Submission to the Environmental Audit Committee's Inquiry on Electronic Waste and the Circular Economy
September 2020

Apple's environmental approach centres on innovation and collaboration. We work with teams across the company to ensure that in everything we do, we think about our impact on the planet. We focus our environmental work in three priority areas where we believe we can have the greatest impact:
- addressing climate change through energy efficiency and the use of renewable energy;
- pioneering the use of smarter chemistry to protect those who make, use and recycle our products; and
- conserving the earth's precious resources.

Additional information on our work in these three key areas can be found on apple.com/ environment.

Turning to your specific questions,

1. What are you doing to reduce future carbon emissions and mitigate the impact of your past emissions?

In fiscal year 2019, we reduced our comprehensive carbon footprint for the fourth consecutive year—down 35 percent compared to 2015, when Apple's carbon emissions peaked, even as net revenue increased by 11 percent over that same period.

Apple is already carbon neutral for its global corporate operations, with all of our corporate facilities, including offices, retail stores and data centres across 44 countries running on 100% renewable electricity. In July, we announced our commitment to become carbon neutral for our entire carbon footprint by 2030 — covering the entire product lifecycle, from manufacturing (including material sourcing), use, transportation and end-of-life material recovery

In our 2020 Environmental Progress Report, we shared our roadmap to reduce emissions by 75 percent by 2030, compared to 2015, while developing innovative carbon removal solutions for the remaining 25 percent.

This includes:

Low carbon product design. Apple continues to increase the use of low carbon and recycled materials in our products, innovate in product recycling, and design products to be as energy efficient as possible. Through these efforts, we have already decreased our carbon footprint by 4.3 million metric tons in 2019. Since 2009, we've also reduced average product energy use by 73 percent.

Expanding energy efficiency. We are identifying new ways to lower energy use at our corporate facilities and help our supply chain make the same transition.

Renewable energy. We will remain at 100 percent renewable energy for our operations — focusing on creating new projects and moving our entire supply chain to clean power.

Direct Emissions abatement. In instances where we cannot reduce demand for a specific process or material, we will avoid direct greenhouse gas emissions through technological solutions or switching to non-fossil-based low-carbon fuels.

Carbon removal. We are investing in forests and other nature-based solutions around the world to remove carbon from the atmosphere.

We have spoken clearly and unambiguously across different forums, in public statements and closed-door discussions, and through our actions. Whether making known our support for the United States upholding its obligations under the 2015 Paris Agreement or backing a price on carbon, we're pursuing strong policies that promote decarbonising our economy. And in November 2019, Apple issued about USD$2.2 billion in green bonds dedicated to projects that will reduce our carbon footprint, bringing our total corporate issuance to $4.7 billion.

Apple received one of 15 United Nations awards as part of the UN's Global Climate Action programme for our achievements in reducing carbon emissions, and for the sixth consecutive year, we were on the Carbon Disclosure Project's (CDP) Climate Change 'A List.'

2. How do you audit the carbon emissions of companies in your supply chain, especially those based in countries with a high proportion of fossil fuels in their energy supply?

Understanding our carbon footprint is essential to taking strong action to eliminate it. That's why we model it so comprehensively, taking responsibility for emissions across our entire value chain, including Apple's corporate operations, and the product life cycle — from manufacturing (including material sourcing), use, transportation, and end-of-life material recovery. This informs our climate roadmap, which lays out our plan to achieve carbon neutrality by 2030.

In measuring our comprehensive carbon footprint, we utilise as much Apple-specific data as possible, relying on industry averages only where original data isn't available. This ensures the accuracy of calculated emissions in our supply chain. Each year, we obtain third-party (Fraunhofer IZM) verification of our comprehensive carbon footprint that validates the accuracy and robustness of our methodology. Fraunhofer's verification report for our fiscal year 2019 concludes:

> *Apple's assessment approach is excellent in terms of granularity of the used calculation data. A significant share of components is modelled with accurate primary data from Apple's suppliers.*

> *For all product LCA calculations, where exact data was missing, the principle of a worst- case approach has been followed and results have been calculated with rather conservative estimates.*

The review has not found assumptions or calculation errors on the carbon footprint data level that indicate the scope 3 carbon footprint has been materially misstated. The excellent analysis meets the principles of good scientific practice.

We will continue to revisit and refine our carbon footprint for accuracy moving forward, and will adjust our climate roadmap as necessary.

We are committed to transparency about our climate strategy, progress toward our reduction goal, and climate risk–related financial information. To this end, we report each year to CDP, a global disclosure nonprofit, which has aligned to the Taskforce on Climate-related Financial Disclosures (TCFD) recommendations.

Our annual Environmental Responsibility Report contains an overview of Apple's comprehensive greenhouse gas emissions (scope 1, 2 and 3), as well as updates on Apple's Supplier Clean Energy projects.

You can find our Environmental Responsibility Report at www.apple.com/environment.

3. What are the carbon emissions released in the whole lifetime of your latest smartphone and latest laptop from production to end-of-life? How does this compare to previous models?

4. What is the average operating life of the smart phones and laptops that you sell?

Apple's Product Environmental Reports can be found on apple.com/environment.

This link provides details of models going back to the iPhone 3G and MacBook (2009). Each device is measured by its impact on our carbon footprint and how environmentally friendly — and safe — its materials are.

5. What steps are you taking to improve the life of your products and prevent premature obsolescence – for example through lack of software and security support?

Our goal is to ensure our products last as long as possible, because our products are built to play a vital role in the daily lives of our customers. We take a holistic approach that optimises for longevity and is adapted to the way each device will be used. And the results are clear: the iPhone lasts longer and hold a much higher percentage of its value than any other smartphone. Long-lasting products are not only good for the planet, they're also good for our customers. Having a product that lasts is important to our customers, and we believe that it makes customers more likely to choose Apple in the future.

In brief, we would highlight three aspects of our efforts in this area:

a.   Durability
Durability is central to the Apple product design. We aim to create devices that endure the rigours of everyday use. And we seek to reduce the need for maintenance and repairs. Our designs are optimised for this. The engineers in our Reliability Testing Lab assess each design decision—from materials to components, to final product and packaging—for real-world performance. Our teams start with in-depth user studies. They look closely at repetitive actions and interactions: picking up and setting down a device, repeated use of

an individual key, and what might scratch a device inside a handbag or pocket. What we learn through these studies drives our design decisions, which vary depending on how the product will be used.

iPhone 11 illustrates some of the choices we've made. Water resistance (designed to take spills from ordinary liquids, and to be water, dust, and splash resistant (rated IP68 under IEC standard 60529), materials such as aerospace-grade aluminium or surgical-grade stainless steel, and the toughest glass in the industry make iPhone durable. When combined with automatic iOS updates with new features and security enhancements, these design choices help iPhone last longer and hold a much higher proportion of its original value than any other smartphone.

b.   Repair Services
We aim to avoid the need for repair in the first place. But when a repair is needed, there should be safe, dependable options available to bring a device back to its best possible performance.

There are more than 5000 Apple Store and Apple Authorized Service Provider (AASP) locations offering repair services. We've trained more than 50,000 technicians to help service and support our products, continually certifying our retail employees and channel partners in tools and techniques to repair devices, and avoid unnecessary service or part replacement.

Through the launch of our Independent Provider Repair programme, we are providing independent repair businesses—large or small—with the same genuine parts, tools, training, repair manuals and diagnostics as AASPs. There is no cost to join the programme, training is free, and genuine parts are offered at the same cost as to AASPs. 700 locations across the U.S.are already participating in the programme, and we've expanded to Europe and Canada.

c.   Ongoing Software Support
We continually upgrade our operating systems to include new features, as well as updates that enhance security and privacy features. We make these freely and widely available to a broad set of iPhone, iPad, and Mac devices, so our customers can enjoy new features and stronger security protections, including those customers without the most recent device. This also means our community of app developers can reach more users when they design for the newest operating systems.

Our customers value this approach. We see this clearly in the adoption rates of our operating systems. By June 2020, we already had 81 percent of all iPhone users running iOS 13. iPad users showed a similar preference for software updates—with 73 percent on the most recent release of iPadOS.

6. Research has shown that you charge £326 to repair the broken screen of an iPhone 11 and iPhone XS, and £69 to replace the battery when out of warranty. Can you outline how you set these prices and breakdown the component parts of those prices? Do you believe this cost of repair incentivises consumers to repair and lengthen the life of their products rather than just replace them?

When a repair is needed, a customer should have confidence the repair is done right. We believe the safest and most reliable repair is one handled by a trained technician using Apple-genuine parts.

Every Apple genuine part goes through extensive testing for quality, integrity and reliability which means when a product is repaired correctly with genuine parts, it will operate as it should.

(For clarity, the price referred to in the *Which?* report mentioned in your letter was for an out of warranty screen repair for an iPhone 11 Pro Max or iPhone XS Max - in other words the larger models. The price for an out of warranty repair for iPhone 11 is £196.44; iPhone XS is £282.44)

7. Some research ranks your laptops as some of the hardest to repair, in part because components are glued or even soldered together. Can you explain why this is the case and what you are doing to improve the repairability of your products?

Through our design focus on durability and reliability, we aim to avoid the need for repair in the first place. But when a repair is needed, there should be safe, dependable options available to bring a device back to its best possible performance.

As mentioned above, we have recently expanded customer access to repair services. We've also made design choices so that products are easier to repair. Mac Pro, for example, is built around a stainless steel space frame, from which an aluminium housing lifts off, allowing 360-degree access, and a dual-sided logic board that allows for components to be easily added or removed. For our iPhone devices, we've utilised stretch release adhesives, which securely hold the battery during use yet can be swiftly debonded by service partners to install replacements.

8. What are you doing to make spare parts and repair manuals available and accessible to the wider public to improve their ability to repair your products? What is preventing you from doing this?

9. Would you support legislation that enshrines a universal right to repair for the public, which would include standards of repairability in product design, wide access to spare parts, and making repair manuals publicly available?

When a repair is needed, a customer should have confidence the repair is done right. We believe the safest and most reliable repair is one handled by a trained technician using genuine parts. We will support legislation that is consistent with these values.

10. What are you doing to ensure your products are designed so that the parts and materials are easy to recycle and re-use in a high-quality manner that retains value? What else are you doing to improve the collection and recycling rates of your products?

What happens to Apple products once they reach end-of-life is our responsibility. When a device can no longer function as originally intended, its parts and accessories may still have more to give. So we recover these and get creative about the ways we can best reuse them. And for the parts that cannot be reused, we are designing new technologies to unlock the useful materials inside them. By effectively reusing and recycling products, we can all help keep the world's resources in use.

When a device as a whole no longer functions, we first aim to recover and reuse the parts inside that still work. One of the simplest ways to reuse a part is in another device. Recovered parts that are refurbished and tested to our stringent standards can be used as replacement parts for devices being repaired. This keeps quality parts in use while also reducing the number of spare parts we need to build.

Recycling represents the final, essential piece of creating circular supply chains. But the recycling industry faces significant challenges, from very diverse streams of waste to low margins on some materials. That's why we're partnering with recyclers, academic institutions, and other stakeholders to make sure materials are recovered in the highest quantities with the technologies available now, and to invent the recycling capabilities of the future.

Traditional recycling technology can recover certain valuable materials— like gold and cobalt—at very high rates. However, often these recycling techniques—like shredding to separate materials quickly—mean certain materials get lost in the process or downcycled for use in lower-quality applications. That's why we are working to take our products apart with the same care with which we put them together.

Another area of our work focuses on designing the automation that can revolutionise the way our devices are taken apart. Our iPhone disassembly robot, Daisy, continues to work hard in Austin, Texas as well as at our site in the Netherlands. Daisy can separate the individual components of 15 different models of iPhone so that recyclers can recover more important materials and at a higher quality than traditional recycling technologies. Daisy receives iPhone devices from our AppleCare and Trade In programmes as well as from partner programmes with Best Buy in the U.S. and KPN in the Netherlands.

Modules from Daisy are already making their way to recyclers. And the results are impressive: a recycler recovered the same amount of copper and gold from 1.4 metric tons of Daisy modules as can be extracted from more than 150 metric tons of mined ore.

While Daisy can disassemble devices into components, select components require additional disassembly to enable material recovery. So we invented Dave, our newest disassembly robot, to take apart individual components. So far, Dave can disassemble the Taptic Engine for greater recovery of materials like rare earth elements, tungsten, and steel.

By processing 800 modules an hour, just one single Dave robot can go a long way for a recycler. Dave is being deployed at one of our key recycling partners, who is part of the circular supply chain for the recycled rare earth elements we use in our iPhone magnets today.

Our third recycling initiative focuses on what the future of recycling could be— with technology that allows recyclers to process high volumes of diverse and increasingly complex electronic waste. In a partnership with Carnegie Mellon University, we're applying machine learning to help address part of this recycling challenge. Researchers are developing methods to train automated systems to sort waste in real-time and learn as they go—so the technology can evolve as waste streams do. Any software created from this joint initiative will be open-sourced to help better support e-waste recycling around the world.

We aim to make recycling as accessible as possible to our customers. That's why we offer and participate in product take-back and recycling collection programmes for 99 percent of the countries where we sell products. In total, these programmes directed 47,000 metric tons of e-waste to recycling globally in 2019.

We've set up systems for collecting and recycling Apple products from iMac Pro to Apple Card. As new Apple products are developed, we create recycling programmes for these too. We also care about how our devices get recycled. We hold our recycling partners to high standards for environment, health, safety, and security. In 2019, we conducted more than 60 audits globally on issues relating to environment, health, and safety—and we performed additional audits relating to security.

11. *How would you like a system of modulated fees under an extended producer responsibility system, as being considered in the UK and the EU, to be designed?*

We recommend the Committee review the DigitalEurope position paper on modulating producers' financial contributions for Waste Electrical and Electronic Equipment, found here:

https://www.digitaleurope.org/wp/wp-content/uploads/2019/07/Joint-industry-comments-modulation-of-producers'-financial-contributions-for-WEEE_2019_07_25_final.pdf

12. *What steps are you taking to ensure packaging of products shipped to consumers is fully recyclable and minimises single use plastic?*

Apple's goal is to eliminate plastics in our packaging by 2025. So far, we have reduced plastics in our packaging by 58% in four years. As of 2019, 92% of our packaging was sourced from recycled fibre and responsibly sourced virgin fibre.

We've maintained our circular supply chain for paper, by sourcing from recycled and renewable sources and by creating as much responsibly sourced fibre as we are using.

100 percent of the wood fibre in our packaging comes from recycled sources or responsibly managed forests.

We're protecting or creating enough responsibly managed forests to cover all the wood fibre we use in our packaging. This helps us ensure we are not taking away from, but instead growing the world's supply.

All the retail boxes for our products can be recycled at standard paper recycling facilities. And we are continuing to transition internal packaging trays to model fibre or other fibre-based solutions to enhance recyclability even further.

13. *What steps, if any, are you taking to encourage 'take-back' of products being replaced by delivery of new items to consumers?*

We aim to make recycling as accessible as possible to our customers. That's why we offer and participate in product take-back and recycling collection programmes for 99 percent of the countries where we sell products. In total, these programmes directed 47,000 metric tons of e-waste to recycling globally in 2019.

The Apple Trade In programme allows customers to return a device at any time, either for credit towards a new purchase or a gift card for use any time. Depending on the age and model, customers can get up to £350 off a new iPhone, £410 off an iPad or £530 off a computer.

If it's in good shape, we'll help the device to go to a new owner. If not, we'll send it to our recycling partner. Some iPhone models will go to Daisy, our disassembly robot that can efficiently recover the resources inside.

Our Apple Trade In programme allows customers in 25 countries to walk into an Apple Store or go online to trade in their devices. Through the iPhone Upgrade Program, customers return their existing devices before upgrading to the latest model. These devices are refurbished and passed on to a new user. Each refurbished device is good for the environment and and further demonstrates that our products possess the high level of durability and desirability required to be embraced by second and third owners. For devices at the end of their life, we'll recycle each free of charge.

The success of these programmes belongs to our customers. Their efforts identify the value of our products and help get the most from each device, and from the resources inside.