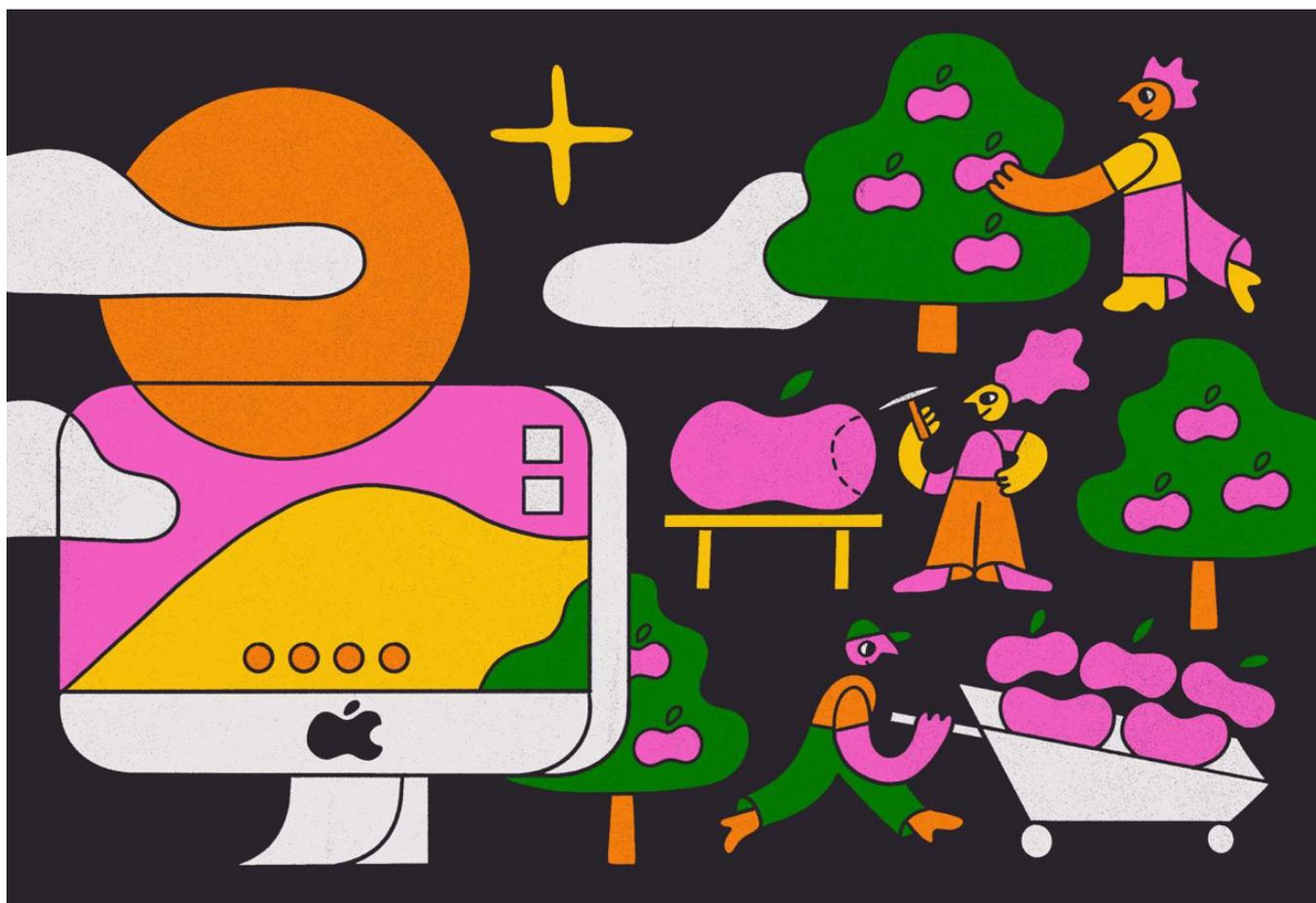# Apple wants every iPhone, watch, and Macbook made with recycled materials — Quartz at Work

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Even for a company with a $1 trillion market capitalization, the goal that Apple has set for itself on sustainability is ambitious. Wildly, extraordinarily ambitious.

The world's most valuable company aims to eventually manufacture every new iPhone, Apple Watch, and glitzy yet-to-be-invented gizmo using 100% renewable power, and (this is the big one) without mining any new raw materials from the planet.

The company hasn't provided a timeline for when these goals will be achieved. What's certain, though, is that it will require gargantuan amounts of recycling of materials from old products, for reuse in new Apple products.

Apple already has [steered billions of dollars](#) into environmental efforts. But technology constraints, cost constraints, and the imperative to shore up its high standing with investors, mean the dream—of good old luxury consumerism but without the environmental consequences—is incredibly far from being a reality, especially bearing in mind that techniques for recycling some of the materials Apple uses haven't yet been invented.

So is Apple's a story of "green" branding, or genuine effort, or both?

As more companies begin to hold themselves to account for the vast impact they have on the planet, it becomes increasingly crucial that we examine how to judge and indeed incentivize them—as consumers, investors, and citizens. Many [would argue](#) that capitalism, which is predicated on growth, can't solve the problems of a planet with finite resources. But if it can help, what better company to lead the way than the world's biggest and shiniest?

What clean energy means

Apple already uses only renewable energy at its own facilities. Other big tech players, like [Google](#) and [Microsoft](#), have made similar pledges to run on renewables during the past two decades and [achieved them](#), often by building or co-investing in brand new energy generation: Wind farms, fields of solar panels.

But Apple's case is distinct. It's both a data business *and* a major electronics maker, and both of these activities take vast amounts of power. Apple started the transformation with its energy-guzzling data centers, getting them all onto renewable power by 2013. Then it turned to

offices and retail stores, announcing in 2018 that it had achieved the 100% renewable goal at all its own facilities.

The sharp-eyed will have noticed a missing piece of this feel-good picture. Apple's data centers, offices, and stores are actually a small fraction of the company's carbon footprint, most of which is spread out along a massive and fluid manufacturing supply chain that could take in the tin mines of Bolivia, aluminum smelters in Iceland, lithium-ion battery makers, and the like, plus shipping and transport. What marks Apple out from many of its manufacturing competitors is a willingness to acknowledge that—and engage with it.

"As soon as the 100% [renewable energy target] was in sight, we started to say, 'What else can we do?'" says Lisa Jackson, Apple's vice president of environment, policy, and social initiatives, who reports to CEO Tim Cook.

"All of our thinking there was driven by our carbon footprint…Still, almost three-quarters of our carbon footprint is in our supply chain, and those are companies we largely do not own," she says. This has meant encouraging Apple's suppliers to switch energy providers or, in some cases where renewables weren't an available, co-investing to build them.

Some firms deal with their emissions through paying for offsets, which essentially means they can continue to pollute, while paying for an equivalent amount of carbon to be "captured" elsewhere, for example through the planting of trees. Environmental campaigners and climate academics widely criticize offsetting, not least because effectively tackling climate change is going to take a massive reduction in CO2 emissions *as well as* the development of new carbon sequestration.

When Apple talks about clean energy, Jackson says, it doesn't mean offsets. "We're talking about new clean energy being built on the grid to service Apple facilities. We wanted that for our suppliers. And we wanted

eventually to see all our suppliers go to 100% clean energy," she says.

In 2018, Apple announced that it would invest in Columbia's mangroves, one of several so-called "negative-emissions" techniques that work alongside cutting emissions to tackle the problems associated with climate change by sucking excess CO2 out of the air.

Apple's 2019 Environmental Responsibility Report calculates the company's entire annual carbon footprint as a massive 25.2 million metric tonnes of CO2. In 2015, that footprint hit an all-time high, pushing way above 35 million metric tonnes. It's declined significantly in the five years since, despite net revenue growth in that time. Since 2015, revenue growth has decoupled from increased environmental impact, the report explains, largely due to the impact of renewable energy use by Apple and by its suppliers.

Apple's green moonshot

Apple, like its products, is glossy and impenetrable.

I met Jackson on a grey afternoon at a building off Regent Street, near Apple's London flagship store. Our meeting, which I'd been chasing down for many weeks with public relations staff in California, where Jackson is based, was squeezed into a hurried 19 minutes. Jackson sat across from me, a small coffee table between us, with a public relations person seated at either side. Her next meeting was with a woman who had arrived early and was waiting outside the door. Jackson had a bad cough. She talked fluently through Apple's plans and discoveries, though. She was on message.

By 2020, Jackson says, Apple's suppliers will generate or procure 5 gigawatts of new clean energy from its starting point four years ago. To date, about a third of Apple's entire "manufacturing footprint" is powered by renewable energy, she notes.

It might be churlish to call that much new renewable energy "easy." But it seems easy in comparison with Apple's next goal, which Jackson herself calls a "moonshot": Making at least the same volume of physical electronics—indeed more, since Apple plans to keep growing—without mining any new materials. That's seriously hard.

Jackson is a serious operator, though. A chemical engineer, she started at the US Environmental Protection Agency in 1987, rose through its ranks, and was appointed to lead it in 2009 by then-US president Barack Obama. She moved to Apple in 2013, explaining her decision as one of timing—it's easier to leave at the end of a presidential term—and the draw of the job. "I had met Tim Cook, I was convinced that he was actually doing it for all the right reasons, that he was the real deal," Jackson says. Plus the role offered the chance "to come in and hang out, geek out, with some other engineers."

The recycling challenge is indeed providing a platform for some high-level geeking out. Jackson's team narrowed down the materials they would begin trying to recycle—or, more accurately, upcycle, since they're to be used in higher-spec products than they were originally. They eventually selected 14 materials, some because they have a high environmental impact (intense water use, for example), some, perhaps, because they looked like the lowest-hanging fruit on a rather tall tree.

Starting out, Jackson says, the biggest challenges were technical. "Is there a way to recover cobalt from batteries? Is there some smart person out there who has figured out how to get dysprosium or neodymium from magnets, which are the rare earths that we're pulling out? And it turns out there was. But in some cases there isn't such technology or it's not at a scale that could be commercialized, so then it's working to find those technologies," she says.

Along the way Apple built a [much-publicized robot](#), named Daisy, to disassemble iPhones into their component parts. There are now two

Daisies, one in Texas and one in Rotterdam, each of which can disassemble 1.2 million iPhones per year.

The next challenges were whether the various conservation techniques could be scaled up, and then cost: Could they be made affordable? After that, it was on to legislation originally put into place to stop electronics waste from being dumped, which had the unintended consequence of impeding efforts to reuse it. Apple had to work with government officials to reform and clarify the rules.

Jackson's team has had some tangible successes: A 100% recycled aluminum alloy is now used to make the enclosure for the Mac Mini, the Macbook Air, the iPad, and one design of the Apple Watch. One supplier is making batteries using cobalt extracted from old Apple devices. The tin used in the motherboard of about 15 different products isn't freshly mined—the mining, Jackson says, is associated with environmental damage and wasted water—but recovered instead. And in September, Apple announced it would make new iPhones using recycled rare-earth materials in the part that produces the phones' haptic feedback to a user's finger—which accounts for about a quarter of the rare-earth materials used in an iPhone.

There's still, however, a long, long way to go to 100% recycled.

The iPhone in the drawer

The week after I interviewed Jackson, my iPhone broke.

From one moment to the next it transformed, as newly broken phones do, from a portal to the world into a smooth, useless brick. A black screen gave no hint of life. Charging didn't work. Pressing both the buttons at once did nothing. I knew in my heart it was gone.

Out of interest, I went back to the Regent Street store, arriving before it

opened, and found a queue of 20 people already outside. (There was no new phone launch; this was just a normal Tuesday.) The store opened. A young man from the "Genius Bar," as Apple insists on calling it, dutifully plugged in my dead iPhone and tried pressing both the buttons at once. Then he confirmed what I already suspected: There was nothing to be done.

Could I recover the data? I might be able to pay another company to do that, he said. Once I'd tried that, I could drop the phone back at the store to be recycled, he said, after I inquired about recycling options. And if I didn't want to make a special journey back to the shop, could I send it? He suggested I go home and look for information online. So I did.

In some countries, including the US, if an Apple product is broken beyond repair, the company offers a mailing label for customers to send the device in for recycling. In many other countries, like the UK, the only way to recycle a phone is to take it to a store. (According to Apple, some countries' regulations make getting devices back harder.) Working products usually can be traded in for credit toward new ones, which is one way of incentivizing returns. Unlike many of its competitors, Apple also collects products made by other companies for recycling.

But if Apple's goal is to recycle enough devices that it won't need to keep mining rare-earths and other materials to build more, perhaps the company needs to get more proactive—training frontline staff so they are fluent in all of the recycling options and, ideally, making it easy for customers to deal with their defunct electronics. The Daisy robots aren't operating at capacity. Meanwhile, my dead iPhone and its not-totally-dead predecessor are in a drawer, waiting for the day I have time to go back to the Apple store.

As discarded devices pile up in desk drawers and electronics cabinets in homes around the world, it's clear Apple also needs to deal with the problem of inbuilt obsolescence.

The Jackson interview was hurried to a close before I had time to ask her this question: Isn't a goal of radical sustainability undermined by a business strategy predicated on customers replacing their devices every couple of years? In follow-up emails, Apple's media folks reframed my question as: "How Apple approaches product lifespan." Their answer was to point to Apple's standard language on product testing, durability (including features like water resistance in newer iPhones) and repair.

Jackson also had talked to me about the durability of Apple's products, suggesting more people don't recycle them because the devices last a long time. In my many years of experience as an Apple customer, I've found that the company's products work like so: They are extraordinarily functional, then less so as they age. Then they break and are entirely unfixable. Wouldn't an alternative to the laborious work of making brand new phones out of old phones be to make phones that could be fixed when they broke? Wouldn't it make more environmental sense to make laptops that have ports which work with existing kit, rather than demanding a whole new suite of chargers and accessories?

Mike Murphy, Quartz's tech editor, who tests out a lot of new electronics, says that compared to competitors, Apple's devices are indeed durable. Tech executives might argue that it's consumers who demand new models and features. But Apple's recent results bely that reading of the market. In a recent analysis (Quartz membership exclusive) of exactly what's going on with Apple's business, Murphy notes that people aren't upgrading to new devices nearly as much as they used to, perhaps because the recent improvements have been only incremental, perhaps because the new devices really are built to last longer.

And perhaps, increasingly, what people want from Apple is not a constant stream of new products, but simply great devices that work well, for longer. Jackson said in 2018 that the company was pushing for longer-lasting phones. Cook has talked extensively about moving more into

services and content, which could mean a shift away from manufacturing. As industry analyst [Horace Dediu](#) wrote [on his Asymco blog](#) in 2018: "Fundamentally, Apple is betting on *having* customers not *selling* them products."

Re-making electronics

A few months before I began my research for this story, I spoke with Ascanio Vitale, CEO of StopCO2, a small consultancy that advises companies on how to make their businesses more sustainable. We talked about "[life cycle thinking](#)," a school of thought that takes a systemic approach to product creation and consumption. If you buy a carton of milk, for example, the lifecycle of the product includes the farming techniques used to raise and care for the cows, the manufacture of the carton the milk comes in, the shipping of the filled container, and what happens to the carton when it's empty.

Were any big firms taking that thinking seriously? Lisa Jackson was the leading light in the field, Vitale said. It was the first time I'd heard her name.

After I embarked on this piece, I called back Vitale to ask him why he thinks Jackson stands out.

She's "behaving like a good environmental manager in a small company," Vitale said. That means working towards structural change, not just surface change, and committing to tracking the metrics which elucidate that—things like water use, and toxic waste. A startup today could grow around those metrics. Small companies can, with agility, change what they track or the goals they aim for.

Usually, Vitale says, "it's really tough when it comes to a big company like Apple...if you want to change one thing, you need to change it among the whole range of products, across the whole supply chain, which means

involving your stakeholders, your suppliers, to adapt to your new ways. So it takes years. And what [Jackson] is doing is really pretty fast compared to many companies."

Good stewardship, he says, means tackling problems head-on and working through them to find the best solution—not the easiest one. Upcycling is such a solution, he says. It's difficult, but the results are much better than that of more common recycling methods. Plastic bottles are almost never recycled into new bottles, he explains, because the mix of waste plastics creates a less stable material from which additives tend to leach into whatever fluid is contained inside. Instead, bottles are "downcycled," into textiles for example, putting non-sustainable materials into a supply chain that already has biodegradable, non-man-made alternatives, like cotton and wool.

Apple using the aluminum from old Macbooks to make new ones is no small thing, says Vitale who, with a background in aerospace, can also geek out about engineering.

Working raw aluminum takes a lot of energy and produces a lot of toxic waste. And aluminum alloys can vary depending on use. Apple's specific use calls for a specific alloy, so recycling its own product makes sense. Its competitors aren't close to doing anything similar. Apple, Vitale says, is "far away from the final result, but at least they're moving in the right way." This month, Apple also announced that it has begun buying a new form of aluminium made without producing CO2, which it also helped to develop.

A 2017 report on the environmental impact of big tech companies, compiled by Greenpeace, supports Apple's sustainability claims. Apple came out as the second most-sustainable company out of 17, including Microsoft, Samsung, Sony, and Amazon. The leader was Fairphone, a company predicated on making phones with responsibly-sourced materials which can also easily be taken apart for repair or upgrade.

Since that report came out, Amazon, pressured by its employees, has gone a step further than most large companies, including Apple, by setting a 2040 goal for net zero emissions.

But on the question of whether big corporates could therefore actually help with the transition to a truly sustainable system, Vitale, who also worked for years for Greenpeace both as a volunteer and as a campaigner, is adamant: No. They're perpetuating the problem, he says, because a fixation on growth is baked into the very structure of what a multinational company is.

So long, and thanks for all the iPhones

It was the size and scale of Apple, though, that drew Jackson to the job, she says.

"You look for impact," the former EPA official says. "And it's hard to argue that you don't have impact as a cabinet-level official working on an issue like the environment. But Apple has impact, too. It has tremendous potential for impact. The innovations that we make, the successes that we have, should stand as proof positive that you don't have to choose between a healthy bottom line and a healthy planet."

That notion, that growth and sustainability can coexist, is one Jackson has repeated often in her time at the company. In a foreword to Apple's 2019 environmental report, she wrote of the renewables drive: "That work continues as we source the clean energy needed to maintain that standard—even as our company grows." Growth is knit up with Apple's strategy. If that stopped being the case, it's a safe bet that plenty of traditional investors would get out of Apple's stock. It's also possible that others—the growing environmental, social, and governance (ESG) segment—would filter in to take their place.

Apple is already the biggest company in the world. Does it need to keep

growing?

"Sustainable growth" as an idea is "like organizing a rave in a yoga studio and calling it a meditation," Vitale says: a mashing together of concepts which, he suggests, are mutually exclusive. We don't need to make the system better, in other words. We need a different system.

Perhaps Vitale's is a radical voice. But the point he's making is being increasingly recognized, even in the most traditional of business enclaves. This year the Business Roundtable, a powerful CEO lobby in the US, issued a statement declaring that companies must be responsible not just to shareholders, but to a range of other stakeholders including employees, customers, and the environment. But how far will companies go, and what will they do when different stakeholders have competing interests? In his 2018 book *Winners Take All*, journalist Anand Giridharadas excoriated the efforts of capitalist enterprises to try and solve the world's problems, precisely because of this tension: wanting to do good, perhaps, but not at the expense of profit.

Apple says it wants to proceed both quickly and carefully. It doesn't, for example, want to distort recycled materials markets by buying everything up. The company actively encourages copycats of its recycling measures, it says, because it wants other companies to become better recyclers too. But the ultimate motive remains: Make more. Earn more.

Apple is working on a big, complex bid to address its sustainability problem. And it's particularly well situated to do so. Decades of stellar success mean it has huge resources at its disposal. At the same time, its profit-seeking, global status, like a sleek aluminum casing, is the richest kind of straightjacket.

But if Apple can change, and change its suppliers with it, then maybe we should be demanding that other tech companies, other manufacturers, and other giants of global business change, too.