

Education

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From Circuits to Circles: Basic Principles of Circular Electronics

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A Challenging Circular Era

There are real signs that a new circular age is dawning.

An EU Circular Economy Package, the emergence of networks such as the CE100, a Dutch circular economy week, Scotland's national policy agenda to "make things last" and Unilever's pledge to implement fully recyclable packaging by 2025, are just some of the initiatives that have helped grow public and business awareness over the last five years.

But, is this awareness translating into business practice?

In some respects, implementation is the hardest part of transition. Nowhere is this more true than in the electronics sector, where closing the loop involves dealing with hundreds of product components, recyclability issues, complex supply chains and fickle consumers.

But while there are hurdles, the potential for circular electronics to make impact is significant.

A 2015 report by the European Environmental Bureau showed that selected electrical and electronic devices placed on the EU market over one year cause the equivalent of 1,500 million tonnes of CO2 emissions over their lifecycle; an amount equal to what the entire annual energy production of the UK, Germany and Poland emits, combined.

Tackling this has the potential to wholesale reduce CO2 emissions, as well as reduce other environmental burdens such as water use, waste generation and the release of hazardous substances.

With this in mind, Climate-KIC Education Benelux, in collaboration with Fairphone, made circular electronics the focus of its first "Spark" community event of 2017. The aim was to raise much-needed discussion on all aspects of the value chain – business modelling, design, manufacturing, procurement and e-waste – and set in motion principles that might help organisations navigate some of these intractable issues.

Participants and experts differed in their opinions and approaches, but there were many areas of alignment. To begin with, identifying and developing the right business model is at the core of circular economy. There are a growing number of success stories to draw on, but no "one-size-fits-all" solution.

Since business models or market types influence product development, design and manufacturing are critical to closing the loop. Short lives and fast markets can favour design for disassembly, while repair or lease models entail relationship building. Materials, manufacturing, procurement and supply chain structure are key to executing the right design.

While circular economy demands a radical shift in focus from waste management and recycling to business modelling, there is still the looming question of what to do with all the linear products already within circulation. We also discussed how there are other, more systemic, factors in scaling up circular electronics. Institutions have a role to play by exercising their purchasing power and helping raise the demand for circular products and services.

The efforts of pioneering individuals and companies need to be matched with policy and legislation that accelerates transition. Taxes must ensure the true-cost of linear disposability is paid, while subsidies must be re-directed so that the last barrier – the cost of going circular – is removed.

What we concluded was that circular economy is a constant process of benchmarking materials, not just against budgets, but against social and environmental impact, as well as planetary boundaries.

While identifying measures is critical to evaluating progress, creating a shared vision is the first step.

True to the collaborative nature of Climate-KIC, “Spark #1: Circular Electronics” adopted an inclusive approach, developing these discussion points into a set of principles for implementing circular economy into the electronics value chain. As a new circular age is dawning, it’s only by bringing today’s practitioners together with tomorrow’s climate leaders, that we can harness the momentum of circular economy, putting it into practice.

From Circuits to Circles

Basic Principles of Circular Electronics

Business Models, Development and Consumer Engagement

At the heart of circular electronics is a circular business model that supports longevity and durability. Such a model should engage consumers with services and experiences that both meet their needs and build trust. A truly circular business model ensures access and choice in a way that it makes it easier to choose than linear models.

Procurement

Institutions and global companies represent significant purchasing power with potential to influence demand for circular products and services. Of course, facilitating this demand needs to be more than simply adding ‘circular’ standards in the procurement procedure. It should also involve co-creating a shared vision across the organization on what circular economy is and what its wider benefits are.

Design and Manufacturing

From developing a service to ensuring products last, design is critical to closing the loop. Particular business models or market types will influence design: short lives and fast markets favour design for disassembly, while repair or lease models entail relationship building. Materials, manufacturing, sourcing and supply chain structure are key to executing the right design.

E-waste and End-of-Life

E-waste within a circular economy is a flow of materials, where the focus is on recovering products and components already deemed as waste. Guided by the principle that waste is, in fact, a resource, recycling and waste processing infrastructure as well as consumer incentives can help recover materials.

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About Spark#1: Circular Electronics

Climate-KIC Sparks are an annual series of community events, which include workshops and roundtable discussions with entrepreneurs, companies and researchers pioneering in the climate innovation space. Previous topics have included creating climate wealth, entrepreneurs as activists, low-tech solutions for a sustainable society and innovation in manufacturing.

Spark#1: Circular Electronics was held during Nederland Circulair's "Week van de Circulaire Economie". The event brought together Climate-KIC education participants, members of the public and expert practitioners for a panel discussion, breakout sessions and presentations at Fairphone's Amsterdam headquarters.

We would like to thank our expert panellists and breakout session leaders:

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About Climate-KIC

Climate-KIC is Europe's largest public-private partnership dedicated to developing and scaling innovation that helps business and society mitigate and adapt to climate change. Our education and incubation programmes, including Spark Lectures, help build the capacity and entrepreneurial skills needed for climate innovation.

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