Dell on the Circular Economy

Dell's Position

We support the underlying principles and objectives of a circular economy and firmly believe that technology is a key enabler in the drive to create an economy that keeps products, materials, and components at their highest value and utility at all times. At Dell, we are finding ways to implement a circular approach for our own products and to help our customers take advantage of technology's ability to deliver new value in new ways, to examine the bigger systems, to identify efficiencies, and to uncover new opportunities.

What is a Circular Economy?

We could begin in many places, but we'll start with the honed synthesis of the Ellen MacArthur Foundation, where Dell is a member of the Circular Economy 100 (CE100) program:

A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models. Such an economy is based on few simple principles. First, at its core, a circular economy aims to 'design out' waste. Waste does not exist—products are designed and optimized for a cycle of disassembly and reuse. These tight component and product cycles define the circular economy and set it apart from disposal and even recycling where large amounts of embedded energy and labor are lost.

Secondly, circularity introduces a strict differentiation between consumable and durable components of a product. Unlike today, consumables in the circular economy are largely made of biological ingredients or 'nutrients' that are at least non-toxic and possibly even beneficial, and can be safely returned to the biosphere— directly or in a cascade of consecutive uses. Durables such as engines or computers, on the other hand, are made of technical nutrients unsuitable for the biosphere, like metals and most plastics. These are designed from the start for reuse. Thirdly, the energy required to fuel this cycle should be renewable by nature, again to decrease resource dependence and increase system resilience (e.g., to oil shocks).

Dell's Principles

- **Transformation** – Dell is transforming the way we design and deliver products and services. This begins with a systems-level view of our product lifecycles. Our designs emphasize ease of repair and recyclability from the start and we continually look for ways to incorporate sustainable materials in both our products and our packaging. We are committed to continually improving the energy efficiency of our entire portfolio and we have global takeback options to make it easy for

customers when they are done with their products. Our lifecycle approach aims to keep viable products and parts in circulation with our global efforts to reuse, refurbish and resell products and parts to extend their lifetimes to the maximum extent possible. And when products and parts reach the end of their useful life, our responsible recycling programs ensure those materials find another life as well.

- **Innovation** – Transitioning to a more circular economy will require both innovation and collaboration across industries. Entrepreneurs play a critical role in identifying new ways of enabling a circular economy. And technology innovation has an important role to play in facilitating it all. Through virtualization, cloud computing and mobile technology, customers can fully utilize their resources and tap into scalable solutions that do not require significant amounts of hardware while taking advantage of smaller, more efficient devices that last longer and can be upgraded through software. Using technology also helps drive new understandings and efficiencies. By transforming the system via measurement that is part of the Internet of Things and Big Data, new analyses can change the way companies and consumers act. By tapping into knowledge gleaned from improved usage data, progressive companies can rethink how their products and services should be delivered and consumed.

- **Collaboration** – Transitioning to a circular economy also will need significant collaboration with our customers, up and down our supply chain, across industry sectors, and with policymakers. Entrepreneurs are critical to helping fill gaps and often bring the innovative spark that is needed to actually pull together the kinds of transformation envisioned.

- **Governance** – A circular economy will be a long-lasting success only if and when it enhances and complements the development, growth and strength of the economy overall. Governments should adopt a new, future-leaning approach to policies concerning a circular economy that recognizes that the increased use of technology can create new, disruptive societal benefits (such as we're seeing with the sharing economy and the growing Internet of Things). Governments and civil society will have to develop approaches that balance the desire to aggressively promote the need for systemic changes with the desire to protect more traditional values of transparency, accountability and fairness – that balance existing legal obligations and siloed regulatory structures (such as extended producer responsibility) with lighter, more nimble touches that intentionally promote disruption and can accommodate products and approaches yet to be created. Governments also can play an important role in promoting a circular economy by sharing best practices, harmonizing standards globally, and using public procurement policy.

Dell's Leadership

Technology can play a powerful role in benefiting people, communities and the environment. Dell is a leader in sustainability and the nascent electronics circular economy. In 2015, we were proud to receive the inaugural Accenture Award for Circular Economy Pioneers as well as the Green Electronics Council Catalyst Award. We are working across our products' lifecycles, emphasizing reuse, repair, remanufacturing and recyclability; sustainable material choices; energy efficiency; and software-defined devices. We also provide the hardware and software solutions to help our customers monitor and measure their own systems to improve efficiency, eliminate waste and develop completely new solutions. Underpinning these efforts is our 2020 Legacy of Good plan –driving sustainability alongside business objectives and creating shared value in all that we do.

- **Materials** – Dell has created a growing closed-loop plastics network. We're the first company to offer a computer made with UL Environment-certified closed-loop recycled plastics - our OptiPlex

3030 All-in-One. Each year we use more than 10 million pounds of post-consumer recycled plastics in our products. Since 2014, we've also begun incorporating plastics sourced from our collection of used electronics (approximately 4 million pounds per year). This process gives these plastics an extended life, has a smaller lifecycle carbon footprint, and even reduces costs. Our 2020 goal is to use 50 million pounds of recycled-content plastic and other sustainable materials in our products. Additionally, we are committed to phase out substances of concern wherever possible, maintaining and continually adding to our Materials Restricted for Use list.

- **Packaging** – We're working to reduce the amount of packaging needed to safely transport our products. As of 2015, two out of every three Dell product shipments now arrive in packaging using sustainable materials - innovative sustainable packaging using wheat straw, mushrooms and Air Carbon, a carbon-negative plastic made from captured methane emissions instead of oil. Since 2009, Dell has avoided 31 million pounds of packaging, while helping support local farmers and reducing pollution in places like China. Our 2020 goal is to deliver waste-free packaging sourced from sustainable materials and 100% recyclable or compostable.

- **Takeback** – Dell has the world's largest takeback program, with recycling services in 78 countries and territories. Since FY08, Dell has recovered more than 1.4 billion pounds of used electronics – well on our way toward our 2020 goal of 2 billion pounds. While we are building a closed-loop process for plastics and other materials, Dell's takeback programs aim to achieve landfill avoidance for all return stream materials.

- **Resale** –Each year we manage approximately 800,000 products that are returned, exchanged or part of cancelled orders. Our Global Dell Outlet team manages all of these with a focus on reuse, refurbishment and resale. If remanufacturing is not possible, the units are responsibly recycled.

- **Energy** – In 2014, 38.4% of our global purchased electricity needs came from renewably generated sources (such as wind, water and solar), with 21 Dell facilities purchasing 100% of their electricity needs from renewable sources – so we're on track to meet our 2020 target of 50%. We also work to reduce the energy used by our customers: since 2011, we've reduced the average energy intensity of our product portfolio by 30.1% - with a 2020 goal of 80%.

- **Cloud, Virtualization and more** – We're also helping our customers add computing capabilities without adding additional physical assets. Virtualization services often help customers to lower their power and cooling costs, reduce physical footprints, and delay or even eliminate the need to buy new devices or build new facilities. Dell's software-defined products and our open source focus help our customers enable the latest technology advances while extending the life of current devices and running them more efficiently. Cloud solutions allow customers to scalably provide their workforce and customers with new technology without having to buy new hardware.

- **Understanding systems** – The growth of the Internet of Things has incredible potential to transform the way resources are used and products and services are managed. By analyzing and acting on these new data streams, we can improve efficiency, identify opportunities and accelerate the transition to a more circular economy.

- **Public Procurement** – Dell is a leader in developing and using green procurement standards, such as ENERGY STAR and EPEAT, market-driven solutions that already are successfully driving elements of a circular economy.

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