast of these developments, we use a variety of information sources:

- Subscriptions to regulatory tracking services
- Trainings and conferences
- Technical laboratories
- Trade and technical journals and newsletters
- Stakeholder consultations
- Meetings with professionals within government, industry, and NGOs
- Expert consultants
- Agency resources

As our product portfolio, global markets, and social purposes expand, a growing range of regulations apply. Using leading international regulatory product databases, we monitor emerging worldwide environmental and other regulations and ensure the continued market access and compliance of Microsoft Devices hardware, packaging, and related services.

Specifications

Digitized and centralized specifications, operating controls, and management programs enable diverse disciplines to easily integrate complex sustainability requirements into routine business processes. These documents are key to continuously assessing our products and establish clear roles for suppliers and internal stakeholders. Revisions are controlled via a workflow management tool. Certain specifications are published on Microsoft.com for easy access by our stakeholders.

Documentation

Product Engineering, Strategic Sourcing, Certifications, Product Safety, and Environmental Compliance teams collect and maintain comprehensive supplier, product testing, and certification documentation. Microsoft collects full material declarations and test reports from its supply base to ensure every part used in a Microsoft product complies with Microsoft materials restrictions and current regulations before the product is shipped to customers. To ensure ongoing compliance during production, we conduct annual validation testing on a range of devices and packaging.

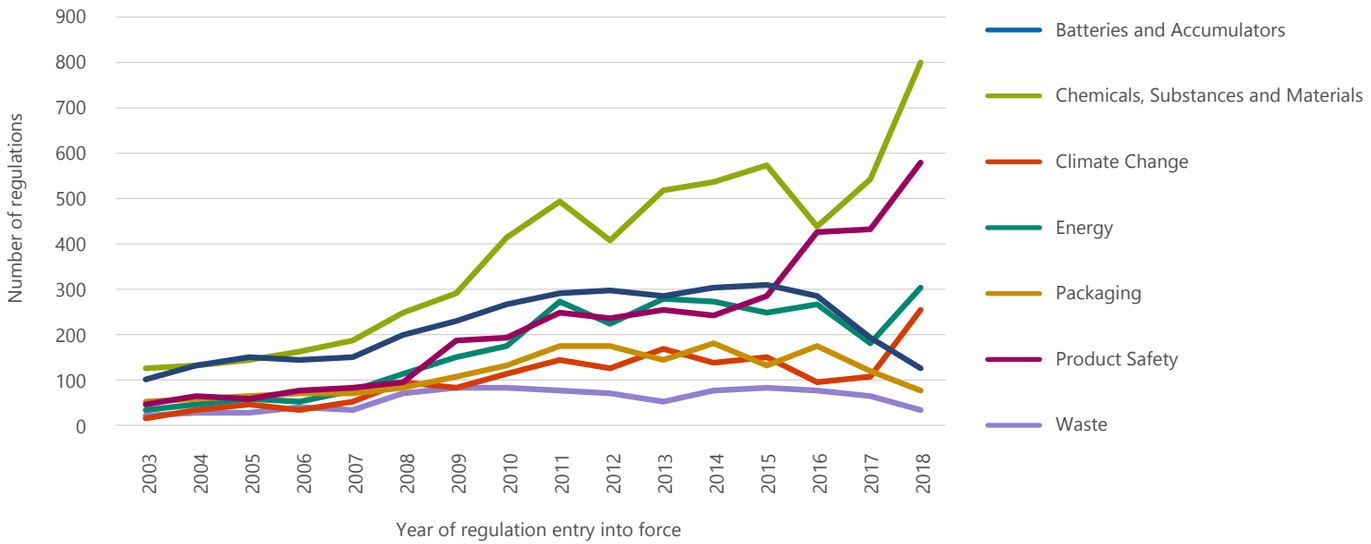
Assurance and monitoring

Our sustainability assurance and monitoring system includes auditing and certifying the quality of our management systems to the ISO 9001, 14001, and 17025 standards and conformance to the ISO 10377 guidance. In addition, Devices implements a comprehensive SEA auditing program. This program collects and analyzes data from our suppliers and performs on-site audits to assess their performance based on our specifications. Assurance and monitoring include product testing for safety and restricted substances.

GRI STANDARDS DISCLOSURE: 307-1, 416-2, 417-1

Staying ahead of product regulations in FY19

Trends in new environmental and product safety regulations by selected topics and calendar year of entry into force



515
Total new product regulations

302
Regulations reviewed in FY19 by our SCS team

136
Regulations found applicable to Devices' products

See page 16 for sources.

Our strong foundation

Knowledgeable technical experts, digital technology, and documented processes are foundational to our operating model. Devices uses in-house experts in energy, product safety, occupational health and safety, environmental compliance, sustainability, human rights, multiple engineering disciplines, supplier labor, and supplier health and safety. These experts partner with each other throughout our value chain.

Tools and technology enabling supply chain sustainability

Technology enables efficiency and transparency in our secure and collaborative Modern Workplace and enables us to accurately address complexity, scope, and scale. Interacting with our partners through our technology platforms builds trust and a shared understanding of information. Our platforms allow business decision makers to consume real-time information and make optimal sustainability-related decisions using mature and robust sustainability models.

Compliance Model	The compliance model is supported by Microsoft 365 and other tools, and key metrics are automatically reported and tracked through multiple configurable Power BI dashboards hosted on Microsoft Azure. Employees can access the most recent and relevant qualitative and quantitative compliance performance metrics. All documentation is available through an Office 365 SharePoint site that is configured for document control.
Supply chain risk analysis and mitigation	Power BI dashboards provide a 360-degree view of our most important supply chain metrics in one place, updated in real time. This visibility has transformed how we embed compliance and sustainability into our business and is a significant component of our supply chain management. Microsoft Power BI enables efficiency and transparency in our work and helps us scale and manage inherent complexity in managing supply chains. Business decision makers can consume real-time information and make optimal decisions to help us achieve our mission. In the raw materials sourcing portion of our supply chain, we use Power BI dataset layering to view associated risks geographically. In FY19, we published an online Responsible Sourcing nonconformance data Power BI dashboard for stakeholders to access nonconformance information about our supply chain. This resource offers stakeholders credible and accessible information customized to their needs. 
Audit Management System	To monitor and evaluate the social and environmental performance of our suppliers, we use an Audit Management System (AMS) built using Microsoft technologies and tools, including Visual Studio, Visual Studio Team Services, the Microsoft .NET Framework, Azure SQL Database, and Azure Blob Storage, hosted on Microsoft Azure. Combining Power BI with the AMS gives SCS, Manufacturing, and Strategic Sourcing the ability to harness greater insights into the data through modern data visualizations and simple report authoring. The AMS enables our SEA program to address supplier complexity across hundreds of factories through quick access to business intelligence regarding current and historical SEA audit information. Users can upload, manage, and flexibly extract data about multiple suppliers from “one source of truth” and initiate workflows to manage follow-up and resolve corrective actions.

Online supplier training platform	The SEA Academy online platform complements our existing supplier SEA programs and establishes a scalable system for capability-building training and related communication to Microsoft suppliers and internal stakeholders. The platform was developed using Java hosted on Microsoft Azure. The platform includes PC and mobile versions accessible by Microsoft internal stakeholders, supplier, and factory users, and it includes training modules, a resource center, access to best practices, Workers' Voice Hotline case management, survey capabilities, linkage to FAQs and Q&As, and our AMS. For more information, see the Building our suppliers' capabilities: The SEA Academy section of this report.
Regulatory compliance	Digital technology enables Devices to manage complex product datasets and workflows. Our suppliers provide the material composition for each device and packaging component—now for more than 100,000 components. We use smart technology to evaluate this data for restricted substance compliance, track and eliminate substances, and inform our voluntary efforts. This process is a gating item during new product development. This technology is hosted on Azure. To drive consistent practices in all product development programs, product engineers and SCS use Microsoft Access database management with a Microsoft SharePoint user interface, providing a security-enhanced repository to track project schedules and other related project content. The system provides a single-point management tool for consistency in communicating and referencing project progress, allowing greater understanding of resources by project and business line, people workloads, and strategic touch points.
Factory of the Future	We have deployed a "smart building" system at a major Microsoft supplier that helps the supplier more efficiently manage the energy used for heating, ventilation, and air conditioning (HVAC). This system uses sensors, Azure hosting, the Azure IoT Hub, and Power BI to collect and analyze data enabling a facility's HVAC engineers to understand what aspects of their systems require maintenance or calibration.

Management system for environmental sustainability

All significant Devices operating locations are ISO 14001 certified. ISO 14001 is an internationally recognized framework that establishes a process for entities to manage and continuously improve their environmental performance. Through ISO 14001, our customers and other stakeholders receive objective assurance that Devices responsibly manages the environmental compliance and impacts of our devices and packaging. Additional positive business outcomes include ease of entry to markets, measurable cost savings through reduced waste generation, more efficient energy use, less resource consumption, and reduced risk. In the fall of 2017, we were audited and certified to the revised standard of ISO 14001:2015 with zero major findings. Additionally, the Microsoft Surface Design and Development, and Microsoft Ireland facility, were successfully added to our ISO 14001 certificate.

To continuously improve, we use Environmental Management System (EMS) audit results data contained in the AMS system to create a Power BI dashboard to track progress against our corrective and preventive actions. We also educate employees about the EMS programs.

FY19 EMS program results:

EMS programs and objectives	Targets	FY19 Results
Energy consumption Reduce CO_2e emissions	Increase CDP supplier response rate for calendar year 2018 (CY18).	• There was a three percentage point increase in response rate in CY18. • Began a cross-functional Safety, Compliance, and Sustainability Workgroup to focus on increasing response rates.
	Third-party verified Scope 3 CO_2e footprint.	Each year, we've worked to improve accuracy of our Scope 3 footprint. In FY19, we worked with a consultant to quantify Devices' Scope 3 carbon footprint and set a CO_2e reduction target, and we expanded the scope of our product lifecycle analyses.
	Complete initial Scope 3 CO_2e inventory for product transportation by end of calendar year 2019 (CY19).	Tracking to completion with information from Sourcing and Logistics. Data used to track Microsoft products across the globe, from factory to customer, is leveraged to more accurately model transportation emissions.
	Develop Microsoft's first carbon neutral product by end of FY19.	Objective completed.
	Roadmap for the reduction of energy use in factories by end of FY19.	The objective is 75% complete.

EMS programs and objectives	Targets	FY19 Results
Device recycling Minimize environmental impacts of Devices	Determine and document the % recyclability of ICT and Xbox products and their packaging by end of H1.	The objective is 50% complete.
	Develop repairability metric for Surface products in partnership with Design for Repairability.	The objective is 80% complete.
	Increase trend of product returned (collected) relative to product placed on market using CY16 as the starting point.	Objective completed.
	Increase trend on metric tons of product collected for refurbishment globally using CY16 as the starting point.	Objective completed.
Packaging design 2020 Plan to minimize environmental impact of product packaging	10% reduction in total packaging (design) weight by end of CY20, with baseline as FY17.	To meet these targets, Microsoft is: • Building and implementing a comprehensive measurement and tracking system for packaging sustainability. • Incorporating baseline metrics across all Microsoft structural packaging configurations. • Implementing scorecards for new packaging designs.
	Set year-over-year (YOY) targets of 4% improvement vs. prior year.	
	Measurement from new design spec, not actual tonnage. YOY design comparison.	
	For all paper in aggregate, >70% post-consumer recycled content by weight by end of CY20 (YOY targets of 63% by FY18, 67% by FY19, and 70% by FY20).	
	By end of CY20, the average actual product-to-package ratio across all in market designs is >40%, and no single design lower than 8%.	
Waste Minimize waste from direct operations	Form a Zero Waste Work Group at the Microsoft Redmond and Ireland campuses.	Zero Waste Work Group formed at both the Redmond and Ireland facilities.
	Conduct audits of recycling and solid waste management practices at these sites.	U.S. audit completed in March 2019. Ireland audit scheduled for September 2019.

EMS programs and objectives	Targets	FY19 Results
Devices raw materials Establish a Responsible Sourcing of Raw Materials (RSRM) program for Devices	Publish cobalt supply chain results by end of FY19.	To reach these targets, Microsoft is: • Finalizing a strategy and system to understand and investigate source of materials. • Implementing risk identification and mitigation strategies for cobalt and disclose results. • Developing training for new requirements for key directly contracted suppliers. • Strengthening existing relationships and developing new partnerships across supply chain. • Expanding external disclosure of risks identified, results, and progress across programs. • Supporting Ecodesign and Resource Efficiency program for prioritized raw materials. • Continuing to update our prioritized material matrix with updated risks and minerals.
	Publish risk map for all prioritized materials by end of FY19.	
Devices Ecodesign Minimize environmental impacts of design and use of Microsoft Devices products	Complete Eco profiles for all new major devices launched in FY19 by end of FY19.	Objective completed.
	Register Surface Pro (2017), Surface Book 2 15", Surface Book 2 13", Surface Go, and any other existing eligible devices to EPEAT Computers and Displays (2018) category.	Objective completed.
	Register any eligible new Surface products that launch in FY19 to EPEAT 2018 computer category.	Objective completed.
	Provide training to rest of Environmental Compliance team on use of the Ecodesign checklist. Communicate to all product GMs legislative trends and emerging standards related to Ecodesign, repairability, and recyclability.	Objective completed.
	Expand Ecodesign program to include one new product other than Surface computers.	Objective completed.
	Develop an Ecodesign checklist based on the EPEAT Computers and Displays (2018) category standard per product type and and train Environmental Compliance team project leads on its use.	Objective completed.

Our stakeholders

Our stakeholders are passionate about the sustainability of our devices and ongoing efforts to solve social and environmental issues in our value chain. We welcome the challenge of meeting what can be divergent needs.

GRI STANDARDS DISCLOSURE: 102-42, 102-43

One of our most important stakeholders, Microsoft employees are critical to the program's success and committed to continuously improving product and operational sustainability.

How our employees impact sustainability

Development and New Product Introduction (NPI)

- Design repairability, reliability, and recyclability into our devices
- Reduce energy consumption, volume, and weight of products and packaging
- Use least hazardous substances, and recycled/recyclable materials
- Promote research and education

Strategic sourcing

- Enforce Supplier Code of Conduct and compliance
- Hold suppliers accountable to meet SEA specifications
- Source more benign and conflict-free materials

Manufacturing

- Enforce environmental health and safety, labor, and ethics requirements for suppliers
- Focus on management of water, greenhouse gases, hazardous substances, emissions, and waste

Packaging, logistics and distribution

- Develop compact products and packaging for palletization efficiency
- Introduce eco-friendly packaging materials
- Use carbon-efficient distribution models

Quality repair and refurbishment

- Build high-quality devices to reduce waste
- Recycle product and reuse raw materials
- Promote refurbishment programs
- Refurbish failed or returned products

Communications with stakeholders

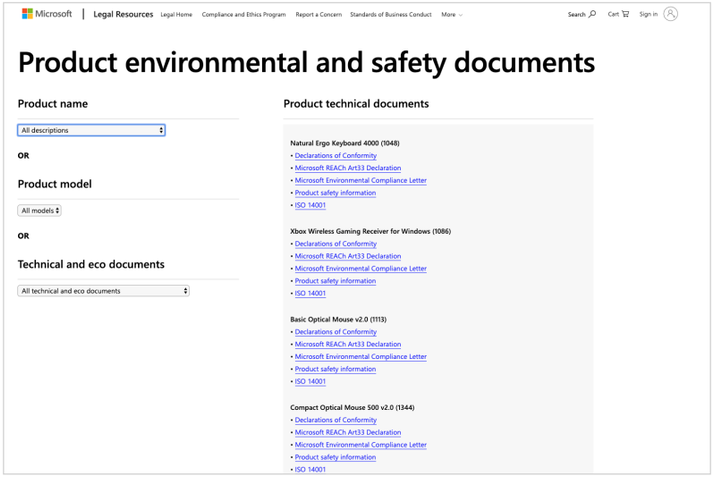
Credible and respectful communication is foundational. A variety of external stakeholders contact Devices for information about our products and programs. We also partner with Investor Relations; Corporate, External, and Legal Affairs (CELA); Marketing; industry organizations; and NGOs to respond to information requests. We strive to be transparent, direct, and personal.

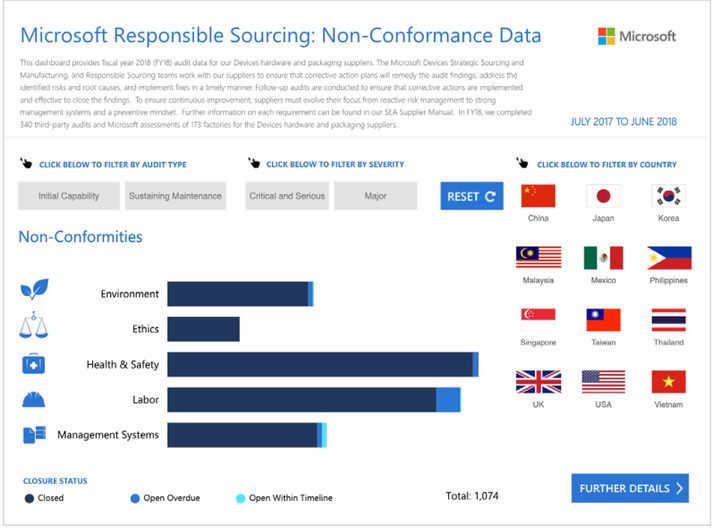
In FY19, we continued to streamline our online resources to enable stakeholders to more easily access sustainability information about our products by establishing a universal footer on the Microsoft web pages linking to a self-service portal. Information related to environmental compliance is available at microsoft.com/en-us/legal/compliance/environmental-compliance. Responsible Sourcing information is available at microsoft.com/en-us/responsible-sourcing. This year, we also added a section on frequently asked questions (FAQs) to the environmental compliance web pages, allowing our stakeholders to easily find answers to common questions.

In addition, we substantially increased our customer and stakeholder focus by enabling the reverse lookup of product documentation by model number and material aspect.

In FY19, we also published an external interactive Power BI dashboard to enable increased transparency of our supply chain. The digital dashboard enables stakeholders to access nonconformance information by country, severity, section, and closure status, with regular updates for timely information. This dashboard is unique in the industry and highlights our commitment to empower others through our technology.

GRI STANDARDS DISCLOSURE: 102-44





Stakeholder partnerships

Microsoft is dedicated to building the capabilities of and partnering with NGOs and cross-industry sectors.

Our partnerships offer diverse points of view that challenge our ambitions and raise our thinking.

GRI STANDARDS DISCLOSURE: 102-13, 102-40

Partnerships for sustainability

	Partner	What we have achieved through this partnership
E-waste Solutions Alliance for Africa	Alliance (E-waste Solutions Alliance for Africa) is an industry group that collaborates with governments in Africa to create or expand sustainable framework policies and long-term solutions for end-of-life product management.	The Nigerian government, Global Environment Facility (GEF), and UN Environment have joined the Alliance to launch a $15 million investment to create a formal e-waste recycling industry in Nigeria. The partnership was convened on the World Economic Forum's Platform for Accelerating the Circular Economy during January 2019.
ALLIANCE FOR RESPONSIBLE MINING FAIRMINED	Alliance for Responsible Mining (ARM) is a global initiative established in 2004, working for the sustainable development of and small-scale mining (ASM).	Microsoft partnered with ARM to help create opportunities for gold miners and provide them with incentives to become economically, technologically, and environmentally viable enterprises in a responsible manner. Microsoft began working with ARM to develop a market-entry standard for artisanal gold miners in conflict and high-risk areas. The standard provides a pathway for stepwise improvements by artisanal miners. Microsoft also partnered with ARM to develop ASM mines' capabilities in Peru to meet the Fairmined standard and increase access to market.
BSR	Business for Social Responsibility (BSR) is a global network of member companies, thought leaders, peers, and stakeholders focused on creating viable sustainability solutions.	HERproject™ was launched in 2011 and implemented in seven Microsoft suppliers, covering 277,381 trainees by the end of FY19. BSR's HERproject™ is a collaborative initiative that strives to empower low-income women working in global supply chains. HERproject™ drives impact for women and business via workplace-based interventions on health, financial inclusion, and gender equality.
CDP DRIVING SUSTAINABLE ECONOMIES	Carbon Disclosure Project (CDP) is an international organization providing a global, standardized system for companies and cities to measure, disclose, manage, and share vital environmental information.	Through disclosing our GHG emissions and supply chain water usage information publicly, we create global transparency, trust, and credibility. CDP also gives us visibility into the environmental performance of our key suppliers, allowing us to track and encourage improvement.

	Partner	What we have achieved through this partnership
Consumer Technology Association™	Consumer Technology Association (CTA) is the trade association representing the US consumer technology industry. CTA supports smart, collaborative approaches to improving electronics recycling and increasing sustainability.	We work with CTA to develop new strategies for consumer product energy efficiency in North America. The CTA has helped ensure that new state energy regulations are harmonized.
DIGITALEUROPE	DIGITALEUROPE is the leading trade association representing digitally transforming industries in Europe. DIGITALEUROPE's call to action, digitalization as key for a sustainable Europe, is for the EU's Strategic Agenda 2019–2024. DIGITALEUROPE believes digital and sustainability should work hand in hand by leveraging digital technologies as key enablers for sustainability while ensuring a sustainable digitalization.	Microsoft works with DIGITALEUROPE to develop new strategies to improve safety and energy efficiency for products in Europe. DIGITALEUROPE represents our industry to work with the European Commission in their development of new regulations.
Electronics Product Stewardship Canada / Recyclage des produits électroniques Canada	Electronics Product Stewardship Canada (EPSC) is the Canadian Environmental trade association. EPSC, founded in 2003, is a not-for-profit, industry-led organization created to design, promote, and implement sustainable solutions for the recycling of end-of-life electronics.	In FY19 we participated in ongoing meetings with Ontario regulators to negotiate the new Ontario WEEE law. This has been a key priority for this trade association.
esa entertainment software association™	Entertainment Software Association (ESA) is the trade association of the video game industry in the U.S. ESA works with Microsoft, Sony, and Nintendo with respect to emerging energy requirements in the U.S. for game consoles. At present, we are on the docket at the California Energy Commission to determine if console energy use should be regulated. The ESA position is that the voluntary agreement now in place in the EU is a useful alternative in California as well. Significant energy savings can be achieved in California through a similar agreement, without the need for further legislation.	Microsoft works with ESA to improve the energy efficiency of game consoles sold in North America.
Game Console Voluntary Agreement	Game Console Voluntary Agreement Steering Committee.	Microsoft collaborates with other manufacturers of video game consoles to set aggressive targets for console energy efficiency.

	Partner	What we have achieved through this partnership
	The Global Battery Alliance seeks to address the high environmental and human costs of battery production, and shift the supply chain to a more circular economy. The global collaboration brings together industry leaders to understand and begin to solve some of the pressing issues facing today's battery supply chains. This project is part of the World Economic Forum's Shaping the Future of Economic Progress, Shaping the Future of Energy, and Shaping the Future of Environment and Natural Resource Security System Initiatives.	Newly onboarded to the Global Battery Alliance in FY19, we will participate in several of the GBA working groups. Through this collaboration we will work with other industry players in creating a path towards more responsible battery supply chains.
	Green Electronics Council (GEC) collaborates to achieve a world in which only sustainable IT products are designed, manufactured, and purchased. Founded initially to manage EPEAT, the leading global ecolabel for IT products, GEC advocates for sustainable IT by helping both manufacturers and large-scale purchasers.	Our involvement in the EPEAT program helps drive sustainability improvements in our products and in the technology sector. In FY19, all our Surface computers were EPEAT Gold rated (2009 computer category) in the U.S. As the EPEAT rating criteria become more rigorous over time, Surface computers are adopting even more sustainability-enhancing features.
	Global Reporting Initiative (GRI) is a nonprofit organization that promotes economic sustainability. It produces one of the world's most prevalent standards for sustainability and corporate social responsibility reporting, the GRI Standards.	We follow the most widely used sustainability reporting framework to enable enhanced transparency and accountability. In FY18, Microsoft supported the development of guidance for reporting related to the responsible sourcing of raw materials.
	IEEE Product Safety Engineering Society (PSES) provides ongoing education for its members, keeping them abreast of the latest tools and techniques for addressing product safety and compliance. We are also active on the PSES Technical Activities Committee, which is a hub for industry collaboration regarding the changing regulatory environment worldwide.	Through our membership with the IEEE PSES, we serve the product safety and regulatory profession and the public by fostering the development and facilitation of knowledge exchange in the disciplines of product safety and compliance engineering. PSES brings us together with the thought leaders, including representatives from many Fortune 500 companies, on product safety, product liability, medical devices, safety regulations, forensics, electromagnetic compatibility, and related fields.
	Information Technology Industry (ITI) Council and its Environmental Policy Committee (EPC) and Regulatory Policy Committee (RPC) provide members with information and the ability to exchange and present views regarding developing regulatory changes around the world.	ITI brings together many of the leading technology companies to help governments around the world to implement more effective safety and environmental regulations. We work with their safety and environmental committees to help ensure a high level of product safety and environmental protection without creating unnecessary barriers that would prevent consumers from being able to buy leading-edge products.

	Partner	What we have achieved through this partnership
IRMA Initiative for Responsible Mining Assurance	Initiative for Responsible Mining Assurance (IRMA) has developed a standard for social and environmental performance and a system that delivers recognition for achievement of benchmarks against that standard. IRMA links investors and private sector purchasers of mined material with mines seeking to lead. The system offers accountability and credibility through multi-stakeholder governance and independent, third-party verification.	Through IRMA we have partnered with multiple stakeholders to implement an independently verifiable, responsible mining assurance system to improve social and environmental performance at the source of minerals used in our products.
IPE Institute of Public & Environmental Affairs 公众环境研究中心	Institute of Public & Environmental Affairs (IPE) is a nonprofit environmental research organization that aims to expand information disclosure to communities on the hazards and risks in their environment, promoting widespread participation in environmental governance.	Through the IPE website, we quickly identify our suppliers' performance on environmental compliance in China. Since May 2006, IPE has provided a pollution database to monitor corporate environmental performance. IPE's aim is to expand environmental information disclosure to allow communities to fully understand the hazards and risks in the surrounding environment, thus promoting widespread public participation in environmental governance. After partnering with IPE, Microsoft has helped more than 80 suppliers to improve their performance on environmental compliance and close related issues.
25th ANNIVERSARY 1993 2018 icphso	International Consumer Product Health and Safety Organization (ICPHSO) is a nonprofit, volunteer-driven, global membership organization dedicated to providing nonpartisan forums for the exchange of ideas and information on health and safety issues related to consumer products.	Through our membership in ICPHSO, Microsoft engages with numerous Fortune 500 companies on best practices involving consumer product safety processes, early insight into proposed consumer product safety legislation, and a network of trade, legal, and regulatory authorities.
International Product Safety and Liability Prevention Association	International Product Safety and Liability Prevention Association (IPSLP) supplies a constant stream of knowledge, current information, and resources to management teams around the world regarding product safety and product liability prevention to help them design and manufacture safer products.	IPSLP helps Microsoft design and manufacture safe products by communicating proposed global product safety and product liability regulations.
ITSCI ITRI TIN SUPPLY CHAIN INITIATIVE	ITRI Tin Supply Chain Initiative (ITSCI) is a joint initiative that assists upstream companies (from mine to the smelter) to institute actions, structures, and processes necessary to conform with the OECD Due Diligence Guidance. The initiative includes small and midsize enterprises, cooperatives, and artisanal mine sites.	Microsoft supports ITSCI, which promotes the understanding of the upstream supply chain from mine to smelter and downstream companies (such as product manufacturers). This initiative currently spans 35 countries and operates at approximately 1,000 mine sites in Burundi, Rwanda, and the DRC, shipping hundreds of tons of minerals per month and involves ~80,000 miners, who in turn provide support for ~375,000 dependents.
OECD	Organization for Economic Co-operation and Development (OECD) is an international economic body of 34 countries dedicated to stimulating economic progress and world trade.	Microsoft utilizes OECD guidance for supply chain due diligence for minerals from conflict-affected and high-risk areas.

	Partner	What we have achieved through this partnership
	Pact is an NGO that provides a process and tool for companies to address child labor in their mineral supply chains.	Microsoft supports a Pact project to eliminate child labor at mining sites in the DRC, specifically in the Manono and Kolwezi regions. Positive results from this year include the establishment of neighborhood committees, which identified 2,000 children working in mine sites and reached more than 5,000 key community stakeholders, families, and children through a range of activities to raise awareness about the risks of child labor in mining and strengthen child protection norms and attitudes.
	Portable Rechargeable Battery Association (PRBA) is a nonprofit trade association that serves as the voice of the rechargeable power industry, representing its members on legislative, regulatory and standards issues at the state, federal, and international level. PRBA hosts an annual meeting and provides reports, newsletters, and other information to keep its members informed of the latest activities and issues affecting the rechargeable power industry.	Microsoft participates in PRBA committees, such as the Portable Battery Committee and Recycling Committee, and attends annual meetings to collaborate on topics related to global transportation, collection, recycling, and labeling of rechargeable batteries.
	Responsible Minerals Initiative (RMI) is the leading industry initiative composed of over 350 companies working toward building a responsible mineral supply chain. The group develops tools and resources, including the Responsible Minerals Assurance Process (RMAP), the Conflict Minerals Reporting Template, Reasonable Country of Origin Inquiry data, and a range of guidance documents on responsible minerals sourcing. RMAP uses an independent, third-party audit process to identify smelters and refiners that have systems in place to ensure sourcing of only conflict-free materials.	Microsoft participates in RMI workgroups, which allows us to influence and collaborate with other major companies using these minerals. We currently participate in 10 of the RMI's working groups, such as the Cobalt Sub-team, the Smelter Disposition Team, the Global Smelter Engagement Team, and the China Smelter Engagement Team. Microsoft leadership was appointed Chair of the Steering Committee for the current year, providing leadership and direction to the organization. Additionally, the company participates in the annual RMI conference. In partnership with RMAP, we were able to increase the number of conformant smelters or refiners (SORs) in our supply chain.
	Responsible Business Alliance (RBA), formerly EICC, is a nonprofit coalition of companies committed to supporting the rights and well-being of workers and communities worldwide affected by the global supply chain.	The Microsoft Supplier Code of Conduct incorporates the RBA Code of Conduct. Microsoft is on the RBA VAP Advisory Group and participates in RBA workgroups. Microsoft also participates in the annual conference.
	Step (Solving the E-Waste Problem) is an international initiative composed of manufacturers, recyclers, academics, governments, and other organizations committed to solving the world's e-waste problem. By providing a forum for discussion among stakeholders, Step is actively sharing information, seeking answers, and implementing solutions.	Microsoft collaborates in the development of global guidelines for the management of end-of-life materials and the promotion of sustainable recycling.

	Partner	What we have achieved through this partnership
SUSTAINABLE PACKAGING COALITION®	Sustainable Packaging Coalition (SPC) is a membership-based collaborative that believes in the power of industry to make packaging more sustainable. It is the leading voice on sustainable packaging and champions packaging that is good for people and the environment.	As a member of SPC for over 10 years, Microsoft plays a leadership role in the SPC Electronics Packaging Committee, focused on the unique packaging challenges faced by the electronic and tech product sector.
wbcsd	World Business Council for Sustainable Development (WBCSD) is a global, CEO-led organization of over 200 leading businesses working together to accelerate the transition to a sustainable world. WBCSD helps make members more successful and sustainable by focusing on the maximum positive impact for shareholders, the environment, and societies. Member companies come from all business sectors and all major economies.	Among other activities with WBCSD, Devices participates in the Factor 10 Project, including the Global Plastic Initiative (GPI). Factor 10 is WBCSD's Circular Economy project. It brings companies together to reinvent how business finds, uses, and disposes of the materials that make up global trade. This platform will help to identify and remove the barriers that exist and create metrics and scalable solutions that businesses all around the world can use.

Materiality assessment

Materiality guides this report's content. We conducted a materiality assessment in FY18 and revisited this work in FY19 to better understand and prioritize our efforts on issues that matter to Devices and our stakeholders. This recommended practice allows us to focus our resources, evolve our strategy, and tailor our sustainability reporting. To conduct the materiality assessment, we took the following steps:

Step 1 – Identify material categories and issues
We conducted a robust analysis of global standards, existing materiality assessments, and stakeholder engagement results to establish a preliminary list of the categories and issues material to our Devices stakeholders.

Step 2 – Identify importance to stakeholders
To identify the issues that matter most, we used information gathered while engaging with and in continual collaboration with our various stakeholder groups. (For more information, see the Partnerships for sustainability table.)

Step 3 – Map importance and impact
The results were mapped on a matrix against each identified issue's impact on our ability to deliver on our strategy based on six criteria: Microsoft's mission, our corporate values, environmental impact, improving lives, product safety, and compliance.

In FY19, we made the following modifications:

- "Non-hazardous waste management" was changed from the Environmental Sustainability category to the Environmental Health & Safety category. This issue is now more in line with how our Devices organization is aligned.
- "Climate change mitigation" and "Lifecycle impacts of products and services" were combined into one issue: Lifecycle impacts of products and services. Last year, our definition for "climate change mitigation" included mitigation related to energy use from company operations and buildings as well as Scope 3 emissions. To focus directly on Devices operations, we included in our definition of the "Lifecycle impacts of products and services" activities that pertain to Scope 3 sources and removed "climate change mitigation" from our materiality map as our Microsoft corporate-level reporting covers this issue.
- We rated accessibility higher in business impact to indicate our complete alignment with the Microsoft corporate mission and increased focus on accessibility in hardware.

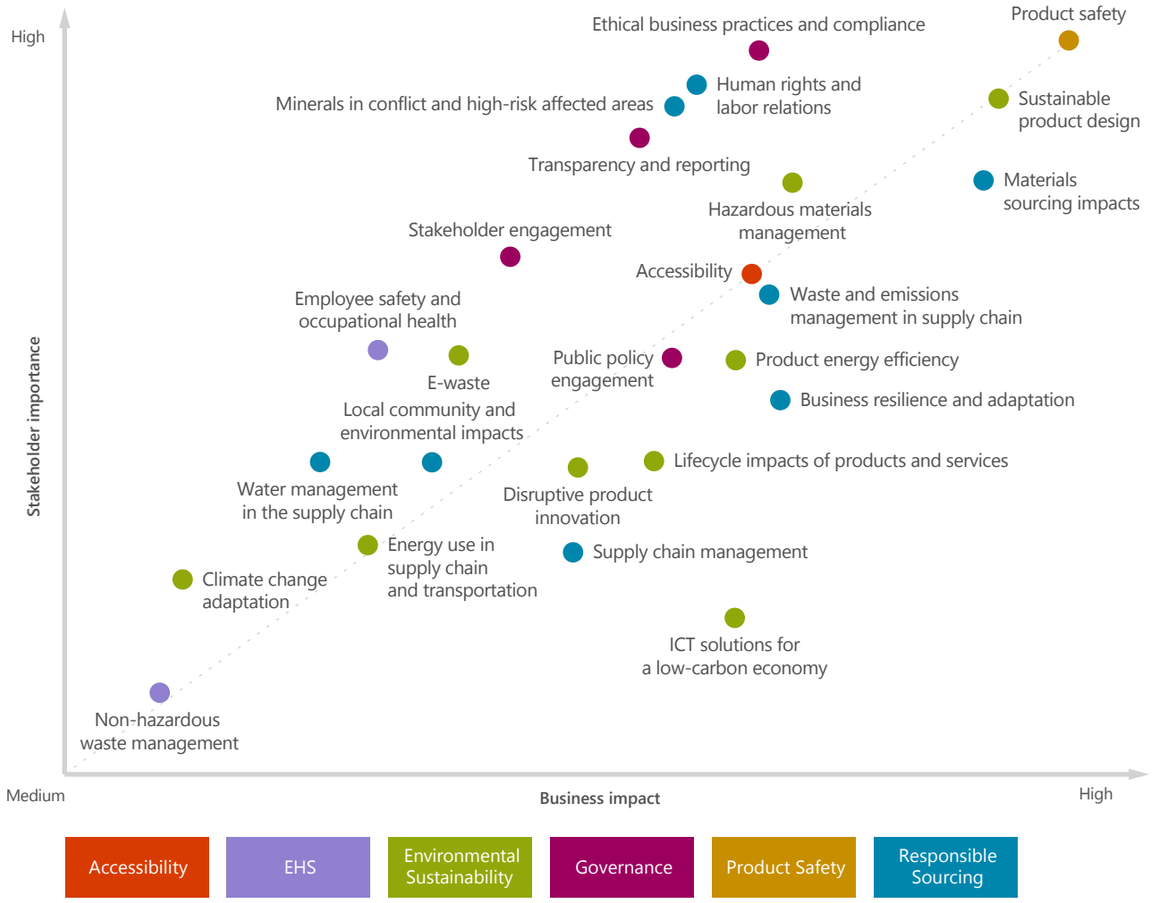
Also, in FY19, we reviewed the industry-specific Sustainability Accounting Standards Board standards for Electronics Manufacturing and Hardware Manufacturers and determined that the material items were covered by our corporate and Devices reporting.

The 10 most material issues to our organization are:

- Product safety
- Sustainable product design
- Ethical business practices and compliance
- Human rights and labor relations in the supply chain
- Minerals in conflict and high-risk areas
- Accessibility
- Transparency and reporting
- Materials sourcing impacts
- Hazardous materials management
- Waste and emissions management in the supply chain

The following chart identifies all material issues and the relative materiality of each issue to the others.

Devices safety, compliance, and sustainability materiality assessment



2 Sustainable product lifecycle

The remainder of this report is organized by our product lifecycle and our efforts to improve sustainability from beginning to end. There is opportunity to reduce resource consumption, manage social impact, and increase sustainability at each lifecycle stage.

A commitment to closing the circularity gap

At Microsoft, we are acting on opportunities to reduce a product's resource use and impacts to people and the environment. Following United Nations (UN) guidance, we analyze the environmental and social impacts of our products and services to guide our programs. We believe that mitigating and eliminating these impacts is critical.

In 2017, worldwide material consumption reached 92.1 billion metric tons, up from 87 billion in 2015 and a 254 percent increase from the 27 billion in 1970, with the rate of extraction accelerating every year since 2000.[4] This consumption is forecast to grow to between 170 and 184 billion tons by 2050.

The Circularity Gap Report 2019[5] describes the global use of materials as not just increasing, but accelerating, absent disruptive change. According to the UN, should the global population reach 9.6 billion by 2050 (a conservative estimate), the equivalent of almost **three planets** could be required to provide the natural resources needed to sustain current lifestyles. This report also indicates that the planet is only 9 percent circular and the trend is negative. The upward trend in resource extraction and GHG emissions is expected to continue. All the key indicators confirm that the problems of a linear economy are "baked in" to the global economy. We are heading in the wrong direction.

[4] *United Nations Department of Economic and Social Affairs (June 2019). un.org/development/desa/undesavoice/more-from-undesa/2019/06/45212.html*

[5] *The Circularity Gap Report 2019. Amsterdam: Circle Economy (2019).*

The following UN Environment diagram[6] best depicts the circular model to which we must transition, where material use is extended or recovered through product reuse, repair, refurbishment, and recycling at end of life. This circular model reduces the dependency on extracting natural resources.

The circular model

Embracing circular economy concepts is a priority for Devices because our technology has a key enabling role to play in protecting the earth. However, electronic waste is an increasing problem and challenge that we must overcome.

As described in *A New Circular Vision for Electronics, Time for a Global Reboot* (2019), nearly 50 million tons of electronic and electrical waste (e-waste) are produced each year, equivalent in weight to all commercial aircraft ever built. Of this e-waste, 20 percent is formally recycled. By 2020, the number of internet-connected devices is projected to grow to between 25 billion to 50 billion. Absent action, the amount of e-waste is expected to more than double by 2050 to 120 million tons annually.[7]

The model we have selected to close our circularity gap is the DISRUPT model as identified in the Circularity Gap Report.

Product Lifecycle, UN Environment

The DISRUPT seven focus areas which enable the circular model, adapted from *The Circularity Gap Report 2019*

D **Design for the future:** Adopt a systemic perspective during the design process, to employ the right materials for appropriate lifetime and extended future use.

I **Incorporate digital technology:** Track and optimize resource use and strengthen connections between supply-chain actors through digital, online platforms and technologies.

S **Sustain and preserve what's already there:** Maintain, repair, and upgrade resources in use to maximize their lifetime and give them a second life through take-back strategies, where applicable.

R **Rethink the business model:** Consider opportunities to create greater value and align incentives through business models that build on the interaction between products and services.

U **Use waste as a resource:** Utilize waste streams as a source of secondary resources and recover waste for reuse and recycling.

P **Prioritize regenerative resources:** Ensure renewable, reusable, non-toxic resources are utilized as materials and energy in an efficient way.

T **Team up to create joint value:** Work together throughout the supply chain, internally within organizations and with the public sector to increase transparency and create shared value.

[6] *Product Lifecycle, UN Environment. lifecycleinitiative.org/starting-life-cycle-thinking/what-is-life-cycle-thinking/*

[7] *New Circular Vision for Electronics, Time for a Global Reboot (2019).*

Product design: The first opportunity to disrupt and address product lifecycle impacts

Designing a sustainable product lifecycle

We initiate our application of the DISRUPT seven focus areas through product design. Reducing or eliminating negative impacts starts with environmentally conscious design. Our Ecodesign initiatives, goals, and objectives primarily cover three focus areas: Ecodesign, product life extension, and resource efficiency.

Designing devices that are reliable, durable, and repairable enables us to extend product lifetime through repair, refurbishment, and reuse. Ecodesign also enables resource efficiency. Resource efficiency means making devices more energy efficient and reducing the use of virgin or nonrenewable materials by using materials that are recycled, recyclable, recoverable, and less toxic to human health and the environment. Resource efficiency also requires us to design out waste.

Our end goals are to have fully reusable and recyclable products and no landfilling of packaging materials. Our strategy to meet these goals requires addressing the environmental impact of products from their ideation through end of life, including:

Selection of materials
- Materials with recycled or bio-based content
- Recyclable and recoverable materials
- Reduction of harmful substances

Energy efficiency (product and power supply)

Product longevity
- Durability
- Repairability and refurbishment, including availability and cost of repair and spare parts
- Upgradeability

Parts harvesting and reusability

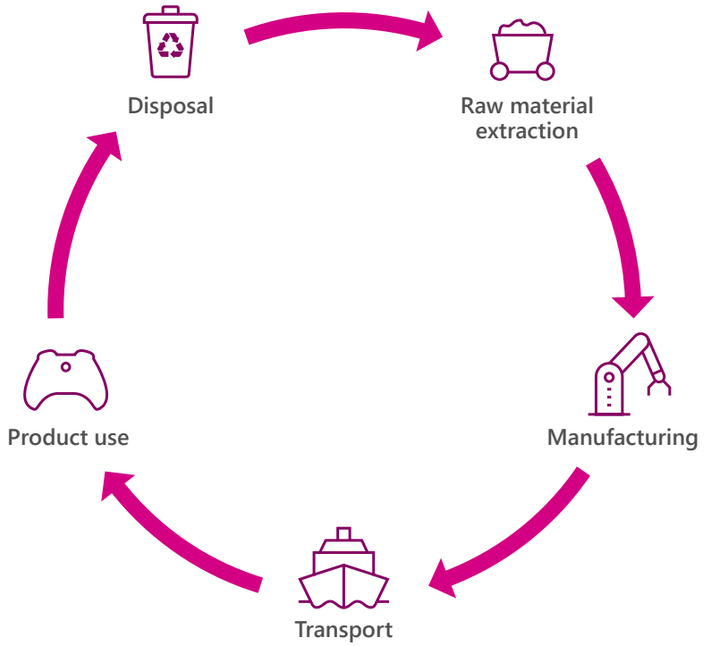
Reduced weight/volume of product
- Mass/volume reduction, bulk packaging

Manufacturing
- Socially responsible supply chain: labor, OHS
- Energy use; renewable energy
- Pollution controls
- Reduction of harmful substances

We use an Ecodesign checklist, containing 60 elements, that must be considered early in the design phase and development process for all new products and packaging. Progress against targets are closely tracked and rated using points within the checklist for every new product. Decisions regarding the use of environmentally preferable materials, product design, and manufacturing processes have implications including feasibility, cost, product reliability, sales, and brand reputation.

This year, incorporating digital technology, we commissioned new software that can quantify and make visible to designers the environmental impacts and end-of-life costs of their design decisions and material selection. Understanding the environmental and end-of-life financial implications during the design phase is critical to making immediate impactful change.

All three focus areas of this program have a synergistic effect. In the following sections, we will discuss each of these key areas.



Lifecycle assessments

We use lifecycle assessments (LCAs) to evaluate and reduce the systemic environmental impacts of our hardware products. Product environmental LCA is a science-based method that calculates the environmental impacts of all activities involved in extracting raw materials and producing, using, transporting, and disposing of a product throughout its lifecycle.

The LCA calculation is performed using GaBi digital technology—a software tool that runs on the Windows platform. Our calculations are based on an LCA in accordance with ISO 14040 and ISO 14044 standards, complemented by ETSI TS 103 199 and ITU-T L.1410. These calculations include extraction of raw materials, upstream materials preparation, electronic component manufacturing, subassembly manufacturing and assembly, final assembly, distribution to customer, product use, and end-of-life treatment. Our LCA results represent our best understanding of a product's lifecycle environmental impacts at the time of LCA publication. LCAs are revised, as needed, to accommodate changes in methodology. We are working toward expanding the scope of our LCAs to include all our hardware.

In pursuit of greater transparency in communications with our customers and other stakeholders, we publish environmental data, including LCA results, for our consumer device lines, including the Xbox console and Surface devices in our Eco Profiles. These Eco Profiles provide GHG emissions in carbon dioxide equivalents (CO_2e) and nonrenewable energy use over the lifetime of a product and identify the product's material usage, energy consumption, ecolabels, product recycling, and other environmental attributes.

Ecolabels

Microsoft is an EPEAT Participating Manufacturer. The EPEAT Computers and Displays (2018) category was recently revised to include more stringent criteria than the 2009 computer category—which our Surface devices met at the Gold level. Surface Pro 5, Surface Pro 6, Surface Book 2, and Surface Go were registered at the Bronze level[8] in the EPEAT 2018 computer category. These ratings are used by customers to make purchasing decisions based on product environmental and social attributes. In FY19, we took major steps toward meeting the higher tier requirements of the 2018 EPEAT standard for future product releases.

We also measure and communicate the sustainability of our products through other environmental leadership programs, standards, and ecolabels, such as ENERGY STAR®, and a voluntary agreement for gaming consoles (Self-regulatory Initiative to Further Improve the Energy Efficiency of Games Consoles, Version 2.5). All Surface computers are ENERGY STAR certified in the U.S.

In China, commercial SKUs of Surface Pro 5, Surface Pro 6, Surface Book 2, Surface Go, Surface Laptop, Surface Laptop 2, and Surface Studio 2 are registered with the China Certification of Environmental Labelling (CCEL) ecolabel.

[8] EPEAT registered in the U.S.

Substance management

We proactively evaluate and phase out substances of concern from our products when feasible and environmentally preferable alternative materials are available. Exercising strict substance management increases the commodity value of e-waste, promoting its use as a secondary resource through recovery and recycling (the "U" in DISRUPT).

By partnering with suppliers and other key stakeholders, best practices for substance management are adopted and promoted. Our substance management program approach extends beyond product design to systemically encompass all aspects of the supply chain from process chemicals used in factories to substances contained in our products and packaging. Compliance is monitored through testing and auditing of factory controls.

GreenScreen® materials used in products

We are also working to replace substances of concern with safer alternatives through the use of GreenScreen for Safer Chemicals. GreenScreen for Safer Chemicals is a method for assessing the inherent hazards of chemicals and their potential effect on human health and the environment. We use this methodology to support product design and material selection. Our goal is to meet sustainability standards, scorecards, and ecolabel requirements.

Restricted substances specification

Our Restricted Substances for Hardware specification (H00594) is publicly available and sets our supply chain requirements to restrict substances of concern in our products and packaging, and during the manufacturing process. When we restrict a substance, we can quickly identify the components containing the substance along with the related suppliers by simply searching our database of supplier material declarations. Our restricted substances specification is updated annually to reflect legislative developments and our research concerning chemicals' potential impacts on health and the environment.

Meeting health and environmental regulatory requirements is only a minimum baseline for Microsoft devices. Our approach to restricting substances from our products and packaging is science based and follows the precautionary principle to human health or the environment. As a result, our restrictions may be more stringent than regulatory requirements, when appropriate, based on this principle. We also work with third-party toxicologists during the design phase to ensure that our restricted substances specifications reflect current thinking.

These proactive practices may lead Microsoft to phase out substances of concern in advance of regulatory restriction. For example, Microsoft phased out four phthalates from its products in 2011, which were later restricted by the European Union Restriction of Hazardous Substances Directive (RoHS) in July 2019.

Lead, mercury, cadmium, hexavalent chromium, PBBs and PBDEs, and specific phthalates

We phased these substances out of our products in conformance with the RoHS Directive and established stricter Microsoft requirements for cadmium.

Halogenated flame retardants

We have restricted and limited many halogenated flame retardants as specified in our restricted substances specification. We require that suppliers meet legal requirements and voluntary restrictions for many halogenated flame retardants in certain applications.

Nickel

All our devices comply with strict global safety and quality standards. Some metal alloys used on product surfaces, such as stainless steel, contain nickel, but standardized testing has shown that these alloys do not cause nickel sensitivity in the general population. We use nickel at levels well within current legal and safety limits. We offer a wide range of devices without stainless steel surfaces as well.

Phthalates

The use of certain phthalates in our products has been restricted since 2005. We now restrict the use of a broad set of phthalates in all our products, including those referenced in the RoHS Directive, EU Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH regulation), and the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). These restrictions apply to all suppliers regardless of product destination.

GRI STANDARDS DISCLOSURE: 102-11

Testing products and packaging

We proactively submit our products for independent, third-party testing during the development and manufacturing stages to verify supplier declarations related to restricted substances. We test every product line prior to customer distribution to ensure compliance with RoHS, the EU Packaging Directive, the EU Battery Directive, and the strict Microsoft requirements, such as those for phthalates and nickel. The tests are conducted in a third-party ISO 17025-qualified laboratory.

We also test products during sustaining manufacturing, which annually monitors the compliance of the products placed on the market until the products' end of life. In the past 10 years, we have tested over 297 products and issued over 1,700 test reports.

Restricted substances control audit

Conformance to our restricted substances specifications throughout our supply chain is our priority. We verify our supplier conformance to our specifications through the restricted substances control audit program. This program provides the opportunity to connect with our suppliers directly to increase their control system capabilities by answering questions and offering training. The audit checklist covers end-to-end incoming and outgoing processes, including supplier management, material management, manufacturing process management, traceability system, testing system, and ozone-depleting chemicals (ODCs) management. The audit focuses on factories in China where most of our suppliers are located. In FY19, we conducted 129 audits, covering assembly, molding, enclosure, and electrical suppliers.

We analyze our findings monthly, communicating results to the suppliers and our management. Through our analyses, we look at trends to identify training needs and additional partnering requirements. In FY19, our findings indicated that suppliers could improve their identification of high-risk processes or procedures with respect to using ODCs, and their implementation of reaction plans should the use of ODCs be discovered.

We strengthened our requirements in this area and shared the requirements in a supplier environmental compliance forum in June 2019. We also trained suppliers on the related ODC specifications and compliance documentation. Through this in-person forum, we also had the opportunity to exchange views and experiences with the suppliers and answer their questions.

Material efficiency

Microsoft continues to reduce its use of virgin materials and prioritize the use of regenerative resources through design and to increase the recycled and recyclable content of materials used in our packaging and products. To understand where opportunities exist, we completed an analysis of the plastics and metals used in the Xbox and Surface devices. We analyzed the materials and substances found in a representative Xbox, including the console, controller, and cables, and a representative Surface computer, including the device, batteries, and power supply. The metals found in the greatest quantity were steel, iron, copper, magnesium, and aluminum. Also found in notable quantities were cobalt, manganese, nickel, chromium, tin, lithium, and zinc.

Plastics in our products also pose opportunities for using recycled content. The challenge we face is qualifying recycled plastics that meet our safety and durability specifications.

Device	Plastics weight (g)
Surface Book 2 15 inch	44.88
Surface Laptop	118.20
Surface Pro 5	17.50
Xbox One S	815.80
Xbox One X	856.01

Increasing recycled content not only reduces our reliance on virgin, nonrenewable materials, but it also reduces Microsoft products' environmental impact. For more information on the recycled content of our packaging, see the Sustainable packaging and distribution section of this report.

Greenhouse gases

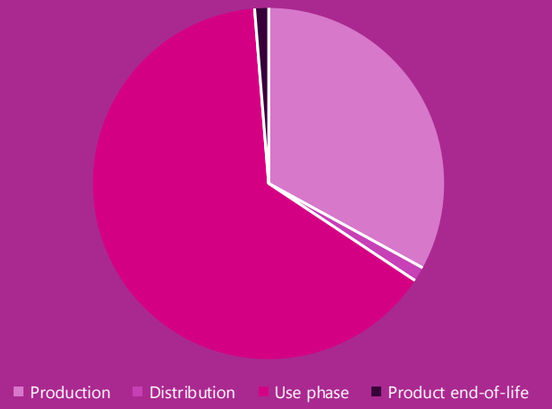
Climate change is a serious challenge that requires a comprehensive and global response from all sectors of society. Increasing GHGs and the resulting climate change have a direct and adverse impact on all the UN Sustainable Development Goals. Microsoft reports annually our Scope 1, 2, and 3 carbon emissions, corporate climate change policy, GHG reduction targets, energy and renewable energy usage, total CO_2e emissions from operations, emissions reduction targets, and progress toward these targets to the Carbon Disclosure Project (CDP).

Included in our report are the carbon emissions due to the lifecycle of Microsoft Devices products which contribute to Microsoft's overall Scope 3 GHG emissions. The chart shown demonstrates the breakdown of the Devices' overall product-related Scope 3 emissions split into the various lifecycle phases. Some of this data is generated from our LCAs, and other data is estimated using broad-based assumptions. Each year, we work to improve the accuracy of our emissions calculations using new technology and tools.

With our improved methodology and in recognition of the importance of Scope 3 emissions, this year, Devices set a target to reduce these emissions. Our Science Based Target is to reduce Scope 3 GHG emissions by 30 percent per unit of revenue by 2030 from a 2017 base year, and to avoid growth in absolute Scope 3 emissions. We have a comprehensive action plan to meet this target described in this section.

As seen in this chart, the largest contributor to our product-related emissions is associated with the energy used during the product's lifetime. This calculation differs substantially based on product line. Our strategy is to improve product energy efficiency through design, software, and technology-specific projects. (For more information about product energy efficiency achievements, see the Creating more energy efficient devices section of this report.)

Proportion of CO_2e emissions by lifecycle phase



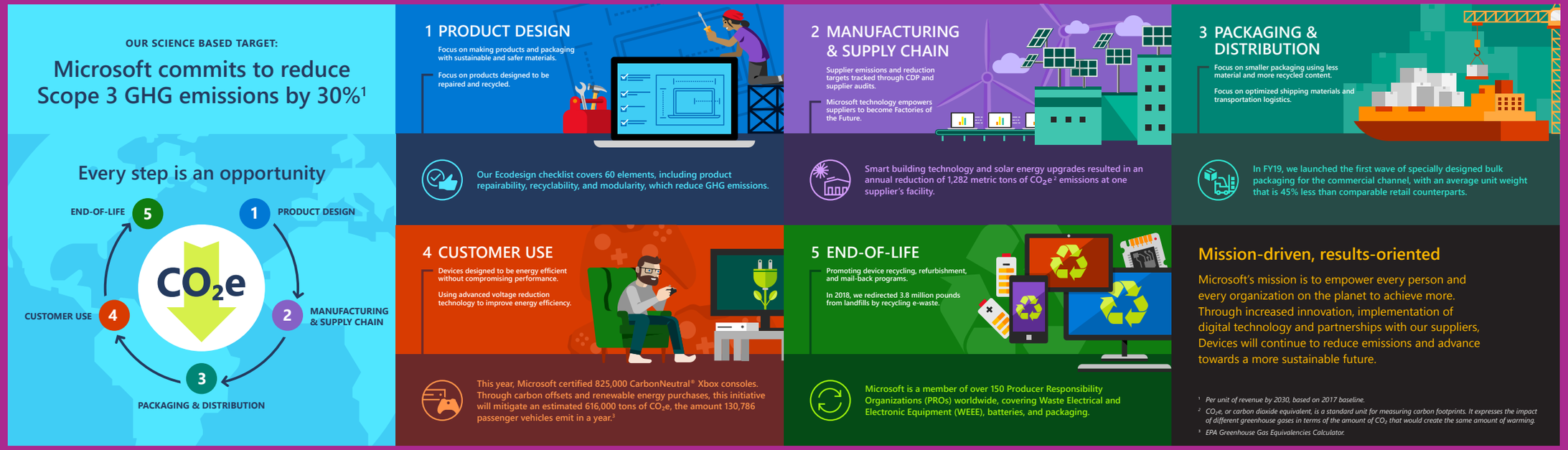
In particular, transitioning from console-based to cloud-based gaming is an example of technology enabling carbon reduction through improved energy efficiency due to datacenter-sharing and managing resources more effectively.

In addition to energy efficiency improvements, to further reduce Xbox One X carbon emissions, Microsoft will be using a combination of renewable energy certificates (RECs) and high-quality carbon offsets to mitigate the estimated GHGs associated with the complete product lifecycle[9] of 825,000 consoles and obtaining a CarbonNeutral® certification.[10] This project is estimated to save about 616,000 tons of CO_2e, equivalent to 130,786 passenger vehicles driven for one year.[11]

We also launched the first wave of specially designed bulk packaging for the commercial channel, which is significantly lighter, uses less materials, and reduces carbon emissions during product distribution than the previous commercial packaging. These packaging improvements will reduce carbon emissions during the product lifecycle. (For more information, see the Sustainable packaging and distribution section of this report.)

For more about how Microsoft software and technologies are enabling our customers to reduce their carbon footprint, see The customer use phase section of this report. Through increased innovation and implementation of our digital technology and partnerships with our suppliers, we will reduce our Scope 3 carbon emissions and will be reporting on our progress.

CERTIFIED CARBON NEUTRAL product | a service of NATURAL CAPITAL PARTNERS



[9] Lifecycle emissions are calculated using a third-party-certified LCA. [10] Third-party certification. carbonneutral.com [11] EPA Greenhouse Gas Equivalencies Calculator. epa.gov/energy/greenhouse-gas-equivalencies-calculator

Design for repair

We continually strive to extend the useful life of our products with designs that enable repair and refurbishment. To accomplish this goal, we team up across the organization to create joint value throughout the design phase to promote designs that enable repair while maintaining our high bar for safety, quality, innovation, and functionality. We develop and qualify the processes, tools, and equipment used to execute quality repairs as well as enable reuse of quality materials in the event a device is not suitable for repair. Our objective is to deploy these resources globally to deliver customer satisfaction, minimize waste, and maximize product life.

To learn more, see the End-of-life management section of this report.

Environmental health and safety during design

Our design-related Environmental Health and Safety (EHS) programs begin at the design phase and continue through product end of life—protecting Devices employees at each stage of the process. The programs are designed to:

- Establish a means of communication with stakeholders on EHS-related matters.
- Ensure compliance with all applicable laws.
- Advise and make recommendations on workplace safety and environmental compliance.

In FY19, our primary focus was to conduct EHS assessments of the Devices laboratories. The purpose of these assessments was to ensure that working conditions are safe and compliant for all Devices employees. This effort led to zero lost time injuries for Devices employees and zero penalties or fines from EHS regulatory agencies that regulate Devices laboratories.

GRI STANDARDS DISCLOSURE: 403-2

3 Raw materials sourcing

Increasing the sustainability of our upstream supply chain

- Prioritized mineral updates
- Cobalt due diligence and results
- Wood update

Charting a path to responsible batteries

Leveraging partnerships for positive change

- Pact
- ARM
- Initiative for Responsible Mining Assurance

Microsoft Devices is committed to increasing the sustainability of our upstream supply chain at its furthest reaches. In 2014, we adopted the Microsoft Responsible Sourcing of Raw Materials policy (RSRM policy) to guide our programs and approaches. The RSRM policy extends our Supplier Code of Conduct to raw materials extraction and harvesting processes in support of human rights, labor, health and safety, environmental protection, and business ethics. This policy covers all minerals and materials used in our devices and packaging irrespective of their country of origin.

Increasing the sustainability of our upstream supply chain

Since adopting this policy, the Microsoft Devices RSRM program has evolved to encompass additional materials, processes, and partnerships. We view our work as a journey to continuously drive sustainability into every product we introduce and sell to our customers. While we continue to iterate on past success and learnings, we remain committed to a growth mindset, constantly finding ways to improve our programs and products.

We follow international standards and norms. The related RSRM programs are framed by the five steps of the Organization for Economic Cooperation and Development (OECD) Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas (OECD Guidance) and the UN Guiding Principles on Human Rights. As a baseline, Microsoft has implemented RSRM requirements aligned to the OECD Due Diligence Guidelines in our Microsoft Supplier Social and Environmental Accountability Manual (Supplier Manual).

These requirements are applicable to all raw materials, including “conflict minerals” and cobalt. The requirements are publicly available in our Microsoft Supplier Manual and incorporated into our direct contracts with suppliers. Directly contracted suppliers also commit to passing the due diligence requirements to their sub-tier suppliers. Third-party audits are conducted to assure supplier and subcontractor conformance. Microsoft auditors in China and Southeast Asia are trained on these requirements.

Where our influence diminishes due to several indirect tiers of the supply chain, we continue to further our RSRM commitment by engaging in strategic partnerships with NGOs and various industry sectors. This portion of our RSRM program is critical because Devices does not directly contract to purchase raw materials.

Prioritized mineral updates

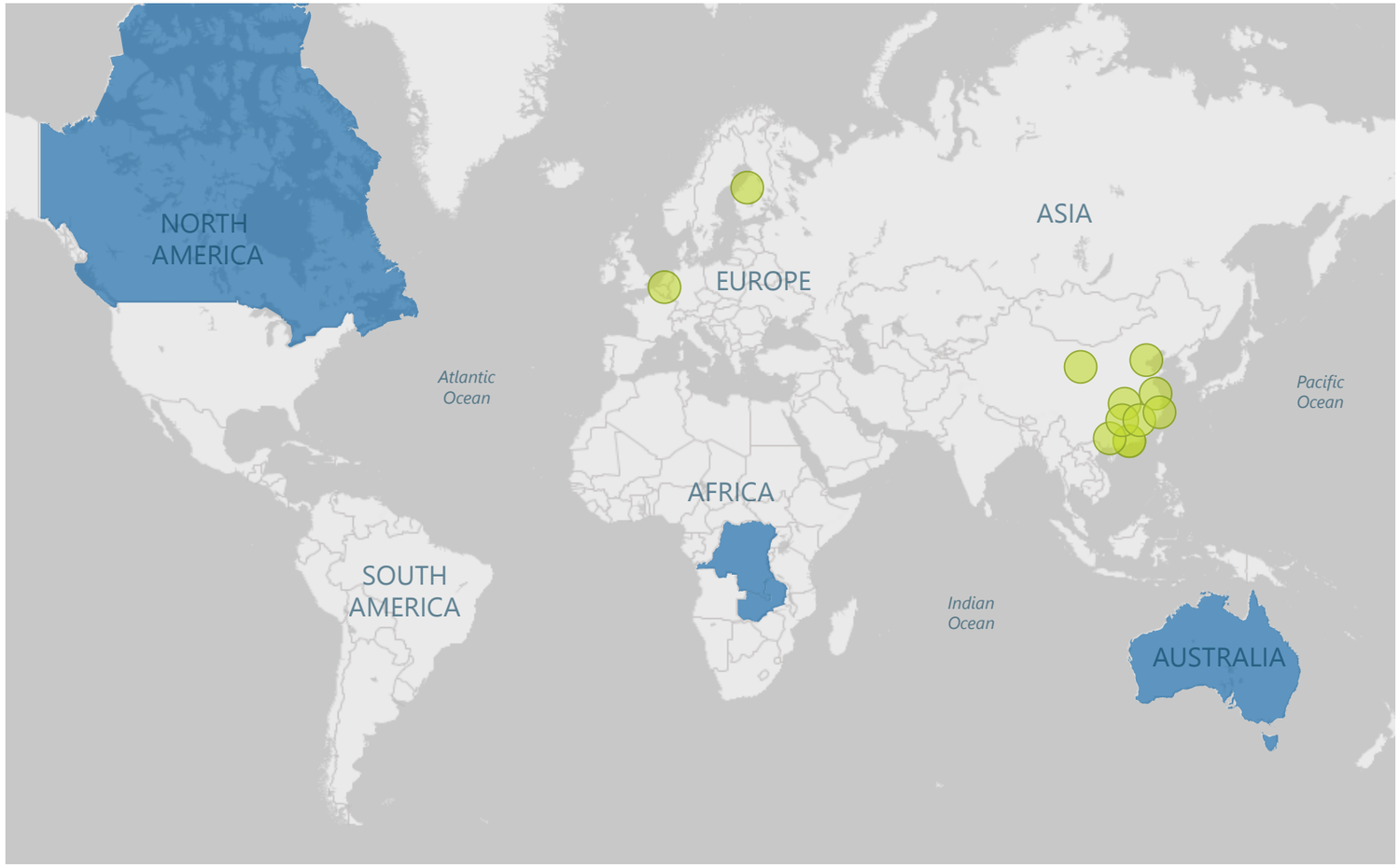
In FY18, we prioritized the application of our RSRM program to specific minerals in our supply chain identified as critical components of our products with high social or environmental risks. This year, we added lithium as a priority material. In addition to the information regarding priority materials in the following tables, please see our Microsoft Conflict Minerals Report for a complete update on our conflict minerals programs regarding tin, tantalum, tungsten, and gold.

Mineral	Risk	FY19 Goals	FY19 Updates	FY20 Goals
Aluminum 	Aluminum production may impact human health through pollution and improper treatment of by-product. The mining and refining process may also release substantial GHG emissions, including perfluorocarbon (PFC) emissions.	Pilot project to increase use of recycled product and explore partnerships to determine possible underreported risks in aluminum supply chains in China.	Internal cross-functional teams are working to understand the feasibility of recycled aluminum with many of our products and are looking for more initiatives to increase the production efficiency of material usage. We continue to seek opportunities to leverage our technology to improve aluminum supply chains.	Continue to explore recycled content opportunities and partnerships within the industry. Internal teams are collaborating to scope recycling initiatives across our products and materials.
Cobalt 	Cobalt is associated with social, environmental, and health and safety risks in the DRC, including, but not limited to, child labor, forced labor, bribery, corruption, indirect support of conflict, community exposure to contaminations, and unsafe working conditions.	Implement RMAP for cobalt smelters and refiners, grow on-the-ground remediation efforts, identify opportunities for continuous improvement in supply chain, and grow supplier capabilities.	Microsoft is currently working within industry groups to identify refiners and understand if they are RMAP compliant. We are in year two of a three-year commitment working with Pact on projects for on-the-ground remediation efforts for child labor in cobalt mines. Additionally, we are working with our directly contracted battery suppliers to build their capabilities through training and engagement.	We continue to engage and develop our partnership with Pact, with a goal of increasing project sustainability and refining success metrics. Additionally, we are expanding our work in cobalt to a broader battery supply chain initiative, detailed further in this report.
Copper 	Copper mining in many regions is associated with risks to ecosystems and communities, because of demands for water and mine site pollution. In addition, industrial mining in Peru has been a source of social conflict.	Identify opportunities to increase recycled content and explore partnerships with the copper industry.	Internal cross-functional teams are collaborating to understand the feasibility of recycled copper in our products and looking for more opportunities to increase the production efficiency of material usage.	We will continue to explore recycled content and other materials for substitution that may be more sustainable in our products. We will also seek broader engagement with large-scale mines involved with copper production.

Mineral	Risk	FY19 Goals	FY19 Updates	FY20 Goals
Gold 	Gold mining is associated with mercury pollution, unsafe and poor working conditions, and armed conflicts. In China, it is associated with heavy metal contamination and ecological risks.	Grow partnership with ARM to bring sustainably sourced artisanal gold to larger markets, and drive nonconformant smelters, especially in China, to conformance.	We continue to work with ARM on gold projects in Peru and provide feedback and support to build the organization's capabilities and the Fairmined Standard. We are also participating in the RMI China smelter engagement team and the gold smelter engagement team to drive nonconformant smelters to conformance.	Grow partnership with ARM, with a goal of establishing program sustainability. Continue to drive smelter conformance and integrate RMAP conformance status into our internal supplier management tools to increase efficiency of these engagements.
Lithium 	Lithium is associated with high water consumption in exceptionally arid environments. Issues over water and land use in major lithium-producing areas have also led to conflict with indigenous and local communities.	Newly added for FY20.	Newly added for FY20.	As part of our expanded responsible battery initiative, we have integrated lithium into our prioritized materials. In FY20, we will begin to map the lithium supply chain and seek an appropriate NGO or industry trade organization partner for on-the-ground sustainability interventions in major lithium-producing areas.
Magnesium 	Magnesium (Mg) is associated with high CO_2e emissions and toxicity.	Continue to map magnesium supply chain, identify opportunities for improvement at Mg raw material suppliers, implement grievance hotline at key suppliers, and pursue opportunities to further reduce process waste. Learn more in our FY19 magnesium story.	We have mapped our Mg supply chain down to the Tier 2, but further mapping and verification is required. Additionally, we have implemented a grievance hotline, which is available to workers at certain magnesium-related suppliers within our supply chain. Since FY17, we have been working closely with our Mg suppliers to mitigate the safety-related risks and waste impact generated in the process. We have co-created innovative techniques to minimize the waste and implement safer handling. Learn more in the Increasing safety and efficiency in handling of magnesium and coolant wastes section of this report.	Based on our initial success with targeted suppliers, we will continue to assess further waste reduction opportunities for implementation at additional suppliers outside of the initial waste-reduction project scope.

Mineral	Risk	FY19 Goals	FY19 Updates	FY20 Goals
Tantalum 	Tantalum production is associated with armed conflict in the DRC.	Ensure tantalum smelters/refiners remain at 100% conformance to the RMAP standard.	Microsoft is an active participant in the smelter engagement team within the RMI. Through our engagements we have maintained 100% conformance but will continue our improvement efforts.	Ensure smelters/refiners remain at 100% RMAP conformance. We will also work to integrate RMAP conformance status into our internal supplier management tools to increase efficiency of these engagements.
Tin 	Tin mining in Indonesia is associated with environmental degradation and poor/unsafe working conditions; in China, producers were shut down for failure to meet environmental compliance standards. Myanmar also has a growing number of high-risk operations.	Develop further best practices in Indonesia, explore partner opportunities in Myanmar, and drive nonconformant smelters to conformance.	Microsoft is actively working in the RMI's tin working group, driving best practices and collaborating with the group on projects in Indonesia. We are also working on the smelter engagement team to continue to drive smelters to conformance.	We will continue our participation within the RMI tin working group and smelter engagement team. We will also work to integrate RMI's Responsible Mineral Assurance Process (RMAP) conformance status for tin smelters into our internal supplier management tools to increase efficiency of these engagements.
Tungsten 	Tungsten production is associated with conflict in the DRC.	Drive tungsten smelters/refiners to 100% conformance to the RMAP standard.	Microsoft is an active participant in the smelter engagement team within the RMI. Through our engagements we have achieved 98% conformance, with one remaining smelter in the Active status in the RMAP.	Continue to drive smelters/refiners to 100% conformance. We will also work to integrate RMAP conformance status for tungsten smelters into our internal supplier management tools to increase efficiency of these engagements.

Cobalt due diligence and results



Microsoft is committed to continually improve our supplier due diligence and capability-building efforts to drive change and accountability regarding cobalt mining and use. Since FY18, we have worked with our directly contracted battery suppliers to survey their contracted sub-tier suppliers to identify cobalt smelters. In FY19, we updated the survey and improved our data collection.

Cobalt smelters and countries of origin

By the end of FY19, our active battery cell suppliers identified 12 confirmed cobalt smelters located in Belgium, Finland, and China. The cobalt smelters, locations, and audit status are listed in the following table. The cobalt countries of origin are Australia, Canada, Democratic Republic of the Congo, and Zambia. We are determining if one additional reported entity is a cobalt smelter.

Standard smelter name	CID	City	State	Country	Audit status
Freeport Cobalt Oy	CID003226	Kokkola	Keski-Pohjanmaa	Finland	Active
Ganzhou Yi Hao Umicore Industry Co.	CID003227	Ganzhou	Jiangxi	China	In communication
Ganzhou Tengyuan Cobalt New Material Co., Ltd.	CID003212	Ganzhou	Jiangxi	China	In communication
Gem (Jiangsu) Cobalt Industry Co., Ltd.	CID0003209	Taixing	Jiangsu	China	Outreach required
Jiangxi Jiangwu Cobalt industrial Co., Ltd.	CID003377	Ganzhou	Jiangxi	China	Outreach required
Jingmen GEM Co., Ltd.	CID003378	Jingmen	Hubei	China	Outreach required
Lanzhou Jinchuan Advanced Materials Technology Co., Ltd.	CID003210	Lanzhou	Gansu	China	Outreach required
Quzhou Huayou Cobalt New Material Co., Ltd.	CID003255	Quzhou	Zhejiang	China	Outreach required
Tianjin Maolian Science & Technology Co., Ltd.	CID003215	Tianjin	Tianjin	China	Outreach required
Umicore Olen	CID003228	Olen	Antwerpen	Belgium	Conformant
Zhejiang Huayou Cobalt Co., Ltd.	CID003225	Tongxiang	Zhejiang	China	Outreach required
Zhuhai Kelixin Metal Materials Co., Ltd.	CID003211	Zhuhai	Guangdong	China	Outreach required

Microsoft is an active member of the RMI smelter engagement team where we work to increase RMAP participation of smelters used by our direct suppliers. Additionally, any smelters reported by our suppliers that are not active or conformant to the RMAP are managed through our supplier non-conformance process to ensure that the smelter is either removed from our supply chain or participates in the RMAP.

Wood update

Paper products derived from wood are a resource supported by a relatively mature sustainability structure. Microsoft relies on global standards for sustainable forested wood products and established markets for recycled paper. In line with our overall sustainability goals and efforts to minimize environmental impacts, we continue to assess the sustainable sourcing of paper-based materials, including the use of "certified" materials such as Forest Stewardship Council (FSC) and Pan European Forestry Council (PEFC) chain of custody. We currently require our packaging suppliers to adhere to Microsoft packaging specifications for using legal and well-managed forest sources. In addition, we require our suppliers to implement sustainability best practices (ISO 14001), and we encourage development of FSC or PEFC Chain of Custody (CoC) certification.

Charting a path to responsible batteries

Microsoft is bringing its bold vision for sustainability and innovation to the entire battery supply chain. Mobile technology puts customers at the center of their modern work and life, and batteries play an essential role in enabling that mobility. We must find more environmentally and socially responsible ways to extract component materials, manufacture batteries, and reduce consumer waste. We have a long way to go and a lot to learn in this space, which is why we will continue to pursue innovative solutions and work closely with stakeholders at each step in the process.

Three years ago, we started working on issues within cobalt supply chains, a critical mineral used in our lithium ion batteries. During that time, we partnered with our battery suppliers to identify all cobalt smelters and refiners. We continue to work with our battery suppliers to conduct due diligence of their supply chains, with a focus on demonstrating due diligence for OECD Due Diligence Guidelines. Our RSRM strategy for batteries considers all components and all parts of the supply chain from the mines, smelters, refiners, factories, and recyclers to our own designs and customer experiences. We are committed to creating a responsible battery beginning with these first steps.

Our efforts toward a responsible battery

At Microsoft, we work at all levels of our supply chain to drive social and environmental accountability. Our program incorporates circular economy principles to drive change in our supply chains. We are at the beginning of this journey, but we are committed to learning more in this space and pushing best practices forward.

Assessing and mitigating the risks of material extraction and processing

- We have made meaningful progress in mapping our cobalt supply chains, but there is more work to do with the other critical minerals within our batteries. We are working with our battery sourcing teams and directly with suppliers to bring transparency to all minerals in Microsoft batteries. This information is important so that we may identify risks based on geography and develop solutions to issues that fit the needs of the specific regions.
- We are constantly seeking new partners and collaborations that will help us leverage Microsoft's core strengths of innovation and technology to drive on-the-ground improvements for communities around human rights. We are already working with Pact on child labor within cobalt mines and will continue to assess other opportunities for further engagements with additional partners.

Exploring the downstream: Reuse and recycling

- Microsoft is always seeking ways to use materials more efficiently and sustainably. We have an interdisciplinary team working to develop sustainable product lifecycle improvements in many of the materials within our products. We are committed to finding the most efficient processes and materials for producing durable and more sustainable products.
- We are also looking further downstream with our recycling partners to identify opportunities to expand due diligence and drive improvements in the material recovery process.

Driving impact at factories and the wider industry

- We want to understand the role we can play in moving our partners and the wider industry toward energy efficiency and reducing GHG emissions and waste. We are exploring ways to offset emissions or improve the efficiencies of our products, which you can read about in the Greenhouse gases section of this report.
- Microsoft sees its engagements with the RMI and the Global Battery Alliance (GBA) as a meaningful way to engage with the broader industry. We seek to collectively move the industry toward sustainable practices.

Leveraging partnerships for positive change

We view our collaborative partnerships with NGOs and industry groups as essential to influencing the sustainability of our upstream supply chain. Our work with external organizations is based on long-term commitments to solving pressing issues within the global metals and mining industries. We engage with industry-level partners, such as the RMI, to collaborate with other major consumers of metals and to direct on-the-ground interventions with partners like Pact and ARM. We believe in the missions of our partners and know that Microsoft can help them achieve more through our technology and support frameworks.

Pact

In 2017, Microsoft committed to a three-year project with our NGO partner Pact to address child labor in mining. This commitment builds on both organizations' long history of promoting responsible sourcing of raw materials. Microsoft works directly with suppliers and NGOs like Pact with the goal of eradicating child labor in the mining supply chain. Microsoft and partners created the Watoto Inje Ya Mungoti (WIM) or Children Out of Mining project in 2015 that uses interventions that are embedded in communities and local institutions to address the economic and social root causes of child labor in mining. From the learnings of the WIM project, Microsoft expanded the partnership in 2017 to Lualaba province (former Katanga region), a major producer of cobalt and copper. The new project, Baadaye ya Watoto (BYD), or Children's Future, is a three-year commitment that is fundamental part of our holistic and multifaceted approach to promote safe, ethical working conditions in the farthest reaches of our supply chain.

These projects promote responsible sourcing through:

- In-depth understanding of the drivers and dynamics that cause child labor.
- Social interventions for children, families, and communities.
- Strengthening local capacity of public institutions and civil society to sustainably reduce child labor.
- Upstream supplier responsibility interventions to increase their accountability and equip them to respond to risks in their supply chains.

Pact promotes community leadership in the implementation of projects to embed local ownership and make interventions relevant, appropriate, and sustainable. Year one objectives were to increase awareness of child labor in mining and the roles of all stakeholders in developing local solutions, including training caregivers on making informed decisions about children's well-being. Positive results include the establishment of neighborhood committees, which identified 2,000 children working in mine sites and reached more than 5,000 key community stakeholders, families, and children through a range of activities to raise awareness about the risks of child labor in mining and strengthen child protection norms and attitudes. The committees also identified support needs for child protection services in the region and key mineral producers in need of training on responsible sourcing and trading.

Altelier Neighborhood Forum. The Neighborhood Committee (NC) met on May 29, 2019 and 32 people attended the meeting, including 24 men and 8 women from the NC and 11 government and NGO institutions. The meeting aimed to identify ways to improve the functioning of child protection services in Musonoie. The services of concern were the "Tribunal de Paix (TRIPAIX)" of Kolwezi and child protection and sexual violence prevention (PEPVS).

The project strives to develop solutions that are replicable and scalable throughout the DRC to ensure increased impact. The partnership continues to innovatively address challenges. Many families in the DRC are economically vulnerable. As a result, heads of households are often inclined to prioritize the overall well-being of the family over protecting their children. Children are expected to help generate needed income to meet the family's basic needs. In the WIM project, neighborhood committees identified income-generating alternatives to mining for parents who regularly brought children to the mines. In BYW, the project identified a need for improved economic support for families whose children were already in mining or were at risk of entering the mines. Educational programs in financial literacy for adult miners and deployment of a mobile application are planned for year two.

The results of the WIM project, which achieved a staggering 97 percent reduction in child labor over the course of the project, are showcased in this video. The BYW project results will be released in future reporting.

Alliance for Responsible Mining

In 2014, Microsoft began its partnership with ARM in developing the Fairmined Standard for mining gold and associated precious metals. The standard requires ASM organizations to address issues such as formalization and legalization of mining operations, environmental protection, labor conditions, traceability of Fairmined minerals, and socio-economic development. As a part of our multiyear commitment, Microsoft continues support to ARM for a multi-donor program on "Promoting an Inclusive Model of Responsible Artisanal and Small-Scale Mining, based on the Fairmined Standard" in Ananea (Puno, Peru). The project is moving forward with the following key initiatives:

- Development of Oro Puno Mining Organization capabilities to meet the Fairmined certification.
- Expand the Fairmined certification to additional ASM organizations in the mid-south region.
- Increase visibility for the Fairmined certification through high-quality videos and photos aimed towards potential mining co-ops to gain their trust and buy-in to the program.
- Transfer knowledge between ASM organizations through outreach and collaboration events.
- Reinforced ARM presence in Peru by increasing the number of ASM organizations adopting the standard and participating in the project.
- Improve miners and mining communities' conditions by utilizing the Fairmined premium for implementation of projects that aim to generate inclusive and sustainable development of living conditions.

Initiative for Responsible Mining Assurance

IRMA has a mission to protect people and the environment from the impacts of mining. IRMA works to create financial value from implementing a standard of best practices and also sharing the value of this standard with the businesses that purchase material from these mines.

In FY19, IRMA finalized the responsible mining standard, launched a self-assessment tool and released a responsible mining map. Microsoft gifted our technology, the Audit Management System to help manage the audit process and donated Azure services to drive IRMA's digital transformation. In addition, Microsoft encouraged the mining companies to participate in the mining assurance program underway at IRMA.

4 Responsible sourcing and manufacturing

The Responsible Sourcing mission is to ensure that the people who make our products and their communities are treated with equity and dignity by improving working conditions, advancing health and well-being, and protecting the environment. We have broadened and deepened our scope, improved our technologies, enhanced our programs, and partnered with the industry to expand our impact.

Managing risk throughout our supply chain

Sustainability is a vital lens through which we evaluate and continually optimize our supply chain. Along with variables such as technology, quality, on-time delivery, and cost, we consider the ways our operations and factories impact the environment, worker health and safety, and human rights. Our sustainability mission is embedded into these operations through investments in digital technology and strong partnerships between functional teams. Our executives champion governance structures, processes, and metrics to ensure responsible sourcing is considered in decision making.

Due diligence program

Microsoft Devices conducts due diligence through annual risk assessments and audits to increase supply chain sustainability and ensure workers who make our devices are treated with equity and dignity. These audits include third-party-led initial capability assessments, sustaining maintenance audits, corrective action audits, SEA (Social and Environmental Accountability)-led factory visits, investigations, and Responsible Business Alliance (RBA)-validated audit program assessments (VAPs) of all directly contracted hardware suppliers, including repair and refurbishment partners. We require corrective actions to remedy nonconformances. Further details of our supplier Responsible Sourcing programs are available on the Microsoft Responsible Sourcing website.

In FY19, we completed 652 audits and assessments of 423 active factories. This includes 211 full third-party audits and 263 corrective action audits. These audits and assessments provide insight into the needs and challenges of our supply chain and guide our investments in supplier capability and program improvements.

Partnership is key to success

Partnership and close collaboration with suppliers and employees in Microsoft's Manufacturing, SCS, Planning, Engineering, and Strategic Sourcing organizations are essential to the success of our Responsible Sourcing programs.

Our supply chain consists of suppliers that show willingness to build, improve, and maintain management systems. We encourage suppliers to improve and advance through our maturity model, or SEA stages, by providing incentives such as future business awards, less frequent audits, and recognition at supplier events. When areas of critical or serious nonconformance are identified, or inability to resolve a major nonconformance within a committed timeline, suppliers must show improvement to avoid new business restriction. If they are unwilling to correct within the specified time frame, they are phased out of our supply chain.

Microsoft Strategic Sourcing and Manufacturing employees have also integrated responsible sourcing requirements into their business objectives. As one sourcing engineer noted, "In our organization, social and environmental accountability in the supply chain is top of mind. As long as you think about it day to day, you include it in your work." Performance in this area is discussed by managers during reviews of employee work objectives. Employees are recognized for positively contributing to the Responsible Sourcing program.

Managing risk with our sub-tiers

While our influence in our upstream supply chain is strongest with directly contracted suppliers, we also invest in building our supply chain partners' Responsible Sourcing programs. We have trained our directly contracted Tier 1 partners on the following:

- **Sub-tier supplier management.** Progressive stages of supplier capability improvement and related activities in different stages, such as risk assessment, audit process, and nonconformance (NC) management processes.
- **Audit methods.** Participants' audit skills and audit strategy, such as triangulation, document review approaches, and interview skills.
- **Labor and EHS requirements.**

One Tier 1 supplier noted, "Microsoft is the first company/client to design and deliver a tailored training for us. We learned a lot from the training, and this helps establish our own supplier Corporate Social Responsibility management policy and procedures."

In FY19, we enhanced our supplier responsibility requirements in our Supplier Social and Environmental Accountability Manual. Changes include increased expectations to ensure a quality audit and an annual full audit requirement for high-risk suppliers. The manual also outlines specific requirements for fabless suppliers, such as our expectations for their adoption of due diligence programs. Moving forward, the learnings from this program will be applied to building our Tier 2 suppliers' due diligence capabilities.

Sharpening our approach by focusing on specific risks by category

We have adapted our approach to the complex risks inherent to specific product and part categories through the development of category risk profiles. These profiles allow us to mitigate these risks and address both common and unique needs by developing category-specific tools, such as trainings, audit approaches, key performance indicators, and supplier onboarding questionnaires. For example, the cable and connector category is labor intensive, and as a result, we ask our suppliers to provide evidence of an effective labor management system to address associated risks.

Microsoft Power BI brings the necessary transparency to understand these risks through data analytics and visualizations. We use the information to mitigate supplier risks throughout the product lifecycle, starting from the design of the product where supplier selection begins.

Ensuring the quality of the audits

Third-party audits continue to help us understand risk and monitor improvements in our supplier factories. To ensure the quality of these supplier evaluations, we have invested in an auditor qualification program since FY14. We partner only with audit firms that meet our defined criteria on expertise, experience, and competence demonstrated at the individual auditor level.

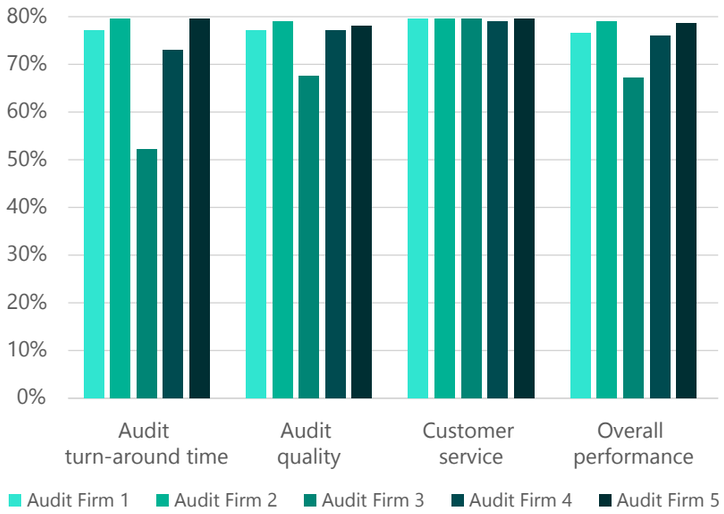
Audit firm monthly performance reviews

Each audit firm is evaluated monthly using the following metrics:

- Audit execution, report, and review turnaround time
- Audit and auditor quality
- Service and timeliness
- Performance feedback from Microsoft and suppliers

If we identify a gap, the audit firm must provide a corrective and preventive action plan within 30 days. Audit firms that consistently underperform will be removed from our approved list. In FY19, we disengaged with one firm due to performance issues.

FY19 audit firm average performance



Auditor qualification

The SEA audit program recognizes two types of auditor qualifications.

Type of auditor	Additional qualifications
• **Labor & Ethics (L&E)**	The individual should be an RBA-approved L&E auditor or a certified auditor or have completed training in SA8000.
• **EHS**	The individual should be one or more of the following: • Certified ISO14001 auditor • Certified OHSAS 18001 auditor • Certified ISO 45001 auditor • Certified RBA-approved EHS auditor • Certified safety or environmental engineer

In China, Devices conducts a shadow assessment to verify the auditors' capabilities. Third-party auditors must receive a "pass" rating to be qualified as an approved auditor. Outside China, Devices approves auditors through a qualification review. In addition, SEA PMs may conduct shadow assessments to verify an auditor's performance. Learn more at our Responsible Sourcing website.

As our supply chain continues to grow globally, we face the challenge of finding qualified auditors outside China. We continue to work with our audit firms to develop auditor capabilities and find ways to address this challenge.

Staying on top of a changing responsible sourcing regulatory landscape

As responsible sourcing–related laws and regulations continue to increase and become more stringent, we have turned to technology to help us scale and manage complexity. By enhancing AMS, we can track and analyze these regulations more thoroughly and quickly address the impact they may have on our business and supply chain.

In FY19, we analyzed 2,949 labor, ethics, occupational health and safety, and environment legal requirements mainly covering China, Taiwan, South Korea, Malaysia, Vietnam, Thailand, Singapore, and Japan with partial coverage of the U.S., UK, and France. We use Power BI to manage updates to these laws and help us act on those that impact our supply chain.

Implementation of regulatory changes requires a synergistic approach. In September 2016, together with our partners in Industrial Design, Development, New Product Introduction, Manufacturing, and Strategic Sourcing, we formed the SEA Champions network with representatives from each team to collaboratively understand the impacts of new regulations, respond appropriately to mitigate risks, and protect the environment and workers.

Helping our suppliers address their environmental risks

We also leverage the Institute of Public & Environmental Affairs (IPE) system to track environmental noncompliances in our supply base. IPE collects and analyzes government and corporate environmental information to provide transparency on supplier compliance through their online database. Every month, the Responsible Sourcing team uses this information to screen our China-based suppliers' environmental compliance. Identified violations are logged in AMS and assigned a severity level of "major." Suppliers are then required to submit a corrective action plan within seven days and show progress within 60 days. Each factory executes the four steps outlined on the IPE website.

In FY19, Microsoft helped 33 suppliers address their environmental compliance issues and demonstrate improvements that led to their delisting from the IPE website.

SEA Stages help us understand our suppliers' management system maturity

We categorize all directly contracted suppliers and related factories according to a three-step model of maturity called SEA Stages. Our Responsible Sourcing team designs and offers capability-building programs according to this model of maturity.

Compliance

The supplier factory meets all applicable legal and Microsoft requirements. The factory has not demonstrated its ability to move from reactive risk management to strong management systems. Factories at this stage tend to have repeat findings identified in audits.

Self-management

The supplier factory has invested in skilled SEA personnel and demonstrates the willingness to develop its SEA capabilities. The factory has management systems in place that proactively identify, control, and manage risk.

SEA Culture

The supplier factory demonstrates a culture of continuous improvement, which includes proactively participating in capability-building and training programs.

At the end of FY19, there were 44 factories in Self-management stage.

- 8 demonstrated Self-management at their initial capability assessment in FY19.
- 21 remained in Self-management stage from the previous year.
- 14 improved from Compliance to Self-management stage.
- 1 improved from Compliance Watch list stage to Self-management stage.

During FY19, there were 15 suppliers that either did not maintain Self-management stage from the previous year, or no longer had business with Microsoft.

Our analysis of data from FY19 yielded the following insights:

- The average overall supplier level improved in three of the four FY19 quarters. This trend indicates that the overall social and environmental capabilities of Microsoft's supply chain continue to mature. The average supplier level did not improve in Q4 due to the onboarding of new suppliers at lower levels.

SEA STAGES

Meets all applicable legal and Microsoft requirements Engages in reactive risk management rather than proactive management systems

Level 1-7

Invests in skilled SEA personnel and demonstrates willingness to develop SEA capabilities. Proactively identifies, controls, and manages risk.

Level 8-9

Demonstrates a culture of continuous improvement including proactive capability building and training programs.

Level 10

Suppliers on the compliance watch list are at SEA Stage level 0

3 Factories placed on **COMPLIANCE** watch list

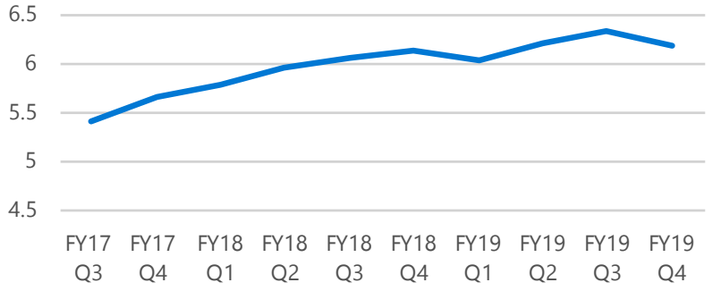
44 Factories have achieved **SELF-MANAGEMENT** SEA stage

365 Factories active in the **SEA STAGE** levels

The following chart shows the steady and meaningful growth in the average SEA Stage level since we started measuring SEA Stages in FY17 Q3. This growth is attributed to the following factors:

- Advanced and targeted SEA capability-building programs and training.
- Improved supplier onboarding.
- Incentivized awards to suppliers that demonstrate improvement.
- Phase-out of suppliers that do not meet Microsoft requirements.

Average SEA Stage level of our suppliers over time

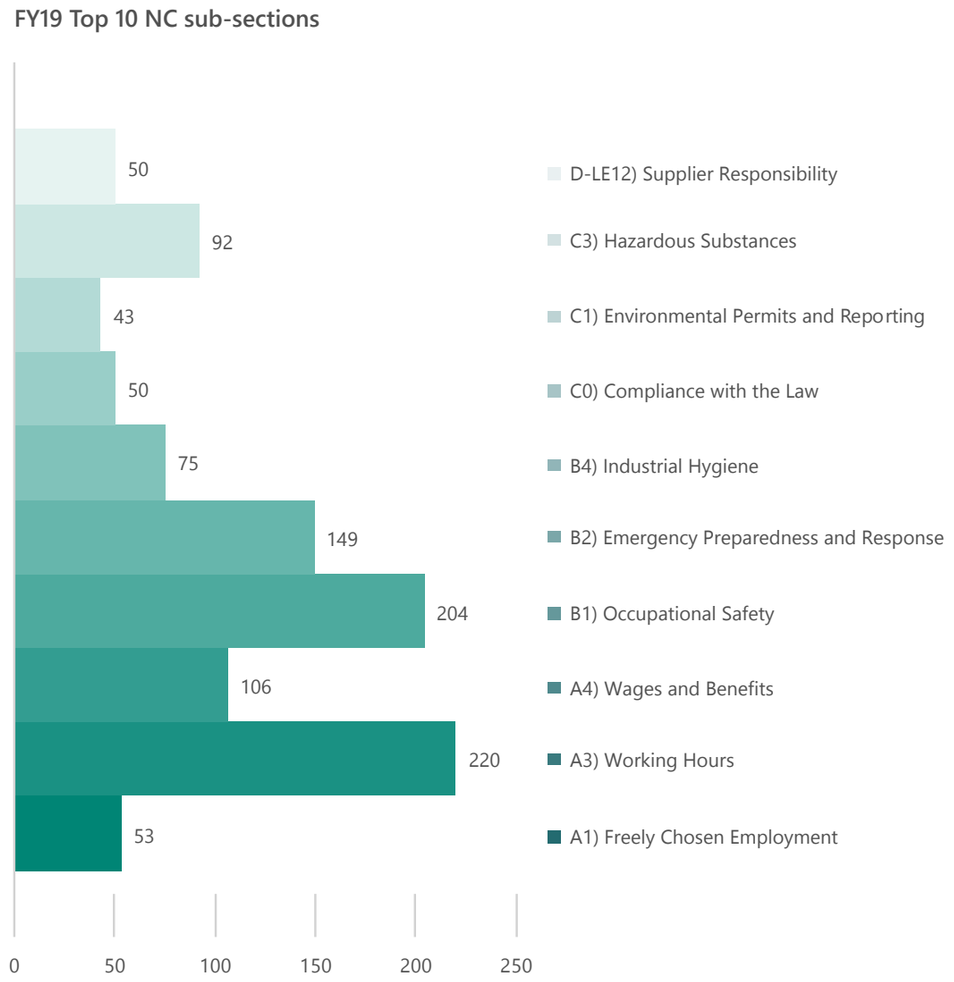


- As we continue to develop innovative technologies with partners outside of the traditional electronics industry, we realized the need to tailor our supplier onboarding and training to better support these suppliers. In FY20, we aim to further understand the needs of the broader supply chain to provide capability-building support and collaborate with broader industry organizations.

Learn more about our audit program results

In FY19, Microsoft released our audit nonconformance (NC) results in an interactive chart available to the public. Using an online Power BI chart, interested stakeholders can view nonconformance data by audit type, severity, and country. Learn more by exploring the interactive audit results online.

The graph here shows the top 10 NC categories for all directly contracted factories for the Devices supply chain in FY19. Like FY18, working hours, occupational safety, emergency preparedness, wages and benefits, hazardous substances, industrial hygiene, freely chosen employment, environmental permits, and supplier responsibility remained the top issues, while sanitation, food, housing and transportation moved out of the top 10.



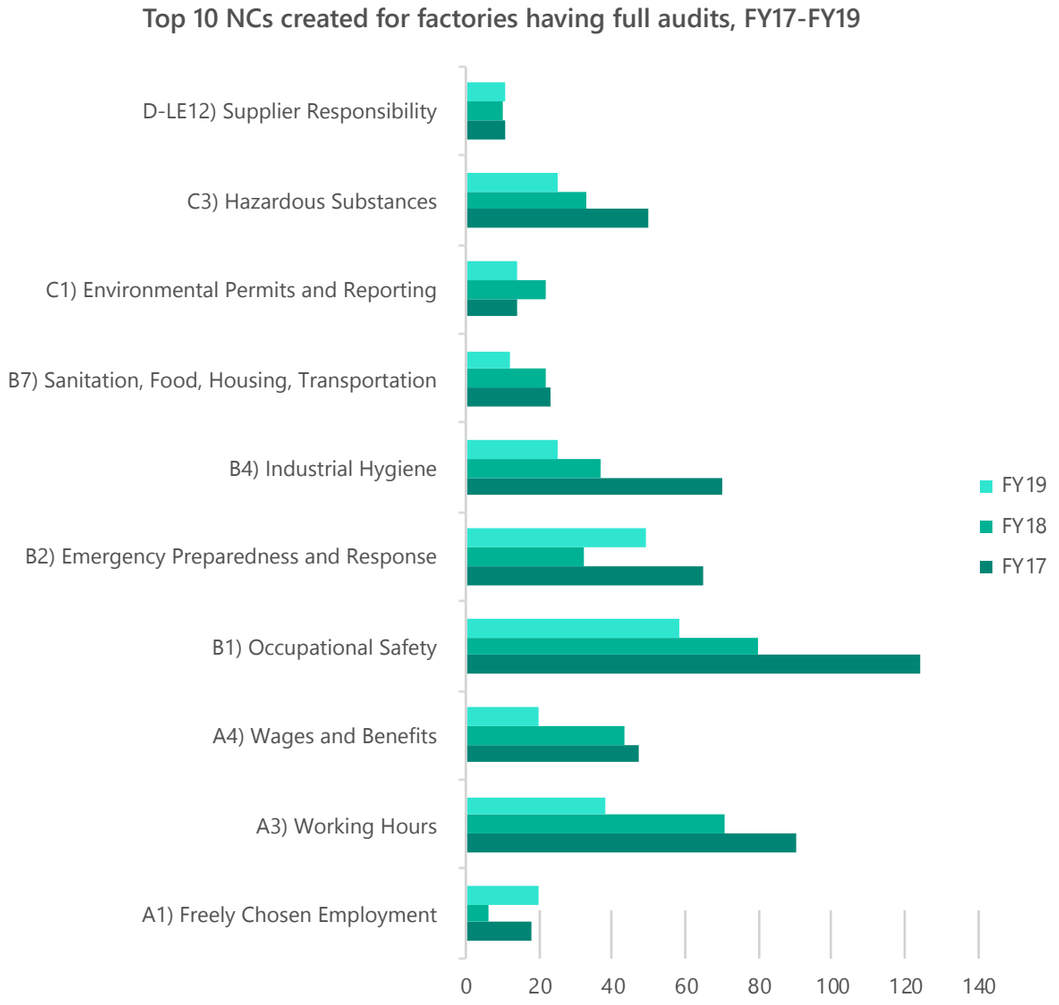
The graph here shows audit results for factories that had audits in the last three fiscal years. It shows a decrease in the number of nonconformances for the majority of the top 10 issues. However, emergency preparedness, environmental permits and reporting, freely chosen employment, and supplier responsibility show an increase or stayed relatively flat due to new, stricter requirements in FY18 and FY19.

Managing risk in our repair and refurbishment suppliers

Microsoft began auditing our repair and refurbishment sites in FY18. In FY19, Microsoft completed audits of the sites located in North America, Asia, and Europe. We determined that there were two common NCs found across the sites:

- Working Hours
- Occupational Safety

Based on these risks identified, we will work with our suppliers to improve their working hour and safety management systems. In FY20, we will onboard new repair and refurbish sites across the globe, and we will proactively ensure that all sites meet Microsoft's requirements.



Driving more sustainable manufacturing

Digital transformation in manufacturing

We are committed to delivering innovation in manufacturing while minimizing our impact on the planet. Devices Manufacturing continues the path of sustainability through digital transformation. This year, technology investments in our Power BI and Internet of Things (IoT) architectures enabled near-real-time monitoring of our global manufacturing network across multiple sites and products to quickly identify issues, pinpoint root causes, and minimize manufacturing variation. This process visibility allows teams to resolve quality issues faster and reduce the amount of solid material waste in the form of scrap or excess materials.

As we drive innovation in manufacturing technology, we are mindful of the ecological footprint our systems may leave behind. Each of our manufacturing technology solutions is enabled by Microsoft sustainable cloud infrastructure and highly optimized datacenters. Microsoft recently announced it has achieved its target to power its datacenters with 60 percent renewable energy and has set more aggressive timelines to attain 100 percent. This means the analytics that enable our factories to operate more efficiently are also increasingly powered by renewable energy.

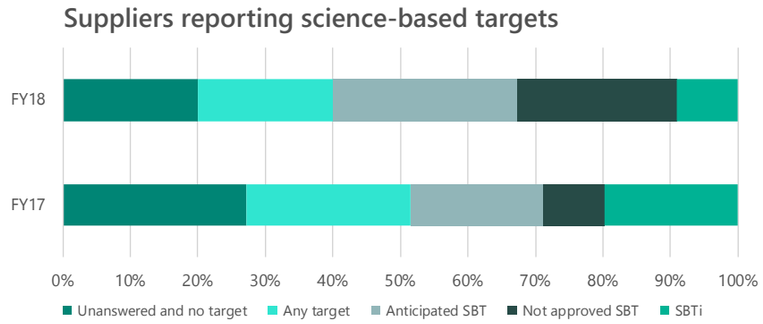
Greenhouse gases and product manufacturing

As a result of the continued energy efficiency improvements to our Surface devices, product manufacturing now represents the highest GHG emissions of any phase of our end-to-end Surface product lifecycle. Our related GHG reduction strategy is to better understand the emissions baseline and partner with suppliers to build efficient production systems. We pursue installation of technologies to decrease GHG intensity, encourage our suppliers to set and meet Science-Based Targets to achieve absolute reductions of their GHG emissions, and routinely monitor supplier GHG emissions using Carbon Disclosure Project data. Learn more about our supplier collaboration to build systems and install technologies in the Factories of the Future and reducing our carbon footprint section of this report.

We ask our suppliers to declare carbon emissions, reduction targets, and other achievements in their response to the CDP survey. In 2019, Devices requested hardware suppliers, representing 95 percent of supplier spend, to report climate change and water usage to the CDP. Their CDP disclosures included the suppliers' corporate climate change policies, GHG reduction targets, energy and renewable energy usage, total CO_2e emissions from production and transport of products, and much more. The information submitted by our suppliers allows us to track their GHG emissions, see their progress toward meeting GHG targets, and gauge where future opportunities for GHG reductions exist.

Of the suppliers requested to participate in CDP reporting, 83 percent submitted responses, including all Tier 1 suppliers. This is an increase from 80 percent last year.

	CY2017	CY2018
Percentage of Devices hardware suppliers responding to emissions reporting section	80	83
Number of suppliers responding to CDP	83	66
Percentage of suppliers with climate objective	67	67
Percentage of suppliers with Science-Based Targets	24	27
Percentage of suppliers reporting CO_2e reduction	53	61
Total GHGs (metric tonnes CO_2e) reduced	**5.1m**	**12.5m**



Factories of the Future and reducing our carbon footprint

In FY19, Devices completed a two-year project to deploy smart-building technology and solar energy at three factory building sites at a major supplier to reduce GHG emissions while decreasing manufacturing costs. The deployment involved a review of the existing heating ventilation and air conditioning (HVAC) systems, facilities team capabilities, and data source integrity. Based on this assessment, Microsoft installed an energy smart-building system with more than 3,000 sensors covering the HVAC systems to reduce energy use and allow for the implementation of smart-building technology.

Microsoft collaborated closely with the factory's facilities management to develop smart-building logic using the Azure IoT platform and Power BI dashboard analytics to monitor and predict efficient HVAC operations. The HVAC engineers and technicians attended a training program on how to best use these powerful tools to reduce their carbon footprint. This factory reduced its electrical usage by 1.8 million kilowatt hours (kWh) from 2017 to 2018. Learn more about this project in our Factory of the Future video.

Climate vulnerability hotspot analysis

Our FY18 Supplier Vulnerability Assessment - Hotspot Analysis indicated that our manufacturing supplier sites are generally at lower overall risk of climate change disruption than the average of manufacturing sites around the globe. However, two cities where we manufacture are located in areas of high risk: one for extreme rainfall, cyclonic activity, and sea-level rise, and the other for heat stress.

To address these potential risks, we worked with our sourcing partners to identify all Tier 1 suppliers in the identified areas. The sourcing managers of the related suppliers are evaluating how to implement this into the suppliers' business continuity plans and risk mitigation strategies.

Air emissions: Ozone-depleting chemicals

The ozone layer of the atmosphere prevents harmful ultraviolet radiation from reaching the earth's surface. Most nations adopted the Montreal Protocol in 1987 and agreed to phase out the production and use of ozone-depleting chemicals (chlorofluorocarbons). Devices restricts the use and release of ozone-depleting chemicals (ODCs) in the production of our devices and packaging in both owned and supplier facilities. Our supplier specifications ban the use of ODCs in the manufacture of our products and packaging and by manufacturing equipment. We require annual declarations of conformity from both Tier 1 suppliers of taxable imported products and high-risk Tier 2 suppliers. We implement independent verification auditing of suppliers with operations at higher risk for using ODCs.

Our goal is to automate the compilation and analysis of this data to improve efficiency and accuracy. In 2019, we created an electronic form to capture ODC data from our suppliers. In 2020, we will build a dashboard in Power BI to provide instant analysis on trends and quickly identify incomplete submissions.

Air emissions: Volatile organic compounds risk management

In FY19, China implemented stricter legislation and controls on volatile organic compound (VOC) emissions aiming for a 10 percent reduction in total VOC emissions by 2020. These policies mainly affect the operations of companies in the packaging, printing, and coatings industries. These VOC control policies are pushing companies to adopt and industrialize new technologies, including high-solid, solvent-less and waterborne technologies at an unprecedented speed.

During our SEA audit in FY19, 30 findings were identified for VOC emission and we worked with the suppliers to enhance VOC management and ensure compliance.

The Responsible Sourcing team helps our suppliers meet the required reductions in impacted supplier categories, such as mechanicals and enclosures, printed circuit boards, and printing suppliers through risk evaluation and capability building. The team reviewed relevant requirements set by the national, provincial, and town-level authorities to understand the standards that our supply chain had to implement. We conducted an in-depth risk assessment of our supply chain, taking into account 85 factories in these impacted categories to understand their programs and systems to meet these regulations. Factories listed on the provincial Key Enterprise Lists for VOC emission reduction and online monitoring in the Devices supply chain were identified and engaged to understand progress in developing and implementing specific plans agreed with the government per the "One Enterprise, One Action Plan" requirement.

VOC risk profiles were developed for each factory. The profiles take into account total volumes emitted via completed factory surveys, where available, and also whether the factory was on the Key Enterprise Lists, applicable regulations, agreed action plans with the local Environmental Protection Bureau, where available, and planned and implemented mitigation on-site. Actions to address gaps between the requirements and mitigation already implemented by the factory were identified and are being discussed with factories that need improvement. As a result of this effort, our reviewed impacted suppliers are showing improvements in this area, and we have mitigated against a potential supply chain disruption from a government shutdown of a nonconformant factory.

Safety assessment for suppliers

Our Responsible Sourcing safety experts conducted process safety risk analysis and on-site safety inspections of VOC treatment devices to safeguard against fire and explosions. The most common safety issues identified were the following:

- Not having explosion-proof fans
- Insufficient safety distance between the lightning rod and the VOC emission port
- Not having online gas detectors or alarms for VOC treatment devices

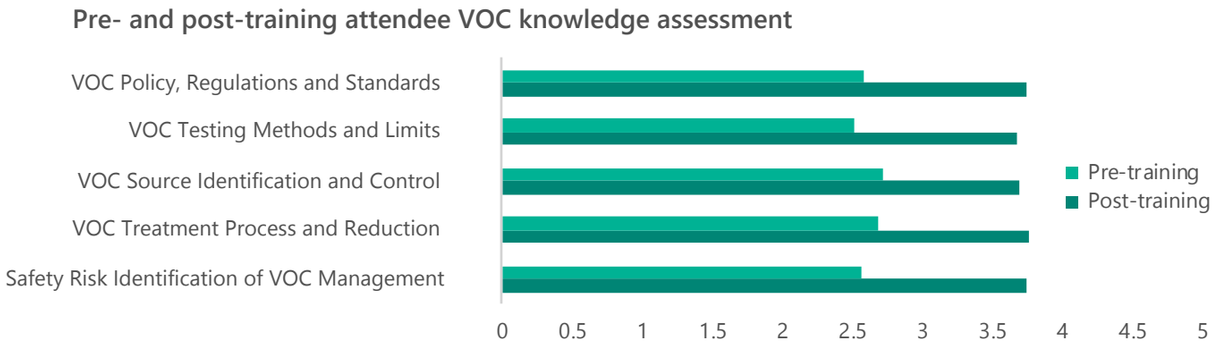
Case studies available in the public domain were shared with suppliers' factory management to help them understand root causes and other lessons learned to help prevent these common issues.

VOC in-house training

To help suppliers understand the VOC policies, Microsoft held two on-site workshops in May 2019. The general objectives of the one-day trainings were to build suppliers' capabilities on VOC pollution prevention and control and covered the following topics:

- Current government expectation on VOC control, policy trend analysis, and key regulations and standards
- VOC treatment technologies
- VOC emission management, control issues, and countermeasures
- Case studies covering treatment technologies, lifecycle control, and odor treatment

More than 130 attendees from the supplier factories attended the training workshop, including factory senior management and EHS managers and engineers.



Water

Water scarcity is among the most pressing environmental problems of the 21st century. In China, almost half of the country is experiencing moderate to extreme droughts with the northwestern region being the most severely hit. In general, suppliers in Microsoft's device supply chain are not heavy users of water resources. Nonetheless, water conservation practices are critical to manage water scarcity.

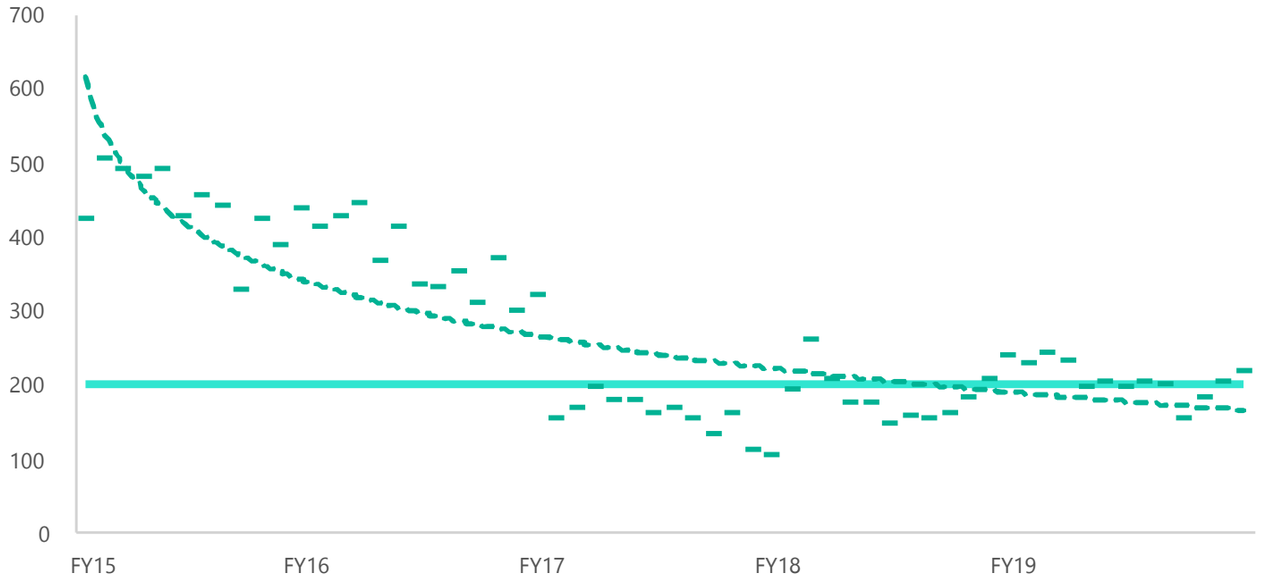
In CY18, we requested suppliers, based on 95 percent spend, to report water usage data to the CDP. Supplier data included disclosure of actions around water use measurement, water management (such as analyzing water-related risks), and reports related to best practices in corporate water stewardship. This information allows us to understand risks and opportunities regarding water scarcity in our supply chain. Of the suppliers requested to participate in the CDP water disclosure, 77 percent submitted responses, including all our Tier 1 suppliers—an increase from 65 percent last year.

	CY2017	CY2018
Percentage of suppliers responding to CDP	80	83
Percentage of suppliers responding to water section	65	77
Percentage of suppliers with long-term water objective	38	45

Microsoft Responsible Sourcing experts have provided education on water efficiency to Tier 1 suppliers. Tier 1 factories have been encouraged to save every drop of water, report any water leakage, and set up monitoring systems for potable water consumption. We worked with suppliers to implement a water balance approach. In the last five consecutive years, the daily water consumption has decreased toward the China recommended standard.

GRI STANDARDS DISCLOSURE: 303-1, 303-2, 303-3, 306-1

Average daily potable water consumption in Microsoft Tier 1 supplier sites



Waste Management

Increasing safety and efficiency in handling of magnesium and coolant wastes

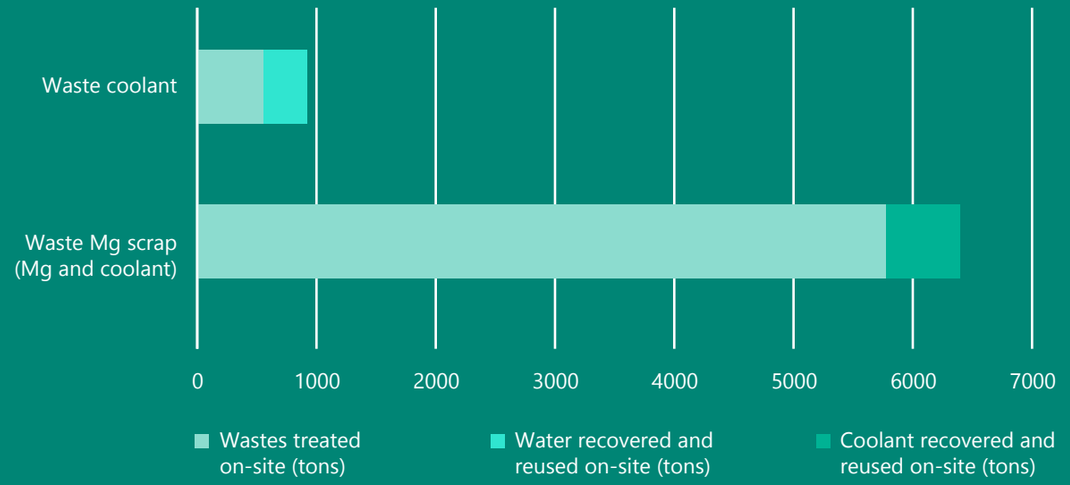
We have been working with our magnesium (Mg) suppliers since 2017 to increase the safety and materials efficiency in Mg processing and waste disposal. We identified safety risks, including potential fire and explosion during the processing and transportation of Mg. Mg scraps mixed with coolant resulting from manufacturing processes are classified as hazardous wastes and are costly to recycle. In partnership with our supplier, we developed a solution to separate the Mg from the coolant. The coolant separated from the Mg scraps can then be reused in production rather than discarded or disposed of as hazardous waste. In addition to the environmental benefit of limiting the amount of hazardous waste disposed, the safety risks during waste storage are significantly reduced. This practice also requires less storage space in the factory and enables more efficient transport.

In FY19, these suppliers reported over 5,800 tons of waste Mg scraps (mixture of Mg scraps and coolant) were processed before being transferred for off-site disposal, and at least 580 tons of coolant separated from the waste mixture was reused in production on-site.

As mentioned above, waste coolant is generated during various industrial processes, such as metal processing. In this program, waste coolant is treated by a set of facilities on-site before being transferred for off-site disposal. Water separated from the treatment is reused in production. After the on-site treatment, the amount of the waste coolant to be transferred is reduced efficiently.

In FY19, as reported by one supplier, over 570 tons of waste coolant were treated on-site, achieving a waste reduction rate of approximately 75 percent. More than 340 tons of water separated from the on-site treatment were reused in production.

Key numbers for waste reduction program in FY19



Exploring a solution for waste etching liquid

Waste etching liquid is generated at some of our suppliers' sites, typically from surface treatment processes. Proper disposal of the waste is challenging due to the hazardous nature and amount of this waste. In March 2019, we invited one of our suppliers, who had a best practice on how to manage this waste, to share at our 2019 Responsible Sourcing Supplier Forum. This supplier started treating this waste etching liquid on-site in approximately 2012. Currently, the supplier maintains several sets of waste acidic and alkaline etching liquid and waste nitric acid on-site treatment facilities. Some liquid materials and copper generated from the waste treatment processes are either recycled in production or sold to local recycling vendors. In June 2019, we held a training session on waste management for relevant suppliers as part of the waste reduction program. Details of the training session are discussed in the Supporting supplier capabilities across a broad range of sustainability areas section of this report. We plan to involve more suppliers in this program in FY20.

We encourage our suppliers to share these best practices to help the broader supply chain adopt these types of waste reduction practices to help us all protect the environment and create safer factories.

Occupational health and safety

Microsoft is committed to the protection and well-being of our suppliers' employees. Keeping workers safe is one of our most fundamental responsibilities. Success requires that safety is deeply embedded in the factory's operating culture. We advanced our programs in FY19 through:

- Establishing a systematic system with proactive prevention for creating a safe and healthy environment for our supply chain.
- Focusing on delivering solutions through using new technologies.
- Phasing out toxic chemicals and reducing the risk of chemical exposure.
- Striving to deploy best practices as well as root cause analysis to continually improve supplier capabilities.

GRI STANDARDS DISCLOSURE: 403-2

Progress on process chemical management

In FY19, we further improved our process for classifying process chemicals used in manufacturing to identify the chemicals' occupational health exposure potential, including inhalation hazards, skin absorption, eye/skin contact, mutagen/teratogen, and their International Agency for Research on Cancer classification.

We also continued to collect chemical information from an additional 78 factories identified in scope for FY19. This completes the overall chemical inventory for our China-based supplier factories. Based on this inventory, we identified three Microsoft-banned and 84 controlled or restricted substances. We phased out all the banned substances and five restricted substances. We reviewed the control measures of all remaining controlled and restricted substances to ensure the suppliers are protecting the workers from occupational health exposure.

Safety culture implementation in selected high-risk suppliers

Supplier risk management includes identifying, assessing, and controlling the risks to our supply chain. A high EHS-risk supplier is defined as a supplier that presents a higher level of environmental health and safety risk because of the presence of one or more of the following factors:

- Using a high-risk process such as Mg processing
- Using highly toxic chemicals, such as cyanide
- Lack of appropriate controls to manage wastewater discharge and air emissions

EHS risk by category			
	Low risk category	**Medium risk category**	**High risk category**
Important	Chipset, camera and projection, wireless, standard components, system memory and storage, cables and connectors	Power supply, display, integrated circuits, M&E (others) packaging, audio	Board, battery, M&E (plating & painting)
Very Important	Tier 1 suppliers		M&E (Mg operation)

In FY14, we introduced a safety culture program to help improve the management of safety in our suppliers' factories. A safety culture includes beliefs, perceptions, and attitudes of employees toward their own safety and others to create an overall safe work environment.

The Responsible Sourcing team designed the program to focus on clear roles and responsibilities, system standardization, and identifying and eliminating risky behaviors. We selected five suppliers with magnesium operation processes for the implementation of the safety program in FY19.

At the end of FY19, we have achieved the following:

- The five selected suppliers have set up commitment at all levels of the organization.
- Tools and approaches for safety culture have been introduced to all five selected factories through expert trainings.
- Safety measure and monitoring processes have been set up in all selected five suppliers.
- The five selected factories have set up systematic safety standards and have been certified as "safety standardization" by local governments.

In FY20, we plan to continue to implement safety culture in these factories and will focus on:

- Employee risk behavior observation and change
- Site management of change and pre-start safety review
- Employee participation in safety management
- Continuous improvement on safety

Managing safety: Innovating a wet system for dust collection

A safe dust collection and mitigation system is critical to controlling combustible dusts. Magnesium and aluminum dusts are extremely flammable and can result in an explosion during processing or transport.

Dust is created by metal abrasive blasting, cutting, crushing, mixing, sifting, or screening dry materials. A dust explosion can occur when the following five factors are present:

- Fuel, in the form of dust particles
- Dispersion of the fuel in the form of a dust cloud
- Oxygen in the form of air
- Confinement of the dust cloud in the form of a container (such as a dust collector)
- A source of ignition

Since 2015, Microsoft Responsible Sourcing experts have worked with suppliers to develop an innovative wet system for dust collection that significantly reduces these risks and improves safety. The principle of this wet system design is to eliminate combustible dust fires and flammable sparks from the process, using cascading water to remove the airborne particulates. The system forces particles through a series of baffles, submerging them into a turbulent vortex of water. After the dust is immersed in water, the material drains down into a water basin. This alternative is highly efficient and effective at preventing dust explosions. This process also meets the Chinese safety standard *Safety specifications for dedusting system used in dust explosion hazardous area AQ4273-2016*.

Cyanide risk: Controlling a highly toxic chemical

Cyanide, a chemical with extremely high toxicity, is commonly used by the printed circuit board industry in gold-plating processes and by the connector industry in copper-plating processes. To control and mitigate the occupational health and safety risks of such operations, we initiated a risk assessment project for suppliers. We conducted on-site risk assessments for the first six factories in FY19. The assessment covered end-to-end factory management of cyanide, including procurement and transportation, storage management, processing, operations, training, environmental protection, emergency response, and related management systems.

The average risk assessment score of the six pilot factories was 70.0 percent. In total, 111 improvement opportunities were identified, of which 59.5 percent involved related processing and operation. Devices organized an online cyanide management training to educate suppliers about cyanide management, laws and regulations, on-site cyanide management requirements, and common findings and practical solutions. After the training, the suppliers made their corrective action plans and took immediate measures to eliminate or reduce the identified risks.

In particular, the cyanide removal process is a critical control point for workers' occupational health and environmental protection. To control the risk in our supply chain, Microsoft EHS experts worked with suppliers to develop a cyanide removal device. The cyanide-containing waste gas enters the device driven by a fan and reacts with the sodium hydroxide (NaOH) + sodium hypochlorite (NaClO) solution in the device, thereby achieving cyanide removal to a non-detectable level.

Industry best practices

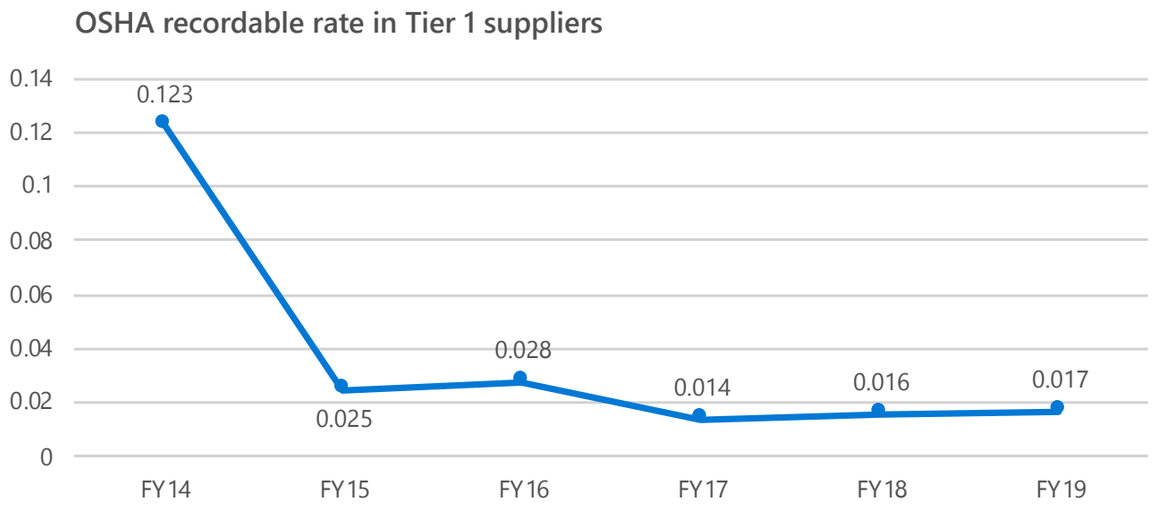
Incidence rates used by the U.S. Occupational Safety and Health Administration (OSHA) are collected to identify the relative level of injuries and illnesses in our Tier 1 suppliers' manufacturing facilities.
Factories must record accidents that are work-related injuries, illnesses, and fatalities according to OSHA Standards. Injuries are considered by OSHA to be work-related when an event or exposure in the work environment causes or contributes to the condition. OSHA recordable rate of injuries and illnesses can be computed from the following formula: Number of injuries and illnesses x 200,000)/Employee hours worked = Incidence rate. These rates help determine both problems and progress in preventing work-related injuries and illnesses.

Since the launch of the Microsoft safety culture program in Tier 1 supplier sites in FY14, we have emphasized building the factory leaderships' commitment and employees' engagement. To fully integrate safety into the business core culture, our Responsible Sourcing team coaches suppliers to promote and foster a culture where safety is a core value. After three years of implementation, the OSHA recordable injury rate of our Tier 1 suppliers has declined significantly below the industry average. As a reference point, according to the U.S. Department of Labor website, the benchmark for electronic computer manufacturing was 0.7 in 2016.

OSHA recordable injury rate performance in Tier 1 factories*

Tier 1 Supplier	FY14	FY15	FY16	FY17	FY18	FY19
Supplier A	0.604	0	0.37	0.26	0.23	0.134
Supplier B	0.078	0.089	0.02	0	0	0
Supplier C	0.024	0	0	0	0	0.017
Supplier D	0.107	0	0.06	0	0	0
Supplier E	NA	NA	NA	NA	NA	0
Supplier F	0	0	0	0	0	0

**We changed the measure to fiscal year.*



In the EHS field, sharing best practices can positively impact the broader industry sector. Companies gain value from the experiences of other companies. In some cases, adoption of best practices can be the difference between life and death for workers or prevent devastating environmental incidents. Overall, we are stronger when we work together toward EHS excellence.

Responsible Sourcing experts have conducted many tests and validations on the prevention of accidents from combustible dusts during processing and storage. These activities include examination of building designs, ventilation, processes, and monitoring. These best practices were shared during the China EHS summit in May 2019.

Labor and human rights

Labor and human rights risks exist in countries where Microsoft products are manufactured. We continued to invest in measures to monitor and remedy these risks, as well as to protect workers' rights. These efforts include but are not limited to our regular audits, a third-party worker's hotline, forced labor prevention programs, and internal mechanisms to increase awareness of risks and relevant regulations.

Giving workers a voice: The Workers' Voice Hotline

The Workers' Voice Hotline program, launched in April 2014, provides workers with a reliable and anonymous reporting channel managed by a neutral third-party provider. This resource enables better transparency and increased efficiency to resolve worker workplace concerns. It also complements and, in certain cases, provides the factory with meaningful feedback on where improvements are needed.

By the end of FY19, we extended the program to 153 factories, leveraging our third-party auditors to provide workers with a way to raise their concerns and questions to our Workers' Voice Hotline post-audits. The hotline received 152 inquiries/cases in FY19, and 25 cases are in the process of follow up. The majority of received inquiries/cases concerned wage calculation, resignation, work-shift and leave or holiday arrangement, social insurance, working hours, layoff, labor contract, delayed payment, and management attitude.

In FY20, we will continue to leverage our third-party auditors to scale the program to more suppliers, especially those located in high-risk countries. Workers will be able to use the existing toll-free number and the new hotline case management on the SEA Academy platform to ask questions and report their concerns.

The impact of the hotline on workers

The Workers' Voice Hotline program was made available to 241,230 workers in FY19. We achieved this scope by providing hotline information to 153 factories during our third-party SEA audits. Some cases reported to the hotline identified risks that would not have been detected by regular SEA audits. Reported cases covered issues such as involuntary overtime, unreasonable leave arrangement, unfair deduction in wages, and performance allowances.

The Responsible Sourcing team investigated all these issues with support from our third-party auditors. We worked closely with the suppliers to take timely actions to correct the issues and mitigate the identified risks. In addition, workers in our sub-tier suppliers who do not have direct business contract relationships with Microsoft utilized the hotline to report issues

Top 10 reported case distribution in FY19 (%)

Human trafficking and forced labor prevention

The Microsoft Supplier Code of Conduct bans all forms of forced labor. Since FY16, Microsoft has disclosed its efforts to prevent and combat human trafficking and forced labor in the Microsoft Slavery and Human Trafficking Statement pursuant to the UK Modern Slavery Act of 2015. The statement describes our requirements, procedures, capability building, and due diligence process. This fiscal year, we focused on increasing awareness knowledge of this issue with Microsoft employees, external auditors, and suppliers.

We provided in-person trainings to build capabilities of our suppliers and internal Microsoft employees to prevent and correct forced labor issues in our supply chain. In January 2019, we conducted an in-person Human Trafficking and Forced Labor workshop for our suppliers in Taiwan. In March 2019, we shared our program updates and specific requirements, including zero fees and additional regulations, with extended suppliers during the Responsible Sourcing Supplier Forum in China.

Internally, we educated the Devices Strategic Sourcing team and other business teams on human trafficking and forced labor. During these trainings, detailed requirements and updates about the program were shared to build Microsoft employee awareness regarding the potential risks of forced labor and human trafficking in our supply chains. We also trained employees to detect and address such risks with the Responsible Sourcing team's support.

GRI STANDARDS DISCLOSURE: 412-3

Audits and due diligence process

In our regular third-party audits, we verify supplier compliance with our requirements on human trafficking and forced labor. The auditors verify and obtain data through document reviews and worker and manager interviews. Interviews of migrant workers are conducted in their native language. In China, we also provide our third-party Workers' Voice Hotline as a channel for workers to report issues or ask questions after the audits.

In FY19, 220 factories were audited, with 6 serious and 47 major findings in the Freely Chosen Employment category. Information about nonconformities can be found in our interactive audit chart.

These findings were distributed as follows:

Numbers of findings per type	Serious	Major
Freely chosen employment policy and procedure that does not prohibit forced labor and human trafficking	0	3
Workers having paid fees for recruitment or employment	5	23
Retention of worker identity documents	1	2
Contractual relationship	0	14
Restriction of workers' freedom of movement	0	4
Forced overtime	0	1

* Factories were required to create corrective action plans for all of these findings.
* Starting from FY19, health examination fee has been defined as a kind of recruitment fee.
  Twenty-two nonconformances were identified in China suppliers in FY19.

All information regarding the progress of the Human Trafficking and Forced Labor program was shared with the human rights core team, established in FY18 and composed of experts from Responsible Sourcing; Corporate, External and Legal Affairs (CELA); Stakeholder Engagement; Responsible Sourcing for Indirect Procurement; Cloud Supply Chain and Provisioning, and Cloud Operation + Innovation.

Best practices from our supply chain

Hiring migrant workers from labor-abundant countries is a common solution to address labor shortage issues. Without proper management, hiring migrant workers can create the risk of forced labor, especially when migrant workers pay high recruitment fees to labor agencies that work in these countries. As a mitigation measure, we embed human trafficking and forced labor requirements in the onboarding screening process for new suppliers to identify and mitigate any high risk at a very early stage.

In FY19, through an audit, we identified two cases of migrant workers who paid recruitment fees at one factory in Taiwan. The issues were successfully closed through clarification of SEA forced labor requirements. Our Responsible Sourcing team of experts also provided consultation support to the supplier to strengthen its management system. The factory refunded 100 percent of all recruitment fees to the impacted migrant workers.

Building our suppliers' capabilities: The SEA Academy

The Microsoft SEA Academy provides training to support a range of programs aimed at building our suppliers' capabilities. We educate suppliers' management, workers and third-party auditors as well as internal Microsoft teams, such as sourcing managers, factory managers, and new product introduction teams, with the goal of increasing sustainability and promoting aligned collaboration throughout our supply chain.

Training execution

In FY19, we provided the following trainings to build the capability of Microsoft internal stakeholders, suppliers, and third-party auditors.

Internal stakeholder capability building	Four trainings for awareness and risk-identification skills
Supplier capability building	Six management system trainings regarding high labor and EHS training
Third-party audit firm capability building	Two auditor trainings regarding high-risk identification and Microsoft updated SEA requirements

Internal stakeholder trainings

In FY19, we also raised awareness of SEA issues and provided risk identification skills training to Microsoft Sourcing managers and factory managers. This training included:

- Two practical visual scan trainings to improve risk identification skills.
- Two refresher training workshops regarding regulatory updates, trends, and potential business impacts.

In FY19, internal stakeholders conducted 72 visual scans, they identified 280 risks or nonconformances during the visual scan, and all of these 280 issues have been closed or controlled.

Supplier trainings and events

Devices also provided a series of EHS and labor management system trainings in FY19. Training topics included:

- Human trafficking and forced labor
- Sub-tier supplier risk assessment and management
- Waste reduction
- VOC management
- Process chemical management

Auditor training

Devices provides third-party auditors with an annual training to help them sharpen their SEA knowledge and auditing skills. For auditors in China, we held training sessions in Shenzhen and Suzhou in May 2019. A total of 87 third-party auditors attended these two sessions. The training focused on:

- SEA audit requirements
  - Strengthen the audit methodology foundation, skills, and techniques to perform audits and draw appropriate conclusions based on findings.
  - Learn how to lead an audit team, conduct opening and closing meetings, collect audit evidence against audit criteria, and present audit findings.
- Microsoft SEA requirements update: Highlighting significant changes in FY20.
- Occupational health and safety risk identification in high-risk industries.
- New environmental requirements in China.

Using technology to scale: Online training platform

In FY19, we launched an online training platform to scale our trainings. In total, 26 online courses were developed for the SEA Academy platform and made accessible to all our suppliers and internal teams. These courses reflect the results of a training needs assessment conducted with our suppliers in April 2018. Trainings include:

Factory SEA professionals and internal stakeholders	Factory supervisors and managers	Workers
General Course: Onboarding Training **Labor Courses:** Working with Labor Brokers Working with Students & Migrant Workers China Social Insurance **EHS Courses:** Fire Safety Hearing Protection Chemical Safety Lock Out Tag Out (LOTO) Working in Height-confined Space	Resolving Conflict Handling Worker Feedback Providing Worker Feedback Bullying, Harassment, and Sexual Harassment Supervisor Health and Safety Pre-Shift Meeting Providing Feedback Motivating Workers	Managing Personal Relationships Personal Hygiene and Infectious Disease Prevention Core Labor Rights/Code of Conduct Basics of Chinese Labor Law Basics on Chinese Labor Contract Law Personal Protection Nutrition and Health Managing Personal Finances Stress Management Communication and Grievance

Supporting supplier capabilities across a broad range of sustainability areas

The SEA Academy provides fundamental support to different capability programs by gating training quality to ensure the training impact.

Program	Training/Program description	Training/Program impact
Workers' Voice	In FY19, we introduced an additional feature to the SEA Academy platform related to our Workers' Voice program. Workers from Microsoft supply chain factories can now provide feedback regarding their living and working conditions to factories and Microsoft through the software platform. An approved Microsoft third-party vendor will manage the information and maintain the communication between the factories and workers. The vendor will track and manage all data to meet General Data Protection Regulation (GDPR) requirements.	With the support of the SEA Academy portal, we can scale the workers' voice to non-China areas. And with the database, we are able to foresee the risks by analyzing the worker grievance data.
Waste reduction program	To support our waste reduction program, an online training focused on overall waste management and treatment techniques for two kinds of hazardous wastes, i.e., waste etching liquid and waste coolant, was held in June 2019. Selected suppliers, especially those generating significant amounts of waste etching liquid and waste coolant, were invited to attend the training. Training topics included: • Overview of Chinese Waste Regulations • Common Problems and Best Management Practices during Waste Management • Waste Management Case Sharing › Hazardous Waste Disposal Cases › Waste Etching Liquid Disposal › Waste Coolant Disposal	Seventy-five people from our suppliers' factories attended the training. Based on the pre- and post-training survey results, we observed an approximately 21% improvement against the participants' pre-training knowledge.
Process chemical program	In June 2019, we provided online trainings regarding cyanide management to support our Process Chemical Management program. The training builds our suppliers' capabilities for safe and effective cyanide management, giving them a better understanding of related laws and regulations. Selected suppliers using cyanide in our supply chain participated. The training topics included: • Laws and Regulations on Cyanide Management • On-site Cyanide Management Requirements • Common Findings • Solutions to the Findings	We conducted a pre-test and post-test, and the average test score increased by about 50% against the pre-training score.

Program	Training/Program description	Training/Program impact
Human trafficking and forced labor prevention	In FY19, we continued to monitor and address risks of human trafficking and forced labor in our supply chain. Taiwan is a high-risk region due to the percentage of foreign migrant workers. To improve the factories' risk identification and control capabilities, Microsoft delivered a training on Human Trafficking and Forced Labor in Taiwan.	A total of 37 participants from 21 factories joined the training. Participants' knowledge about human trafficking and best practices increased 38% post-training.
Responsible Sourcing Supplier Forum	In March 2019, we hosted the 2019 Responsible Sourcing Supplier Forum ("Forum") in China, attended by 189 Devices supplier factory representatives. This event is one of the most important opportunities for direct communication with our suppliers. We provided suppliers with the latest information on Microsoft SEA strategies and requirements and shared industry trends and best practices. Suppliers also provide us with valuable feedback to help improve our SEA program.	All participants responded that the Forum was helpful for their future work and that they were encouraged by the Microsoft recognition provided for those who shared best practices. In addition, 26 participants stated they have SEA practices they are willing to share with Microsoft and other suppliers in the future. This interest was an indication for us that they are willing and inspired to build together a supply chain SEA culture that will benefit us all.

FY19 Responsible Sourcing Supplier Forum

5 Sustainable packaging and distribution

Microsoft Devices carefully considers and sets ambitious sustainability goals for our products' packaging, shipping, distribution, and mode of sale. The impact of these efforts may be less readily apparent to consumers, but our focus on this phase of the product lifecycle has a sizable impact on the overall sustainability of our devices by increasing efficiency and reducing the amount of waste produced.

Innovations in packaging design and materials

Packaging sustainability reduces our environmental footprint, creates business value, drives innovation in design, and supports an efficient and sustainable supply of raw materials. In FY19, we continued to reduce the environmental impact of our packaging by applying a science-based approach and collaborating closely with our suppliers and industry partners. We improved the sustainability of our packaging by using less packaging material, selecting more sustainable materials, and optimizing manufacturing processes.

Packaging strategy

We align our goals across three key areas that support sustainable management.

Environmental

Commit that our design and engineering deliver packaging materials that achieve measurable sustainability gains. Optimize, through data analysis, the use of renewable and/or recoverable materials plus process efficiencies.

Financial

Design sustainable packaging that optimizes the supply chain, is cost viable, is compliant with regulatory requirements, and increases our corporate value.

Social

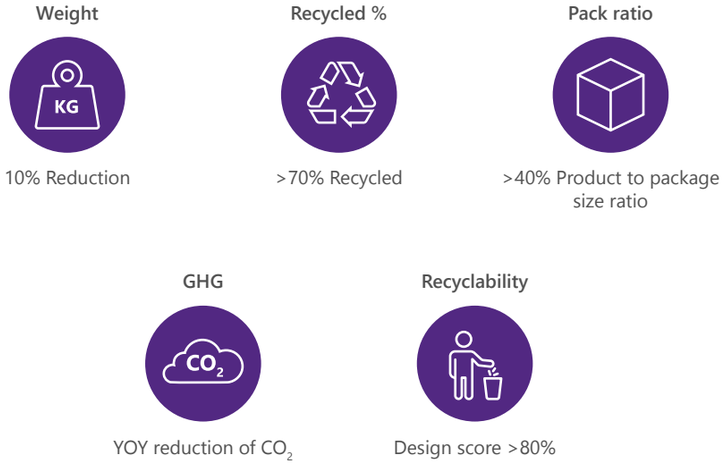
Assume global responsibility for packaging to mitigate risks for the human community. Create a positive impact on brand and contribute to business value through internal and external partnerships.

Here are some foundational facts about our packaging program

- We place great importance on the sustainability of our packaging and driving continual improvements.
- We have an established structural packaging design system for brand consistency and operational efficiency. New product packaging leverages this system. While we continue to refine the system and drive improvements within the existing platform, major shifts occur when the entire design system is refreshed approximately every five to seven years.
- As we work to reduce the environmental footprint, sustainability is a critical factor in the design and final selection of new solutions, while also ensuring that the packaging adequately protects the product, achieves the brand/marketing goals, and is economically viable.
- Microsoft has a "paper first" strategy for our packaging. We favor paper as a packaging material because it's renewable, biodegradable and highly recycled. Our design platform is over 90 percent paper/fiber based. Plastics constitute the remainder.
- We are focused on minimizing the use of plastics in our packaging. Further, we strive to use plastics with recycled content and resins that are accepted for use in recycling systems.

Packaging goals

The data in this report represents FY19 results against the key 2020 sustainability targets we established in 2016:



2020 Packaging sustainability targets

Weight

We believe that the most positive impact that we can have is on using less packaging material. Weight reduction has a positive impact on all of the other areas that we measure.

Recycled content of paper (post-consumer)

To enable a circular economy for packaging, we seek to use the highest levels of post-consumer recycled content possible, while still meeting the performance requirements for brand and product protection. We focus on the recycled content of paper because it constitutes the largest part of our material use.

A note about recycled content: While the highest possible recycled content is desirable, all recycled paper requires the addition of some percentage of virgin fiber. The reason is that fiber size breaks down after repeated recycling and eventually becomes too small and is washed away in the paper-making process. In corrugate, for example, using recycled content seven times is the industry standard.

Product-to-package ratio

Product-to-package ratio is a measure of the amount of empty space in a package. We focus on minimizing the amount of empty space, thereby decreasing the amount of packaging material used, as well as limiting the energy and other resources used for product manufacture and distribution.

Empty space results from how product components are arranged inside the package, product geometry, and buffer zones needed to protect products from shock, vibration, and compression during distribution. Product-to-package ratio varies greatly by product across the portfolio due to product fragility and the characteristics of the components “bundled” inside the package. A product-to-package ratio of 100 percent means there is zero empty space inside the package.

Greenhouse gas (carbon) emissions

We report on the total carbon emissions from the material, manufacture, transport, and end-of-life of our packaging. These calculations are based on the package design and the types and amounts of materials we use.

We seek to reduce packaging-related GHG emissions year over year. GHG emissions are calculated by using the COMPASS (Comparative Package Assessment) tool. COMPASS is an LCA software tool used to perform environmental footprint assessments based on industry average lifecycle inventory data. COMPASS was originally created by the Sustainable Packaging Coalition (SPC) and cross-functional team of LCA experts, LCA researchers, brands, packaging manufacturers, and material suppliers.

Recyclability end-of-life score

Our end-of-life score represents the ease of recycling or disposing of packaging, without harmful environmental effect. We score each packaging design based on its construction and the amounts and types of materials used. Per our 2020 sustainability goals, we strive for a score of greater than 80 percent for each design but, more importantly, for all packaging in total. In general, renewable materials (paper, paperboard, molded fiber, and corrugate) possess a higher end-of-life score.

Measuring our packaging sustainability

Measuring the sustainability of our packaging designs earlier in the design stage is best because much of the measurement work occurs parallel with the product design. As part of early design concept reviews, we measure and compare weight, size, and recyclability of each different concept. Bringing sustainability to the forefront of development engages stakeholders where they can make the most difference and provides a sustainability perspective to our business decisions.

When multiple alternative concepts are evaluated, we use three key measures to compare the designs before selection. Using package weight, size, and materials recyclability scoring, we assess the relative environmental impacts of design concepts, comparing environmental scorecards against earlier design versions as benchmarks.

How we measure our packaging sustainability

Consistent with prior years since we established our 2020 goals in 2016, we look at newly introduced packaging designs from the reporting fiscal year and compare them to a baseline predecessor (relative to our key environmental metrics). In this way, we can assess if our designs are improving year over year. In the approach, every design is equally weighted.

For newly introduced packaging from FY19, here's how we performed:

Weight	Post-consumer recycled content of paper	Product-to-package ratio	Recyclability end-of-life score	GHGs
Reduced by 14.4%	Improved 13.1%	Down 1.6%	Down 1.3%	Decreased by 11.3%
Exceeded year-over-year and 2020 goals of 3% and 10% weight reduction, respectively.	The average recycled content increased significantly vs. baseline. The overall average for this set of products was below our 2020 target of >70% at 60.6 %.	On most programs we were at parity or improved. On approx. 1/4 of new programs, the product to package ratio increased as a result of smaller products, protective requirements, or to eliminate the need for overpacking.	While slightly down vs. baseline, our average score for FY19 was 87.6%, significantly exceeding our 2020 goal of >80%.	GHG emissions as a result of the new package designs and materials used decreased significantly, in line with our year-over-year goal.

Moving forward:

In addition to the accomplishments listed above, we have worked hard to build tools and processes that will enable the measurement of our entire packaging portfolio and its total impact. We recognize the limitations around our current process of design assessment. Beginning in FY20, we will move to reporting that encompasses our entire packaging portfolio. We are doing this to:

- Better understand the actual aggregate environmental impact of the packaging we produce and place on the market.
- Establish comprehensive baseline metrics for our packaging to enable the setting of future sustainability targets.
- Increase our knowledge and prioritization of improvement opportunities.

This new reporting will include the impact of annual production volume for each package design in our portfolio. By considering annual production volume, we will be able to appropriately weigh the contributions of different designs and materials used across the portfolio. We are excited about this evolution in our reporting, what it will tell us, and how it will enable further improvements to the sustainability of our packaging.

ISO 14001 packaging targets

Microsoft Packaging participates in the Devices ISO 14001 Environmental Management System (EMS) and meets ISO standards in supply chain management of manufacturing operations. Packaging has a significant impact on environmental management from the perspective of corporate social responsibility. Careful management of raw materials used in packaging, manufacturing efficiency and distribution, and end-of-life regulations and fees increase the sustainability of our supply chain. ISO 14001 packaging targets stem from our focus on controlling these material effects.

We accomplished the following in FY19:

- Continued to measure new packaging designs against our 2020 sustainability goals, driving smart decisions that advance our progress on sustainability metrics.
- Built and implemented a comprehensive measurement and tracking system for packaging sustainability, including the establishment of baseline metrics for the entire Microsoft packaging portfolio. These metrics will enable us to set our 2025 packaging sustainability targets.

Commercial packaging and environmental impact

In FY19, we launched the first wave of specially designed packaging for the commercial channel. This packaging is tailored to the specific needs of this important part of our business.

The commercial channel packaging is significantly lighter than our historical retail packaging on a per-unit basis. More products will transition to this lighter weight packaging in FY20 and beyond. The average unit weight of this new packaging system is, on average, 45 percent less than the comparable retail counterpart.

The post-consumer recycled content of this packaging also has increased between 10 percent and 20 percent, depending on the product and retail package it replaces. Lastly, the end-of-life score for all commercial packaging configurations surpasses our 2020 target of 80 percent, indicating the high recyclability of this packaging.

On average, units weigh

45% Less

Post-consumer recycled content

10-20% Increase

EPEAT and packaging

For our Surface devices, we seek to meet and exceed the packaging criteria established by the EPEAT 2018 computer category. EPEAT is the leading global ecolabel for the IT sector. The EPEAT program provides independent verification of manufacturers' claims. National governments, including the U.S., and thousands of private and public institutional purchasers around the world use EPEAT as part of their sustainable procurement decisions.

Microsoft packaging complies with all the required criteria related to:

- Elimination of intentionally added heavy metals and elemental chlorine in packaging.
- Separable packaging material.
- Plastics marked in packaging materials.
- Recycled content in wood-based fiber packaging

We are working to meet optional EPEAT criteria using certified sustainably forested material and offering a bulk packaging option for our commercial channel.

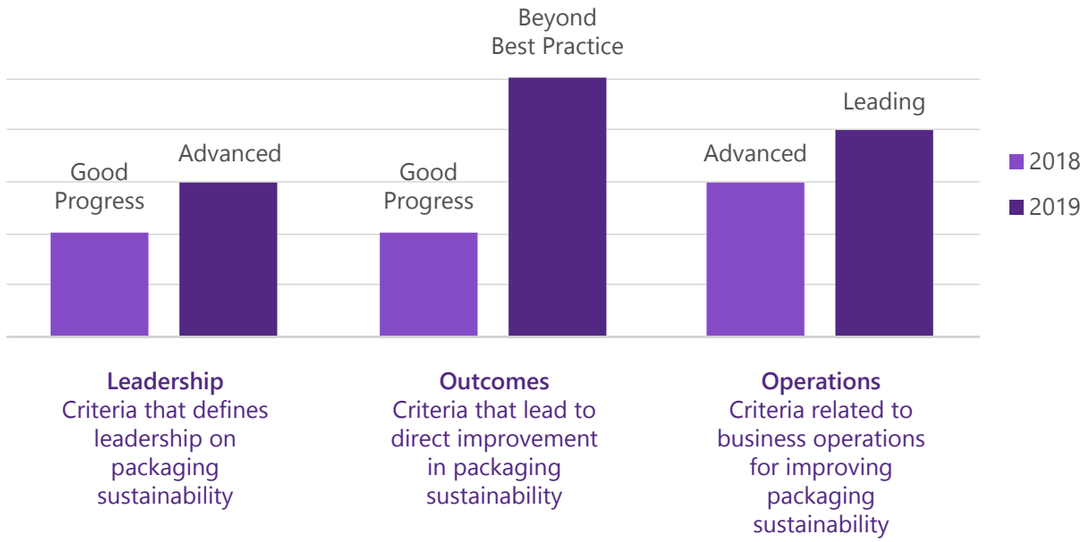
Australian Packaging Covenant

Microsoft's packaging development process works in tandem with our 2009 commitment to the Australian Packaging Covenant. The Covenant is governed by the Australian Packaging Covenant Organisation (APCO)—a co-regulatory, not-for-profit entity that partners with government and industry to reduce the harmful impact of packaging on the Australian environment. The program is a unique form of voluntary commitment against which we benchmark our global packaging. As one of the original signatory members to the Covenant, we agreed to reduce the environmental impact of consumer packaging by seeking improvements in packaging design, recycling rates, and stewardship.

We annually report our packaging sustainability improvements against an action plan to reach our goals. In 2019, we made significant improvements across all three categories of APCO criteria and met or exceeded our commitments under the APCO Action Plan.

2019 APCO Annual Report highlight: Our overall position improved from "Good Progress" to "Leading"

Packaging sustainability criteria



2020 commitment highlights:

Improve on-package messaging to increase active consumer engagement in packaging sustainability

Drive innovation and knowledge-sharing through continued industry collaboration

Improve packaging materials efficiency across packaging portfolio

Packaging compliance

Microsoft also implements strict policies to ensure that our products and packaging fully comply with global environmental requirements. For more information on packaging compliance, see our Environmental Compliance Letter.

Industry collaboration with the Sustainable Packaging Coalition

The Sustainable Packaging Coalition (SPC) is a membership-based collaborative that believes in the power of industry to make packaging more sustainable.

Microsoft actively participates and supports the goals of the SPC. We have been a member of this organization for more than 10 years. SPC is the leading voice on sustainable packaging and champions packaging that is good for people and the environment. The SPC envisions a world where all packaging is:

- Sourced responsibly
- Optimized for efficiency
- Effectively recovered
- Nontoxic
- Low impact

We utilize tools generated by the SPC, including COMPASS®, design-assessment software that compares the environmental impacts of packaging.

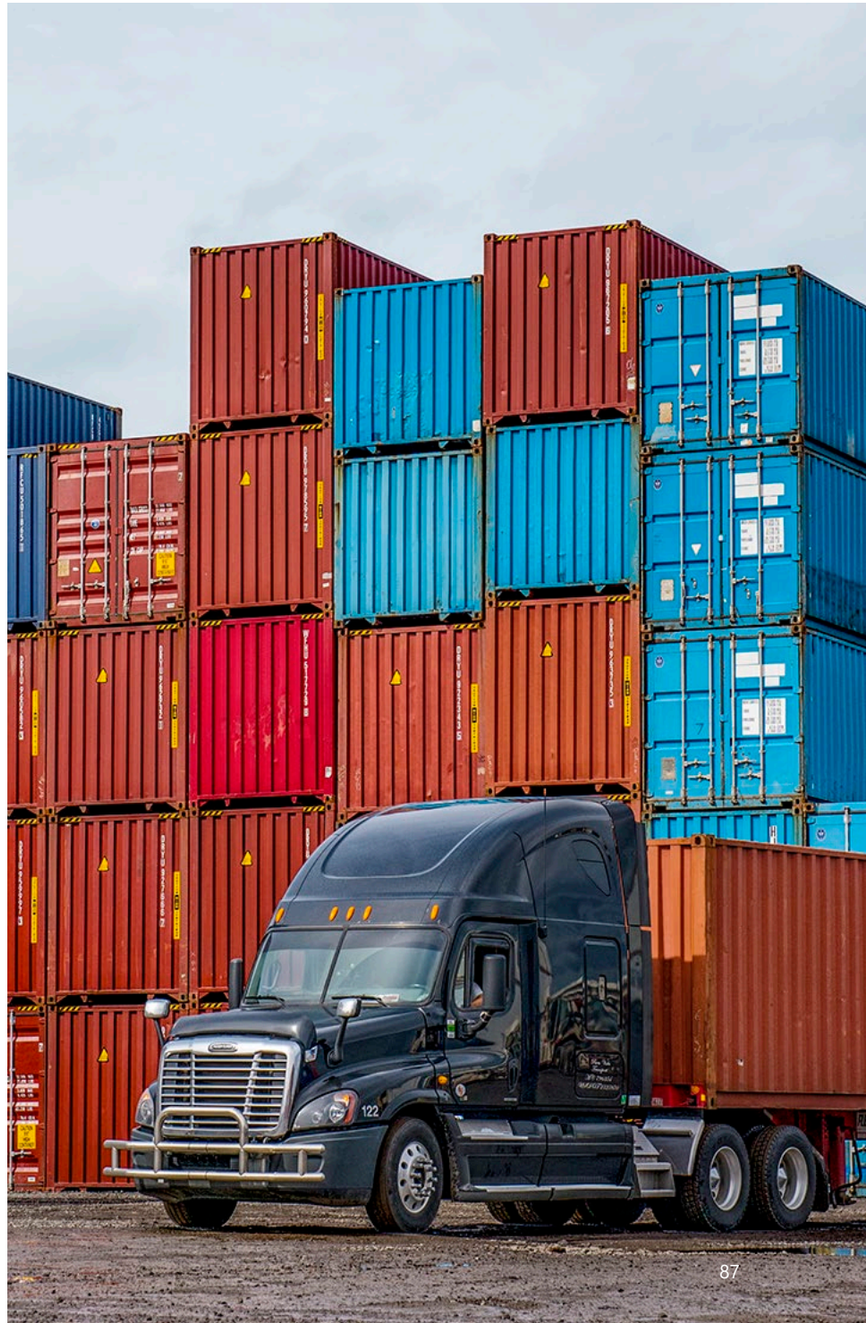
In 2019, Microsoft co-hosted the SPC Impact Conference in Seattle. At this conference, we contributed to advancing industry knowledge and solutions involving sustainable packaging. We also showcased Microsoft capabilities, including AI for Earth initiatives. We look forward to participating in future events and sharing environmental leadership to support further industry advancements toward a sustainable future.

FY19 Sustainable packaging highlights

- For new FY19 packaging, packaging weight decreased 14.4 percent versus baseline designs and the percentage of post-consumer recycled content of paper in these packages increased 13.1 percent.
- We exceeded our 2020 end-of-life target of >80 percent by 7.6 percentage points. This metric demonstrates that Microsoft packaging is highly recyclable.
- Launched the first wave of our new commercial packaging platform for Surface products, which will have a major positive impact across all key metrics in coming years.
- Major improvements in the Australian Covenant scores, positioning Microsoft as a leader in sustainable packaging.
- Developed capabilities for holistic assessment and reporting, covering our entire packaging portfolio. This will be implemented starting in our FY20 reporting cycle.

Opportunities for FY20 and beyond

- Continue to increase the percent of packaging material coming from post-consumer recycled content.
- Continue to reduce weight, design by design, and minimize empty space in our packaging.
- Continue to eliminate single-use plastics in our packaging.
- Increase consumer communication around packaging recycling.
- Leverage our new holistic sustainability capability and metrics to establish 2025 improvement targets.



Smarter fulfillment and logistics

World-class transportation management

The efficient use of our end-to-end fulfillment and logistics network is a significant component of our GHG reduction strategy. We now have the ability to deliver products to consumers either directly from the manufacturing line or through our distribution network. We use smart technology to help us select the most efficient mode of fulfillment, reducing our carbon footprint and increasing customer satisfaction. We also operate a world-class transportation management system that ensures we optimize our freight by reducing the number of shipments and using the appropriate transportation mode to deliver our product from the factory to its final destination.

By using smart technology in our distribution centers, we reduce our carbon footprint by increasing energy efficiency. Launched in July 2017, our most current state-of-the-art distribution centers include lighting that is motion activated and warehouse material-handling systems that operate only when they detect activity. These systems are idle when not in use.

To increase the energy and environmental efficiency of our freight operations, we partner with SmartWay®, a public and private collaboration between the U.S. Environmental Protection Agency (EPA) and the freight transportation industry. Through this partnership, we can accelerate the availability and adoption of advanced, fuel-efficient technologies and operational practices. As a certified SmartWay Transport Partner with the EPA, we improve fuel efficiency and overall environmental performance. Microsoft earned a 2018 SmartWay Excellence Award, the EPA's highest recognition for demonstrated leadership in freight supply chain energy and environmental performance.

Our emphasis on the use of ocean transport rather than air and parcel shipment further reduces our carbon footprint through increased fuel efficiency. We have also moved from parcel shipping to less-than-load (LTL) shipping, which increases load efficiency.

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2018 SmartWay Excellence Award
EPA's highest recognition for demonstrating leadership in freight supply chain energy and environmental performance

FY19 Devices transportation modes

FY19	Air	LTL	Ocean	Parcel	Truck	Total
% (Units shipped)	15%	35%	26%	8%	16%	100%

Palletization efficiency

The optimization of transport packaging is fully integrated into the design and development of our primary packaging. In this way, our transport and palletization minimize waste, energy, and GHG emissions and lower product costs.

Our goal is to maximize the quantity of product per pallet based on the dimensions of our transport packaging and the dimensional and weight constraints of the carriers. We consider product-to-package ratio, product fragility, load stability, and the distribution channel when optimizing these efficiencies. We utilize palletization software to run models and select the best pallet pattern for maximum quantity and load stability. We target achieving pallet densities of no less than 90 percent space utilization. We frequently adjust packaging sizes and the quantity of units per shipping case to achieve or better this score.

FY19 programs and pilots for sustainability

FY19 programs in progress	
Initiative	**Impact**
Package optimization Reduce shipment waste by predetermining optimal packaging.	• Reduced weight and content for outbound shipments.
baseline and ongoing measurement Global tools in place to measure CO_2 emissions, decision impacts, and metrics.	• Transportation programs are measured by their CO_2 emissions. • Outbound shipments are transported with SmartWay-certified providers, with a commitment for carbon emission reduction. • Global impact analysis in progress.
Direct ship program Shipments move directly from origin factory to customer and bypass distribution centers.	• Fewer miles per unit shipped. • Eliminates distribution center handling and distribution center footprint

FY19 programs in progress	
Initiative	**Impact**
CHEP pallets We replace disposable packaging with high-quality, reusable pallets and containers to eliminate waste and improve efficiency.	• Pooled asset use for the share and reuse principle. • Reduces use of natural resources. *From chep.com/us/en/retail/sustainability*
Distribution center ISO 14001 certification Distribution center partner, to achieve ISO14001 certification by late FY20.	• Distribution center partner to reduce environmental risk through certification to environmental management system standard.
Bundle to order (BTO) Shift 30% of distribution center bundling activities to a BTO model to eliminate rework.	• Packaging and waste reduction.
Slip sheet shipments • Utilize slip sheets instead of pallets from a manufacturer for Xbox shipments. • Increases container utilization by 25%.	• Pallet use elimination: 480 containers. • Major increased utilization in shipments and reduction in containers shipped. • Estimated impact: **several million total ton mile reduction**,* increases supply chain efficiency, and decreases CO_2 footprint.
Distribution center battery recharge process • Enable device manufacturing date to flow in messaging to distribution center to allow for targeted SKU recharge based on manufacturing date.	• Reduced electricity footprint at distribution centers. • Avoids unnecessary recharging.
Inbound load consolidation • Less than container load shipment consolidation across multiple contract manufacturers to ship full containers.	• Reduced CO_2 emissions through increased utilization. Estimated impact: >13 million ton mile reduction.

** Ton mile is a calculation that measures the weight of cargo hauled over the transport miles throughout the supply chain. This data is then used to calculate the carbon emissions. In this case, we are estimating the transport ton miles that will be saved by these initiatives.*

Social and environmental accountability in Devices logistics suppliers

As with all our suppliers, we expect our logistics suppliers to meet legal and regulatory standards according to the Microsoft Supplier Code of Conduct. In FY19, to gain a deeper understanding of business practices covering our Supplier Code of Conduct, we developed and administered an initial risk assessment questionnaire and had discussions with our suppliers to validate responses and understand related risks. We initiated pilot management system audits at two logistics suppliers, and we will recalibrate the audit approach after this pilot is finished. We expect to complete initial SEA audits of all logistics suppliers in FY20.

6 The customer use phase

Creating more energy efficient devices

- Energy efficiency improvements in Surface Pro
- Energy efficiency improvements in Xbox
- The Hovis method
- Microsoft products and technologies are enabling our customers to reduce their carbon footprint

Ensuring devices are safe to use

Championing accessibility and inclusivity

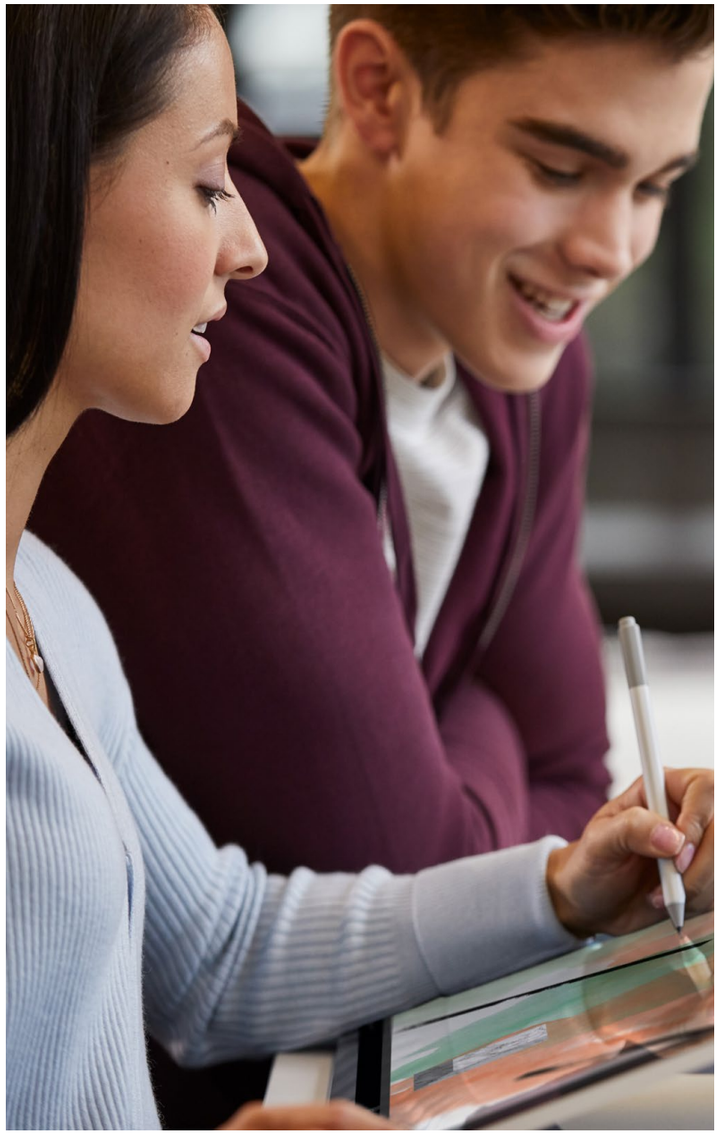
- Inclusive Tech Lab
- The Xbox Adaptive Controller
- Inclusive packaging design

Extending the useful life of our products

- Repair and refurbishment

Empowering organizations and individuals with secure devices

- Surface devices are designed with security in mind
- Applications and data are protected when users collaborate on Surface devices
- Surface devices easily deployed to a secured state



The use phase of our devices begins when the customer completes the out-of-box setup of the device and continues as long as the product is functional and in use. From a sustainability perspective, our goal during this phase of the product lifecycle is to increase the energy efficiency of our devices and extend their usable life through product quality, reliability, and repairability.

Creating more energy efficient devices

Energy efficiency improvements in Surface Pro

Microsoft works with its partners to develop hardware and software that increase computing power while reducing energy consumption. Illustrating these improvements, the Surface Pro, using Windows, has become so energy efficient to operate that the customer-use phase of each device now accounts for a smaller portion of its overall GHG emissions than the manufacturing phase (assuming three years of use). For more information, see our Ecoprofiles.

Microsoft introduced the Surface Pro in 2013 running the Windows 8 Pro operating system. Since then, Surface hardware development teams have improved the performance and energy consumption ratio with each new Surface Pro generation. ENERGY STAR provides a standardized method for calculating estimated total energy consumption (ETEC) in annual energy consumption of kilowatt hours per year. In this report, we use the ENERGY STAR Computers Specification Version 6.1 for this energy consumption calculation.

Estimating a device's computing performance is more challenging. Different devices are optimized to perform different tasks. In this report, we have used two common industry benchmarking programs for this analysis: PCMark® 7 and 3DMark® 11. PCMark 7 was introduced by Futuremark®, now a UL company, to benchmark Windows 7. Although the Surface Pro now runs newer operating systems, this benchmark is used because it can be applied consistently across the different operating systems. This benchmarking program shows performance in typical office tasks.

3DMark 11 is another UL Benchmarks product that analyzes the graphics processing unit (GPU) and graphics capability of a system. The "Entry" profile tests basic graphics and computing capability, and the "Performance" profile tests the GPU more extensively.

For the analysis of the Surface Pro line of devices, the performance-to-energy ratio was calculated using the sum of the PCMark 7, 3DMark 11 Entry, and 3DMark Performance scores and dividing by the ETEC for each model.

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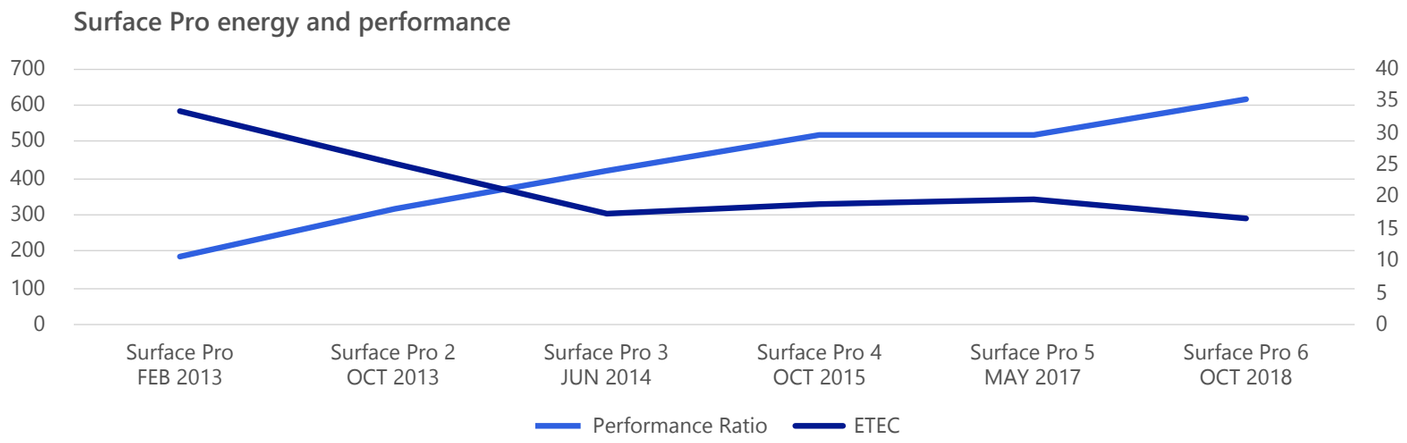
FY19 programs and pilots for sustainability

Surface product	Model	Release date	Operating system	Estimated total energy consumption (ETEC) (kWh/yr)	PCMark 7	3DMark 11 Entry	3DMark 11 Performance	Performance ratio
Surface Pro	1514	Feb. 2013	Windows 8 Pro	33.34	4673	1019	552	187
Surface Pro 2	1601	Oct. 2013	Windows 8.1 Pro	25.01	4922	1906	997	313
Surface Pro 3	1631	Jun. 2014	Windows 8.1 Pro	17.46	5024	1313	984	419
Surface Pro 4	1724	Oct. 2015	Windows 10 Pro	18.71	5403	2697	1556	516
Surface Pro 5	1796	May 2017	Windows 10 Pro	19.55	5731	2782	1666	521
Surface Pro 6	1796	Oct. 2018	Windows 10 Pro	16.69	5981	3655	2008	617

* The performance-to-energy ratio is calculated using the sum of the PCMark 7, 3DMark 11 Entry, and 3DMark Performance scores and dividing by the ETEC for each model.

The results are an example of joint value between the customer experience and sustainability. This chart shows energy consumption decreasing while compute power (performance) has increased with each new product release.



Energy efficiency improvements in Xbox

The Xbox line of game consoles has also reduced energy consumption during the use phase within a generation while achieving a greater level of gaming performance. For example, since the launch of Xbox 360 in 2005, our engineering teams successfully reduced standby power by a factor of 10 to less than three-tenths of a watt, resulting in a 60 percent reduction in energy use for this mode. In the Xbox line of devices, a greater portion of related GHG emissions is now associated with the customer-use phase assuming eight years of use. For more information, please see our Ecoprofiles.

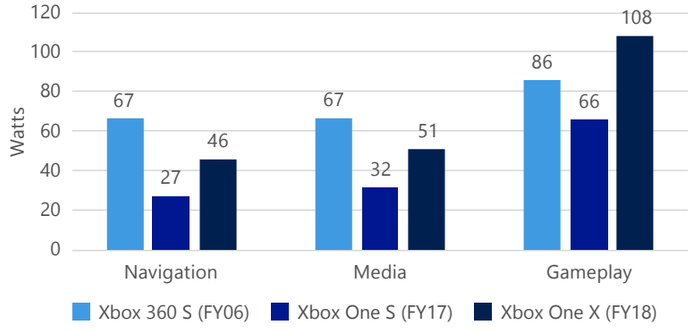
Carrying lessons learned from Xbox 360 forward, we continued our commitment to reduce energy use through the design of Xbox One and Xbox One X. Xbox One provides eight to ten times the processing power of Xbox 360, while Xbox One X is four times more powerful than Xbox One. These processing power advances challenge our ability to lower the total power consumption of Xbox One X.

Despite this significant increase in power for each generation, power needed for media play and the dashboard is 30 percent less than that of Xbox 360 at launch. The increase in energy efficiency results from scalable processor architecture that was not available for Xbox 360. Other efficiencies are gained by providing the user with choices about console functionality while in standby mode. Customers can configure the Xbox One console to use either instant-on power mode or energy-saving power mode, depending on their preferences. By configuring the energy-saving power mode to turn on and off like a laptop, customers have the option of disabling features and can drop the Xbox One console's standby power use by 98 percent. Customers can select this option at any time.

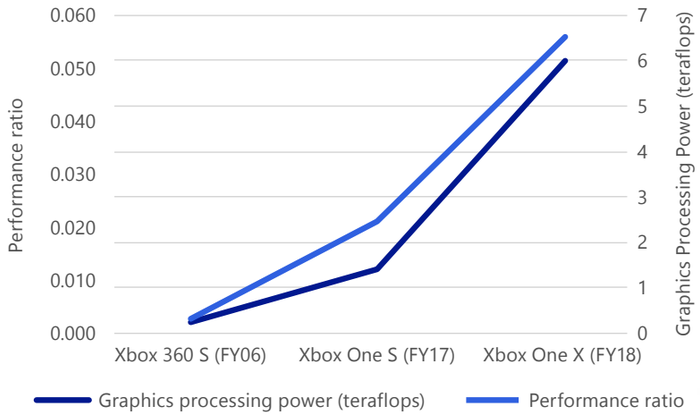
	Xbox 360 S	Xbox One S	Xbox One X
Gameplay (watts)	86	66	107.6
Graphics processing power (teraflops)	0.24	1.4	6
Performance ratio	0.003	0.021	0.056

Improving energy efficiency

Average power consumption Xbox 360 S, Xbox One S, and Xbox One X



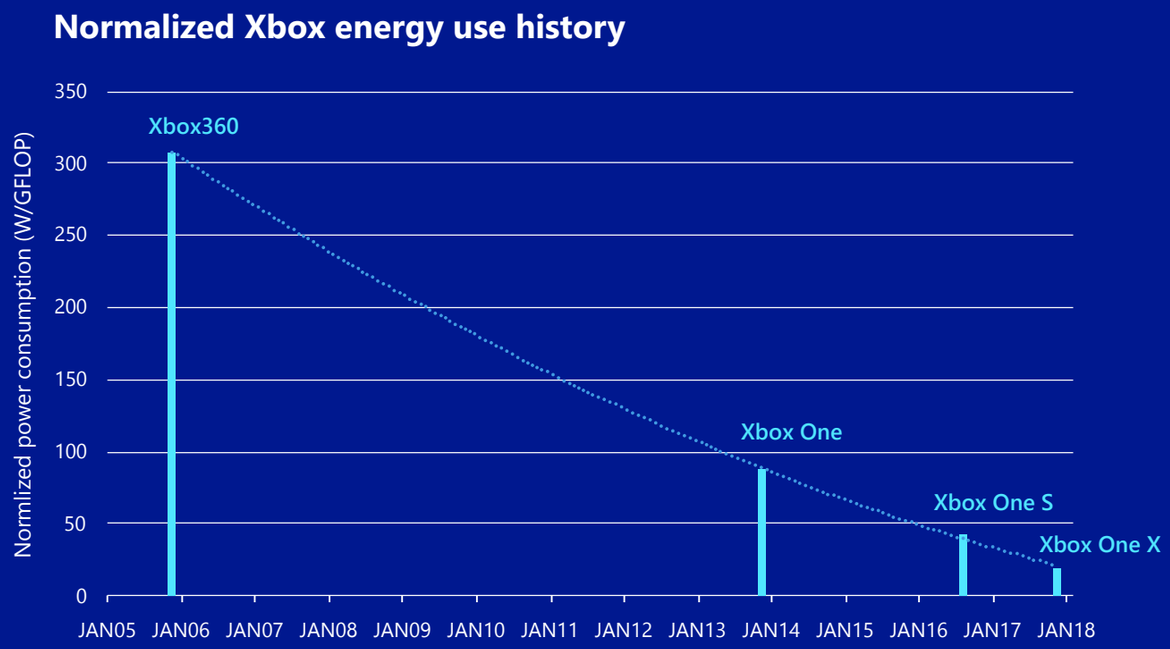
Xbox power and performance



The Hovis method

Improving Xbox energy efficiency and reducing emissions continues as a key focus. Microsoft contributes to a voluntary initiative in the EU (Games Console Voluntary Agreement[12]) along with other console manufacturers to voluntarily set rigorous energy-efficiency targets for game consoles.

Determining typical energy use for a gaming console is extremely challenging because energy use is heavily dependent on the graphics and processing requirements of the game being played and how long a user chooses to play games or watch movies. The rising complexity of games and increasing processing capability tends to elevate a console's energy use. Nevertheless, with each generation of the Xbox console, Microsoft has improved efficiency and reduced overall energy consumption. One way to visualize this is to look at the energy required to perform certain calculations with the understanding that "energy per unit of performance [is] highly approximate."[13]



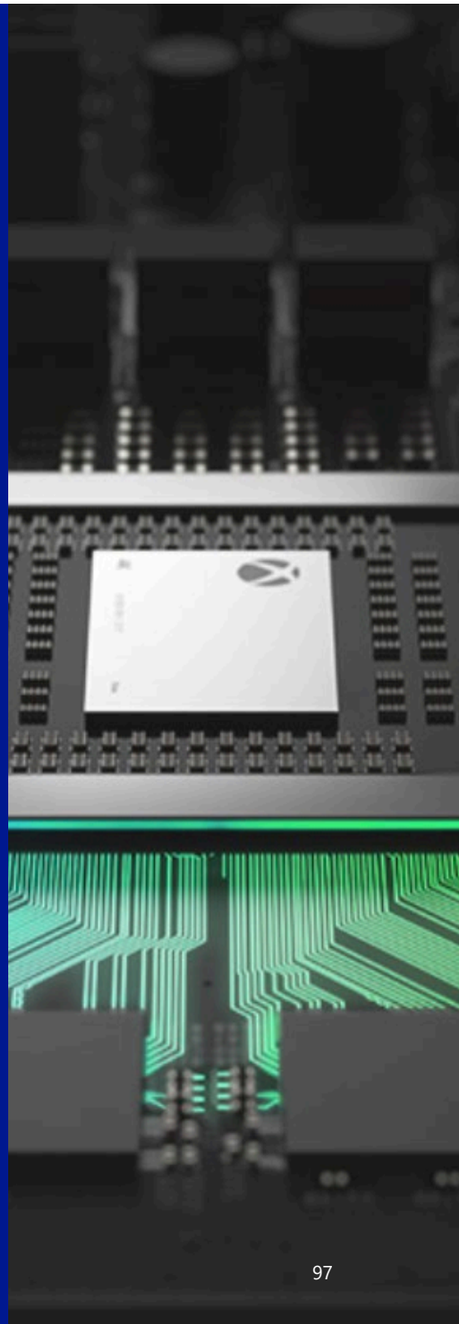
[12] efficientgaming.eu/

[13] *E. Mils, N. Bourassa, L. Rainer, J. Mai, A. Shehabi, N. Mills, Green Gaming: Energy Efficiency without Performance Compromise (2018)*

To achieve this energy savings, Microsoft employed several innovative techniques. Starting from the smallest electronic components in the device, the various hardware and software using them are designed to be as energy efficient as possible. The processing elements are the most energy intensive and Microsoft employs a unique technique for achieving greater efficiency developed by one of its engineers, termed the Hovis method.

Traditionally, all processors were assumed to be identical and the electronic system was designed to accommodate the hypothetical console requiring the most power. The Hovis method accepts that each processor is, in fact, unique with its own voltage, frequency, and power needs. Each console is therefore designed with those specific parameters in mind, which significantly reduces the console's overall power requirement. In the following chart, the blue dots represent individual console power requirements which are far below the assumed darker blue curve, thereby allowing the power capacity to be reduced by about 30 watts.

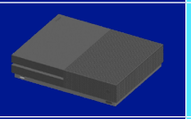
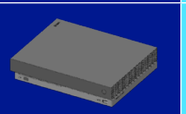
Reduced power requirements using the Hovis method



With the savings from the processing requirements, the main power supply can be reduced in size. This reduction increases the savings even further. All these efficiencies use less energy, which means less energy is wasted as heat, allowing the size of the console to be reduced, which leads to decreased materials use requirements.

For more information, see our energy efficiency page at microsoft.com/en-us/legal/compliance/energy.

Reduced power requirements using the Hovis method

Console Model	Depth (mm)	Height (mm)	Thickness (mm)	Bounding Volume (cm^3)	PSU/Power
Xbox One 	274	332	80	7277	Ext / 220W
Xbox One S 	229.8	295	63.5	4305	Int / 120W
Xbox One X 	240	300	60	4320	Int / 245W

The Hovis method efficiencies

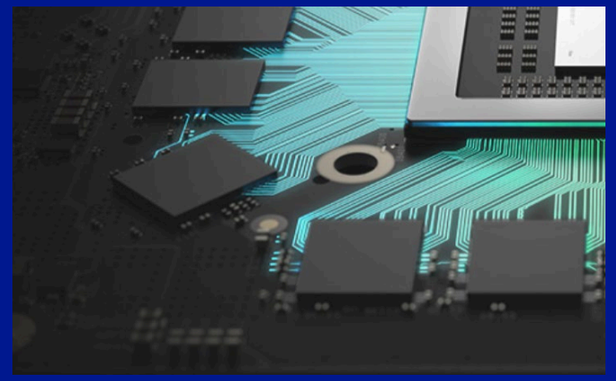
Hovis-ing the processor
The Hovis method models power based on actual rather than assumed

Improving energy efficiency
Energy efficient components in the hardware and software

Reduced power requirements
Lower power requirements mean less wasted energy as heat and smaller power supply

Decreased material use
Less energy wasted as heat means components such as cooling fans can be smaller

Small Xbox console design
Smaller components means the overall console size can be reduced



Microsoft products and technologies are enabling our customers to reduce their carbon footprint

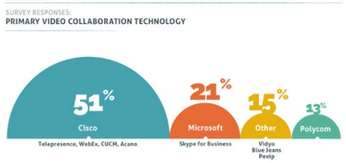
In FY19, Microsoft completed a study to quantify the potential for carbon emissions reductions and increased productivity levels that result from the use of Microsoft productivity tools used by the Surface line of devices and the product lines of other OEMs. The study used the results and methodology published in the 2015 Global e-Sustainability Initiative (GeSI) #SMARTer 2030 report using top-down quantification based on product market share. Products considered were Skype, SharePoint, and Office 365. The outcome was that these Microsoft products avoided 50 million tons of CO_2e in 2015[14], which is almost three times greater than our Scope 1, 2, and 3 emissions.

GeSi #SMARTter2030

GeSI
GLOBAL e-SUSTAINABILITY INITIATIVE

Global e-Sustainability Initiative published an industry-wide study #SMARTer2030 to estimate ICT enablement of broader carbon reduction

Evaluate market share



The proportion of Microsoft products was measured against #SMARTer2030 estimate of 2015 enablement

Calculate Microsoft share

50 Million

TONS OF CO_2e AVOIDED IN 2015

Estimated carbon reduction enablement in 2015 due to Microsoft technology, compared to same productivity without Microsoft — three times greater than Microsoft's own emissions

[14] *Verified by Small World Consulting, Ltd.*

Ensuring devices are safe to use

Product safety is critical to our business and enables us to provide superior products, which customers and employees can enjoy with confidence throughout their usable life. We ensure all products are safe for their intended use by implementing rigorous safety strategies based on industry standards, regulations, and internal specifications, and by proactively examining safety performance at various stages during the product lifecycle.

All Microsoft employees are responsible for helping the company fulfill the following Product Safety Principles:

- **Product safety comes first.** We care about the safety of our customers and employees. We plan, design, manufacture, offer, and maintain products that are safe for their intended use. We strive to discover and address product safety issues early during product development.
- **Educate employees and partners.** We educate our employees and require our industry partners, device manufacturers, and suppliers to follow design and manufacturing specifications that are consistent with our Product Safety Principles.
- **Safe use and handling.** We believe that customers should understand how to safely use our products. We provide customer safety education through labeling, user guides, and online content to build upon the customer safety experience.
- **Safety monitoring and continuous improvement.** Microsoft monitors product performance, customer concerns, and the effectiveness of our product safety programs to ensure and improve the safety of our products.
- **Our community.** We examine ideas and guidelines from industry associations, governmental agencies, and customers and search for new and emerging practices and technologies. Creating safe products supports Microsoft's mission to empower every person and every organization on the planet to achieve more.

Microsoft's product safety management system is designed to conform to ISO 10377:2013—Consumer Product Safety—Guidelines for Suppliers (the Guidelines). The Guidelines provide "practical guidance...on assessing and managing the safety of consumer products, including effective documentation of risk assessment and risk management to meet applicable requirements. They describe how companies can:

- Identify, assess, reduce or eliminate hazards
- Manage risks by reducing them to tolerable levels
- Provide consumers with hazard warnings or instructions essential to the safe use or disposal of consumer products"[15]

In early 2019, we commissioned DNV GL Business Assurance USA, Inc. (DNV) to perform an independent assessment of our product safety management system's adherence to the basic principles and requirements of the Guidelines. Microsoft management is the intended user of the assessment.

The DNV GL assessment concluded that Microsoft's product safety management system has demonstrated conformance with the requirements and intent of the Guidelines. It also found that Microsoft's systems and procedures can provide sufficient management and monitoring of consumer product safety in accordance with the Guidelines' principles and requirements.

Microsoft strives to generate and foster a product safety culture within and outside the organization. Within Microsoft, we adhere to international product safety standards and regulations as well as internal specifications, which inform the design and performance of our products. During product concept and early design, product safety engineers conduct hazard analyses and risk assessments. Identified risks are eliminated or mitigated during subsequent design, testing, and manufacture consistent with the hierarchy of health and safety controls methodology. Engineering product safety reviews are conducted at initial product concept and repeated through design, prototype review, testing, manufacturing, consumer use, and at the end of the product's useful life. In a continuous improvement loop, safety findings and lessons learned are fed back into the design specifications for future products and shared with the engineering teams.

Through our memberships in several organizations, we learn about upcoming and proposed regulations. In addition, we regularly share best safety practices related to consumer products with industry and trade associations, as well as other manufacturers. For more information, see the Our stakeholders section.

We also provide consumers with the information they need to safely assemble, use, maintain, and dispose of a consumer product. This information is available online at Microsoft.com. All Microsoft.com webpages have a link in their footer titled Safety & Eco for quick access to this information. Additionally, our in-market monitoring program captures, triages, and assesses product safety concerns brought forward by our customers.

[15] *iso.org/standard/45967.html*

Championing accessibility and inclusivity

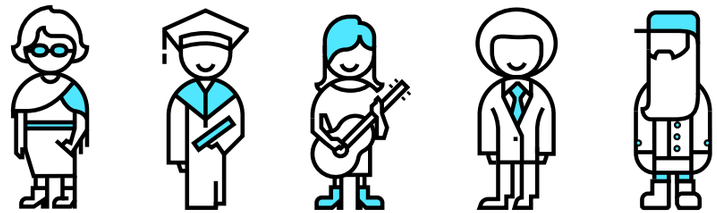
Microsoft's mission is to "empower every person on the planet to achieve more." Achieving that goal requires that our devices be designed to meet the needs and aspirations of individuals, organizations, and communities. We practice Microsoft Inclusive Design Principles to achieve accessibility in our products, and we continue implementing innovative solutions in pursuit of making the benefits of technology available to everyone.

Our inclusive design principles

Recognize exclusion
Exclusion happens when we solve problems using our own biases. As Microsoft designers, we seek out those exclusions and use them as opportunities to create new ideas and inclusive designs.

Learn from diversity
Human beings are the real experts in adapting to diversity. Inclusive design puts people in the center from the very start of the process, and those fresh, diverse perspectives are the key to true insight.

Solve for one, extend to many
Everyone has abilities and limits to those abilities. Designing for people with permanent disabilities actually results in designs that benefit people universally. Constraints are a beautiful thing.



Inclusive Tech Lab

We have hosted more than 6,000 visitors who have been introduced to our Inclusive Tech Lab facilities to engage and understand the challenges that people with disabilities face with technology.

One of the roles of our Inclusive Tech Lab team is to advise on accessibility policy and evaluate and report on our compliance. We adhere to the guidance of the Microsoft Accessibility Standard when designing our products, ensuring a consistent baseline of accessibility from which we can build truly inclusive devices.

The Xbox Adaptive Controller

In 2018, the Xbox Adaptive Controller joined the Xbox family of controllers and devices. The Xbox Adaptive Controller was created to address challenges of gamers with limited mobility and remove barriers to gaming by being adaptable. We developed this controller in partnership with organizations around the world, including The AbleGamers Charity, The Cerebral Palsy Foundation, Craig Hospital, SpecialEffect, and Warfighter Engaged. We worked closely with these organizations and directly with gamers who have limited mobility to assist in the product's development. Our goal was to make the device as adaptable as possible so that gamers can create a setup that works for them in a way that is plug-and-play, extensible, and affordable.

When everybody plays, we all win.

The response to this device has been tremendous, receiving praise from the industry, press, and gamers with limited mobility. The Xbox Adaptive Controller has received the following rewards:

- D&AD Awards 2019: Xbox Adaptive Controller, Black Pencil Winner, Inclusive Product Design
- Entertainment Software Association: 2019 Champion Award—Xbox Adaptive Controller Team
- Golden Joysticks: Outstanding Contribution goes to Xbox for their Xbox Adaptive Controller
- Time.com: Xbox Adaptive Controller, One of TIME's Best Inventions of 2018
- Popular Science: The 100 greatest innovations of 2018
- Windows Central Game Awards 2018: Innovation Award, Best Xbox Accessory—Xbox Adaptive Controller
- Mashable: 14 innovations that helped make the world a better place in 2018
- GamesIndustry.biz: People of the Year 2018: The Xbox Adaptive Controller team

Inclusive packaging design

The team took things a step further when they designed the Adaptive Controller packaging. The box can be opened and unpacked with just one hand, making it one of the most accessible packages ever made for a consumer device. The external shipping box for this device features a loop that enables "unzipping" the packaging with one finger. Further, the inner box can be opened without any sharp tools. See the video about the Xbox Adaptive Controller packaging.

Learn more through this short video at our Accessibility site at microsoft.com/en-us/accessibility. For more information about our designs based on feedback from the accessibility community, see xbox.com.

Extending the useful life of our products

Our aspiration is for our products to reach the highest levels of quality and craftsmanship, even in the face of rapidly advancing technology. Our hardware designers make careful choices on how all the components and materials are assembled, and these choices have a profound impact on the length of the product's usable life—and on the lifetime value they deliver to customers.

Microsoft uses computer simulation and materials characterization techniques to improve product designs for longevity. Thermo-mechanical computer techniques like Finite Element Methods are used to identify the loads on components and materials in different application scenarios. Materials are characterized for their initial strength and degradation over time using advanced techniques. Product designs are guided by choices that ensure that strength exceeds loads over extended periods of use.

Our emphasis on longevity extends to components and materials. Microsoft products use components and materials sourced from global suppliers. We implement an intensive component and material selection and qualification process, and we work with component suppliers on their design and assembly processes to establish qualification protocols. Products are launched only after components are qualified to exceed product life requirements.

After products are launched, we monitor product health based on quality monitors in the factory, customer experience reports, and product returns. Returns are analyzed for actual causes for return. Learnings for design, process, or materials may be incorporated into devices in production and future designs. This closed-loop feedback system reduces the probability for failure in the field for existing products and future product designs while prolonging device life.

Our design and quality principles, coupled with our product service models, contribute to the length of customer use. Software is another important factor in length of customer use. Microsoft can extend product life through firmware and Windows 10 software updates. This service effectively disconnects the delivery of functions from devices, allowing continued use of older generation devices and decreasing the need to replace hardware. The positive impact of these software updates can extend the use phase of both third-party and Microsoft first-party devices.

Repair and refurbishment

Microsoft devices' Windows 10 software and hardware are repairable, and we make available to customers a variety of means to extend the life of our products. For Surface software issues, Microsoft provides a free Surface Diagnostic Toolkit to fix common software issues. Using this tool, the customer can differentiate software issues, which can be easily fixed by the customer, from hardware issues, which may require professional help. Microsoft also provides self-help guidance to fix common issues related to software and device settings.

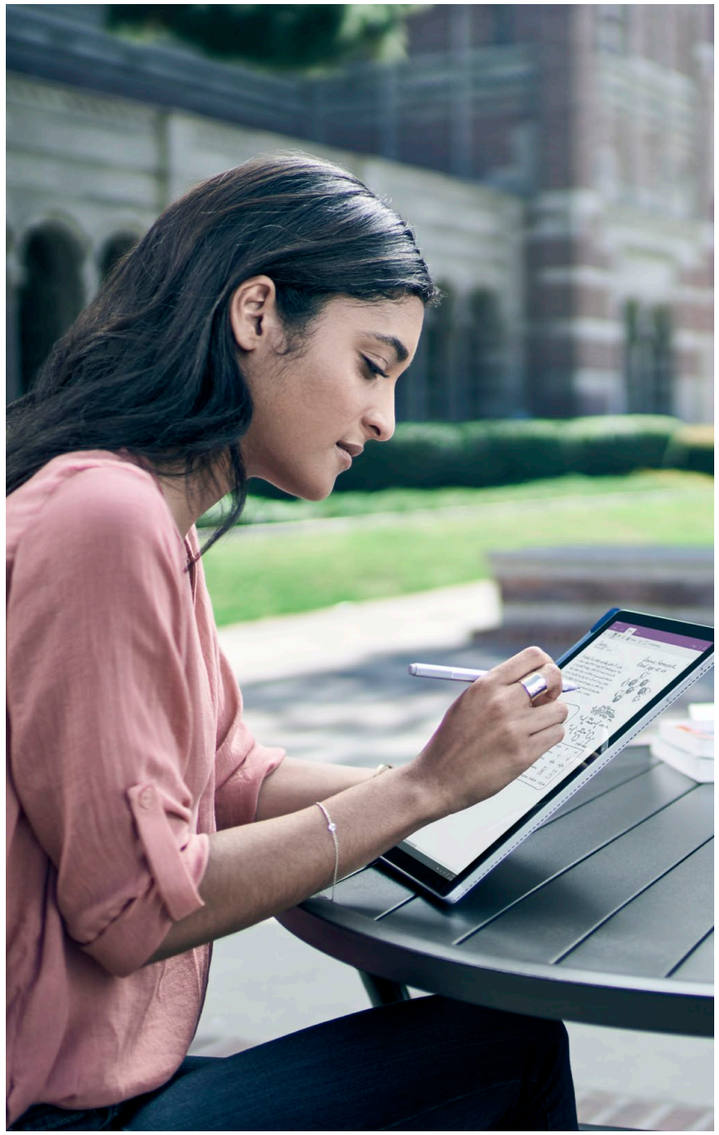
Hardware issues can be fixed through the Devices Service and Repair program for devices in and out of warranty. Getting a product serviced is an easy process that requires the customer to register the device online and enter details about the needed repair. Information is provided, including the cost of out-of-warranty repair and a shipping label and tracking number are provided to the customer for arranging the repair. Obtaining help and repairs is also simple for Xbox customers as warranty and service information is provided online. Customers can obtain online information about warranties for all Microsoft products.

Microsoft is committed to designing our products to deliver what customers need and want in a premium device and that includes multiple options for servicing. We are working with our industry partners to provide repair options that ensure the quality of repairs, safeguard consumer's privacy and security, and protect consumers from injury.

In addition to device repair, Microsoft refurbishes Surface products. Learn more about the Refurbished PC Program in the End-of-life management section of this report. Also, learn more about how we continually strive to extend the useful life of our products with designs that enable repair and refurbishment, see the Sustainability product lifecycle section of this report.

Empowering organizations and individuals with secure devices

Surface devices empower teams and individuals to collaborate freely, be creative, and work with confidence. We continue to make advancements in the security of our Surface devices—along with Microsoft 365—so our customers can trust that their devices are safely accessing their applications and data, whether in the cloud or on-premises. This peace of mind enables more efficient processes, more effective collaboration, and a better experience for all users.



Surface devices are designed with security in mind

Sustainable updatable Surface firmware

Surface devices use firmware engineered by Microsoft. This firmware is updatable automatically via Windows Update, making the process of keeping a device secure sustainable for years after launch. Surface UEFI firmware is based on Project Mu, an open source UEFI code base. This firmware is signed and verified upon start-up to prevent tampering. With Project Mu, Microsoft makes it easier to build secure, scalable, and serviceable UEFI firmware for the ecosystem of Windows devices. This allows for fast and efficient updating of UEFI firmware after release, with both the ability to respond to security threats and to provide performance-enhancing updates in a timely manner.

Surface devices powered with a secure and compliant TPM

Surface devices are equipped with a Trusted Platform Module (TPM) version 2.0 that meets industry standards like FIPS 140-2 Standard and Common Criteria/ EAL certification. TPM allows Surface devices to meet requirements from the most security-conscious organizations, including governments and military. Keys used in authentication and encryption are protected by the TPM. This feature shields several use cases, including authentication to Windows and to Microsoft 365 preventing spoofing of users' credentials and biometrics (such as with Windows Hello or Windows Hello for Business), using virtual applications, and accessing data encrypted in disk at rest (such as with BitLocker).

Surface devices secured from the factory

Surface devices include verifiable device security from the factory. Each device is provisioned with an individual key that chains to the Microsoft Root of Trust. With Secure Boot, customers can have confidence that the Surface firmware is tamper free. Additional keys and identities are based on this Root of Trust.

Applications and data are protected when users collaborate on Surface devices

Surface devices and secure authentication to your apps

When users connect from Surface devices to applications in the cloud and on-premises, authentication to these apps is secured. Authentication tokens and session keys coming from Azure Active Directory (Azure AD) are protected in the TPM of the device using an asymmetric key generated also in the TPM at deployment time. This feature effectively prevents bad actors from replaying stolen tokens on a different device to gain unauthorized access.

Surface devices mitigate the risks associated with the use of passwords

Biometrics on Surface devices allow secure authentication to Windows and Microsoft 365 through Windows Hello and Windows Hello for Business. This feature gives the convenience of using biometrics for user sign-in while keeping authentication secure by reducing the risks associated with the use of passwords (such as credential theft). Windows Hello and Windows Hello for Business credentials are asymmetric keys generated in the TPM of the device, protected by the biometric signature of the user. There are no credentials malicious agents can steal because there are no credentials that leave the device to authenticate the user to Microsoft 365.

Secure modern management of firmware settings via Intune

Looking forward into FY20, with Device Firmware Configuration Interface (DFCI), IT professionals will be able to securely manage firmware setting on their Surface devices using a mobile device management (MDM) solution like Microsoft Intune (part of Microsoft 365). With DFCI, IT administrators gain the efficiency of cloud-scale remote firmware management with zero-touch device provisioning and built-in security. DFCI eliminates BIOS passwords, provides control of security settings including start-up options and built-in peripherals, and lays the groundwork for advanced security scenarios in the future.

Secure access to applications from Surface devices via device-based conditional access

Surface devices can participate in device-based conditional access to make sure they meet organization compliance policy. This access extends to devices that are joined to the organization, users with strong authentication (such as Windows Hello for Business), or from devices that meet specific policies (for example, encrypted disk and complexity of PIN). Session and device risk protect the user identities and data with cloud intelligence based on dynamic and contextual access conditions. Surface devices support Windows Defender Advanced Threat Protection to enable device risk in conditional access.

Surface devices easily deployed to a secured state

Secured deployment with factory security

Windows Autopilot uses the verifiable device security from factory to customers right out of the box for deploying a brand new Surface device in an organization. With the factory security, Surface devices can be pre-registered in Azure AD so, upon first boot, they authenticate to Azure AD and obtain a new organization-based identity. This authentication allows the device to be enrolled and configured to the organization's MDM solution like Microsoft Intune and access the organization's applications and data. The organization can then trust that only devices it purchased and authorized can access organizational resources.

User-driven deployment of Surface devices with Windows Autopilot

Windows Autopilot simplifies and modernizes the deployment of Surface devices. IT professionals can customize the out-of-box experience for their Surface devices and enable end users to achieve a fully configured device ready for business use with just a few clicks. There are no images to deploy, no drivers to inject, and no infrastructure to manage. Most importantly, users can go through the process independently, without the need to involve IT.

Easy lifecycle of Surface devices

As these devices get enrolled into the organization MDM (like Microsoft Intune), organizations can easily replace any Surface device in a fast and secure way and manage its lifecycle by remotely removing all organizational data from the device or redeploying it to a new employee. All transition states happen in a secure manner given that all identities coming from Azure AD and Intune are protected through the device's TPM.

7

End-of-life management

We have made significant steps in evolving our product lifecycle strategy to embrace circularity. When repair is not an option to extend product life, we have programs and processes in place to ensure that as many product components as possible are recovered, recycled, and kept out of landfills. We extend our commitments through investments and partnerships in a range of recycling programs around the world that cover both our products and our packaging.

Electrical and electronic equipment, batteries, and packaging

The recycle phase

Microsoft Devices has a dedicated team that manages the complexity of the return and recycle phase of electrical and electronic equipment (EEE), batteries, and packaging. We partner with collection schemes and Microsoft-contracted asset recovery and recycling suppliers and work with retail stores and our OEM partners to support our customers' ability to return and recycle our devices, batteries, and packaging.

Greater recycling options

We continue working globally to ensure recycling options are more readily available to our customers. Since 2006, Microsoft and its contracted Producer Responsibility Organizations (PROs) have collected and recycled over 91 million kilograms of waste electronics and electrical equipment (WEEE) and batteries globally.

Device refurbishment

We offer repair of our Microsoft Devices through robust refurbishment programs. In addition, we give new life to used electronic devices of several OEM devices using the Windows platform through Microsoft Authorized Refurbishers (MAR) and the Refurbished PC program. Our MAR partners provide professionally refurbished computers preinstalled with genuine Microsoft software for use at home, in commercial businesses, or at nonprofit organizations. The combined efforts of a network of organizations and members of the Refurbished PC program bring affordable access to technology through favorable pricing on Windows and reuse of EEE that may otherwise be discarded. Where the EEE may not be reused, the Refurbished PC network assists with making appropriate asset disposal decisions.

We urge you to recycle your electronics to enable the refurbishment, partial reuse, or recycling of your devices.

Users of electronics have expressed that they are fearful about loss of privacy and data access issues should they turn in their devices for refurbishment or recycling. Did you know that Windows 10 has a data wiping feature that you can use?

Our philosophy on individual and extended producer responsibility

Collection and recycling of WEEE, batteries, and packaging are often organized with other manufacturers through collective arrangements. In certain markets, recycling may be delegated to a PRO.

Where enacted WEEE, battery, and packaging legislation is in place and PROs are not available, Microsoft supports Individual Producer Responsibility as a strategy to comply with our regulatory obligations. Microsoft also promotes incorporating end-of-life recycling costs into the cost of new products to encourage producers to find innovative ways to design more sustainable products that can be easily reused, disassembled, or recycled.

Investing in global end-of-life programs for devices, batteries, and packaging

Microsoft follows several strategies for addressing consumer electronic waste, including a range of recycling programs, supplier conformance programs, and material recovery initiatives.

Regulatory recycling programs

Microsoft is a member of over 150 PROs worldwide, covering WEEE, batteries, and packaging. PROs act exclusively on behalf of their member companies to collect and recycle WEEE, batteries, and packaging in an environmentally sound manner and operate in full compliance with all applicable laws and regulations.

Voluntary recycling programs

Microsoft offers several types of free, voluntary recycling programs for WEEE, batteries, and packaging to make recycling easier and convenient for our customers. For example, in the U.S. we provide a mail-back program. Microsoft also supports TechCollect in New Zealand—a not-for-profit service that is industry funded and provides the first free WEEE recycling service.

Microsoft will be expanding its free-of-charge recycling programs to several countries around the world. For the latest information on where and how to recycle WEEE, batteries, or packaging, visit our website.

Voluntary recycling at Microsoft Stores

Microsoft Stores offer trade-in and recycling of Microsoft and non-Microsoft-branded EEE turned in by consumers at select locations. Learn more at microsoft.com/en-us/store/locations/recycle.

Voluntary recycling initiatives in Africa

Microsoft is a founding participant in the E-Waste Solutions Alliance for Africa (Alliance) together with Dell, HP, and Philips. The Alliance is a proactive industry working group aligned toward sustainability leadership and solving the e-waste challenge in Africa. The Alliance, which began in 2011 following the First Eko E-Waste conference in Nigeria, is working with several African governments to make this a reality. The Alliance's goal is to facilitate the development of practical solutions for the collection, recovery, and recycling of WEEE in Africa.

The Nigerian government, Global Environment Facility (GEF), and UN Environment have joined the Alliance to launch a $15 million investment to create a formal e-waste recycling industry in Nigeria. The partnership was convened on the World Economic Forum's Platform for Accelerating the Circular Economy during January 2019. Funding comprises a $2 million GEF investment, which will be leveraged for an additional $13 million private sector co-financing. It is estimated that 100,000 people work in the informal e-waste sector in Nigeria alone. The investment will not only unlock economic growth but also promote safe and decent employment for these workers.

Supplier conformance standards

Our manufacturing and asset recovery and recycling partners directly contracted by Microsoft must meet our specifications as stated in H09117—Supplier Conformance Standards for End-of-Life Management of Electrical and Electronic Equipment and Waste Materials. This requirement includes, but is not limited to:

- Maintaining all necessary certifications, including but not limited to R2 and e-Steward, or the equivalent.
- Obtaining, holding, and maintaining valid accreditations of the following:
  - ISO 14001 Environmental Management
  - ISO 9001 Quality Management
  - OHSAS 18001 Health and Safety Management
- Complying with all applicable international and national laws, including laws pertaining to the transboundary movement of hazardous waste (for example, Basel Treaty).
- Selecting and auditing subcontractors that process materials according to our requirements.

Microsoft global material recovery of end-of-life electronics and batteries

To further our commitment to pursue an end-to-end sustainability strategy, we track the disposition of our branded electronics and batteries managed by our Asset Recovery and Recycling partners from start to finish. This activity provides visibility and insights into our end-of-life process related to WEEE and batteries.

Recovered material	Recovered from	Primary processing	Final processing	Location of final processor	Market end uses
Copper, gold, silver, palladium, tin	Circuit boards, CPU, RAM chips	Dismantled, separated, and shredded	Metal extraction	Canada, Japan, Belgium, Sweden, Germany	Base metals, re-melt alloys, and precious metals sold globally as commodities
Aluminium	Hard drives, screen frames, CPU heat sinks	Dismantled, separated, and shredded	Smelting	U.S., China, Belgium, Germany	Sold globally as a commodity
Steel	Device hinges, rails, frames	Dismantled, separated, and shredded	Smelting	U.S., China, Germany	Secondary steel sold globally as a commodity
Copper	Cables and wires, CPU heat sinks	Dismantled, separated, and shredded	Smelting	Japan, Belgium, China	Sold globally as a commodity
Plastics (ABS, PE, et al.)	Device chassis/cases and covers, device-integrated keyboards, peripherals, accessories	Dismantled, separated, and pelletized	Recyclables plastics sorted according to resin type	Canada, Singapore, Australia, Hong Kong	Sold globally as commodity; mixed with virgin to make new plastic parts and products
			Non-recyclable plastics processed for energy recovery	U.S., Belgium, UK	Energy recovery
Lithium, cobalt, nickel	Lithium-ion batteries contained in devices, accessories, and peripherals	Removed from electronics	Smelting or chemical extraction of materials (pyrometallurgical treatment)	U.S., Canada, South Korea, China, Australia, Netherlands, France, Germany, Poland	Incorporated into re-smelted alloys sold globally as a commodity; extracted metals sold back into battery manufacturing