

# IS THE TECH SECTOR GETTING GREENER?

# Carbon

footprints. Toxic chemicals. Recycling and e-waste. Worker health and safety. These are some of the environmental issues that are top of mind for technology companies these days. Some of the issues are relatively new, such as striving for 100% renewable energy. Others are perennial, such as managing the toxicity of chemicals used in the manufacturing process and product components.

Some require bold leadership, while others are addressed by compliance with industry standards or government regulations. For market leaders, though, there's increasing pressure to elevate their commitment to environmental responsibility and transparency, setting the bar higher for themselves and their supply chain partners.

The reasons for a sharper focus on environmental issues varies from company to company, but typically are driven by pressure from employees, customers—corporations, governments, and consumers alike—and from shareholders. One factor is the increasing economic clout of the [Millennial generation](#) in the U.S., which is projected to overtake the Baby Boomer generation in population next year, according to Pew Research. And as of 2017, Millennials [outnumbered](#) Baby Boomers in the workforce, and are projected to account for about three-quarters of the U.S. workforce by 2025.

An [MIT AgeLab survey](#) found that Millennials consider themselves more concerned about the environment than their elders, while both Boomers and Gen Xers have become more concerned as they age.

The demographic shift and increasing concern about the environment is part of the reason why annual corporate social responsibility (CSR) reports of many large tech OEMs are more robust than they were just a few short years ago. The trend toward greater transparency is not as evident among OEMs in Asia as it is in Europe and the US, although progress is being

made. Similarly, companies within the supply chain are often motivated by the demands of their larger customers, which are increasingly setting the environmental performance standards of their supply chain partners.

Scan any annual report published recently by a tech leader—Apple, Cisco, Google, IBM, Intel, Microsoft, TSMC, and others—and you'll find detailed charts and graphs documenting their progress reducing CO2 emissions and toxic waste, as well as improving water management.

For example, 80% of [Cisco's global electricity consumption](#) in the fiscal year 2017 was generated from renewable sources. And [IBM reported](#) that it recovered and recycled 87.8% of its nonhazardous waste in 2017, which surpassed its 75% goal. To its credit, IBM also reported bad news: Its hazardous waste generation in 2017 increased by 7%, a jump caused by the disposal of hazardous waste generated by a water leak from a fire suppression system at one of the company's facilities.

Many leading tech companies also spotlight their efforts to improve the environmental footprint of their supply chain partners and profile suppliers as examples for other suppliers. In its 2017 sustainability report, [Taiwan's TSMC](#) touted its “fully developed semiconductor green supply chain” and its commitment to communicating with and encouraging its suppliers to improve their “quality, cost effectiveness, delivery performance and sustainability in environmental protection, safety, and health.”

Some modest supply chain metrics TSMC reported include:

- 100% of the new suppliers signing the Supplier Code of Conduct
- 100% of materials sourced from responsible minerals
- Reduction in waste of major local waste-producing suppliers by 20.5% compared to 2014

## Grading the Effort

While corporate CSR reports are becoming more quantitative and transparent, there is still plenty of room for improvement. Greenpeace published the 19th edition of its [Guide to Greener Electronics](#) in October 2017, a report card of the environmental performance of 16 market-leading technology companies—six headquartered in the US and 10 in Asia—plus Fairphone, a privately held Netherlands-based developer of ethically sourced smartphones. (See sidebar on page 6.)

Greenpeace graded the 17 companies based on four criteria: transparency (30%), commitment (30%), performance (30%), and advocacy (10%). These criteria were used to evaluate three standard criteria companies use to measure their environmental sustainability programs:

- Renewable energy and climate change
- Sustainable design and resource reduction
- Hazardous chemical elimination in both products and the supply chain.

Among the 16 major global players, Apple topped the list, earning an overall grade for B- for the combined three categories. It ranked first in the energy category with an A- and first in the chemicals category with a B. Fairphone topped the ranking for sustainable design and resource reduction with an A-, while Dell and HP tied for second place, both earning a B-. Amazon joined three Chinese companies—Oppo, Vivo, and Xiaomi—to share the bottom rung, each earning Fs. Greenpeace awarded a D or lower to 11 of the 17 companies, representing two-thirds of the sample (Fig. 1).

### 1. Greenpeace Guide to Greener Electronics: 2017 company report card

Overall Grades		ENERGY	RESOURCES	CHEMICALS
FAIRPHONE	B	B	A-	B-
Apple	B-	A-	C	B
DELL	C+	C+	B-	C+
hp	C+	B	B-	C+
Lenovo	C-	C	C	D
Microsoft	C-	D+	D+	C
acer	D+	C-	C-	D
LG	D+	D	C-	D+
SONY	D+	C-	C-	D
Google	D+	C-	D	C-
HUAWEI	D	D	D+	D
ASUS	D	D	D	D+
SAMSUNG	D-	D	D	D-
amazon	F	D	D-	F
oppo	F	F	F	F
vivo	F	F	F	F
mi	F	F	F	F

Source: Greenpeace

Greenpeace gave Amazon an F in large part because it claimed Amazon is one of the “least transparent companies in the world in terms of its environmental performance.” In addition to Amazon’s online commerce and distribution business and a global cloud computing business, the company has a growing retail hardware footprint with its tablet computers, the Amazon Echo, and speakers. The Greenpeace report also claimed that Amazon does not publish any restrictions on hazardous chemicals in its devices or chemicals used in its supply chain.

While Amazon may not provide the level of detail and transparency as other tech leaders, it does quantify aspects of its environmental footprint. And to its credit, Amazon has a sizable and well-respected global sustainability team led by Kara Hurst, previously CEO of The Sustainability Consortium.

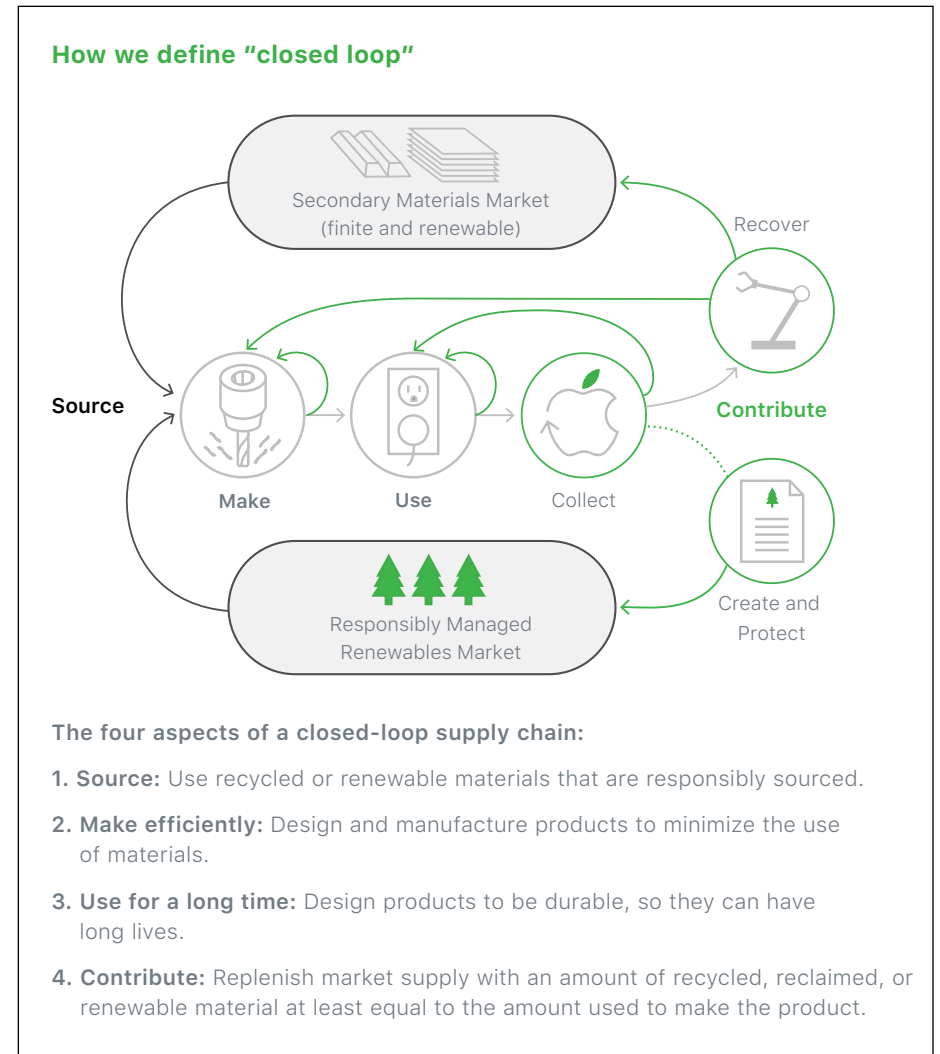
Apple, on the other hand, is a transparency standout in both the energy and chemicals categories. This is due in large part to CEO Tim Cook, who publicly committed the company to power its data centers, retail stores, corporate offices, and colocation facilities in 43 countries around the world with 100% renewable energy, according to [Apple’s 2018 Environmental Responsibility Report](#).

In 2015, Apple engaged directly with suppliers across its supply chain to help them reduce their energy use. As of April this year, 23 manufacturers of Apple devices or components have committed to power all of their Apple operations with 100% renewable energy, according to the company. What’s more, the company claims it is on track to meet its goal of putting 4 gigawatts of new clean energy online in its supply chain by 2020.

On the resources front, Apple announced in 2017 an ambitious goal to transition to closed-loop sourcing, where products are made only from recycled and renewable materials—thus eliminating the need to extract virgin raw materials from the earth. Apple acknowledges that this is a long-

term goal that will require years of collaboration across Apple teams, its suppliers, and recyclers (Fig. 2).

## 2. Apple’s aspirational closed-loop sourcing model.



Source: Apple 2018 Environmental Progress Report



However, according to Greenpeace, Cook’s commitment to have Apple leave the planet “better than we found it” is increasingly being undermined by his product design team, which makes it much more difficult—if not impossible—to repair or upgrade devices. This design methodology shortens the useful life of the devices and increases the potential of Apple’s products ending up in landfills.

To address this issue, Apple has developed a trade-in program for iPhones called [Apple Giveback](#). And it is promoting its iPhone disassembly robot named Daisy. While shredding old phones can recover some reusable materials, Daisy can take apart up to 200 iPhone devices per hour, removing and sorting components, and recovering materials that traditional recyclers can’t, according to Apple.

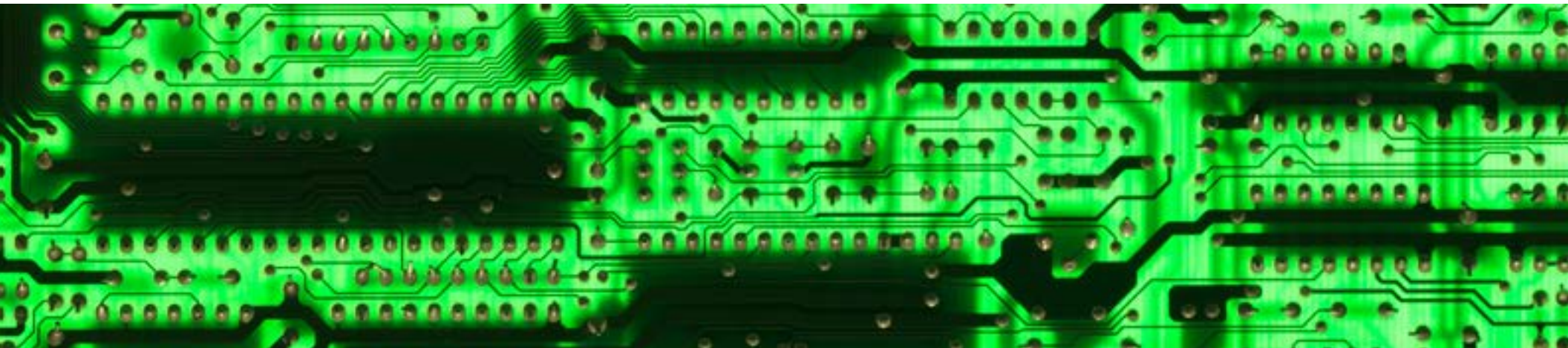
## The Next Frontier: Circular and Non-toxic

Apple is not alone among tech leaders in making the long-range commitment to reduce the reliance on extracting raw materials from the earth. This commitment is part of the working definition of the [circular economy](#), which is appearing in a growing number of CSR reports across the tech sector.

The term has been in use since the 1970s, but has only recently gained popularity thanks to organizations such as the UK’s [Ellen MacArthur Foundation](#). Apple, Cisco, Google, HP, IBM, Microsoft, and Philips are all members of the foundation, which promotes the use of recycled materials for manufacturing future products to replace non-renewable resources. One of the end goals of the circular economy model is to source all raw materials required to manufacture new products from recycled, renewable, and reclaimed materials.

One of the Foundation’s case studies profiles HP’s Instant Ink [printing-as-a-service model](#), an IoT-enabled subscription model for individuals and small businesses that increases cartridge recovery and recycling.

The other, perennial challenge within the electronics supply chain is to limit and eventually eliminate the use of certain chemicals and materials in both the manufacturing process and in the finished products themselves. Among the worst offenders are [phthalates](#), which is a family of chemical compounds primarily used to make polyvinyl chloride (PVC) or vinyl flexible and pliant. [Phthalates](#) are considered “plausible” endocrine disruptors and [PVC](#) is a known carcinogen. [Brominated flame retardants](#) (BFRs) are used in plastics by the electronics industry to improve product safety. Some [BFRs](#) are suspected carcinogens. *(Continued on page 7.)*



## 10 out of 10 for the Fairphone 2

Unlike the leading smartphone brands that dominate the global market, Netherlands-based [Fairphone](#) takes a different approach to designing its smartphones. Instead of trading in or disposing of old phones and replacing them with shiny new ones, Fairphone designs its Android phones for repairability and upgradeability (*Fig. 3*). And when the phone is finally retired, it can be disassembled easily to maximize the reuse of the parts and materials. As of [early 2017](#), Fairphone had sold 125,000 phones.

Repairability is a big deal considering that about [1.5 billion new smartphones](#) are produced each year. While Apple, [Samsung](#), and other phone makers have takeback programs for old phones, they don't

specifically design their phones for repair or upgradability. In fact, many components are glued in place, making disassembly by the user difficult.

A few years ago, [iFixit](#) published an article detailing a teardown of the Fairphone 2 that was conducted using only human hands and a Phillips-head screwdriver, according to the company. iFixit rated the phone a 10 out of 10 on the repairability scale because of how easy it was to open and fix. "The battery and the screen—two components that will most need to be replaced or repaired over the lifetime of the phone—pop out without any tools at all," according to iFixit.

### 3. The Fairphone 2 is designed for repairability.



Source: Fairphone

While everyday use of electronics that contain these chemicals is considered safe, the fear is that dust and particles from these substances can be inhaled or ingested during the manufacturing process and disassembly in [e-waste facilities](#). They can contaminate air and water and enter the food chain through plants, fish, or other animals, which is an issue in some of the [large e-waste sites in China](#).

A number of tech leaders have banned or are in the process of banning these chemicals from their products, which has implications for their supply chains. For example, Apple eliminated BFRs in 2008 from enclosures, cables, circuit boards, and connectors, according to the company's 2018 Environmental Progress Report. Also, Apple reported that its products are free of PVC and phthalates with the exception of power cords in India and South Korea, where Apple is seeking government approval to use replacements.

One group dedicated to addressing the complex workplace health and safety challenges in the electronics supply chain is the [Clean Electronics Production Network](#) (CEPN), formally launched in June 2016 by the Green America Center for Sustainability Solutions. The coalition includes a number of technology companies, among them Apple, Dell, Fairphone, Flex, HP, Inventec, and Seagate. CEPN's goal is zero exposure of workers to toxic chemicals in the electronics manufacturing process. Not surprisingly, there's a strong correlation between membership in the CEPN and high marks on the Greenpeace report card.

CEPN prioritizes solutions that address toxic exposures through substitutions or process changes that eliminate toxic chemicals wherever possible. Two areas CEPN is focused on are:

- Developing a standard data collection tool for manufacturers and suppliers to share data on chemicals used in production
- Using the tool to identify risks and hazards and foster dialogue between suppliers and brand owners about risk reduction

So, is the tech sector getting greener? The answer is a qualified yes. There are standouts among the largest OEMs on the planet that have an outsized impact on the industry's environmental footprint. And there's an infrastructure of global standards bodies and trade organizations that are doing the essential work of defining best practices. But progress remains uneven. Perhaps the most important catalyst for accelerating the pace of change is pressure from customers, employees, and shareholders. The tipping point will come when the commitment to environmental sustainability is recognized by all industry leaders as an essential driver of business performance.

By Bruce Rayner, Contributing Editor

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