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Introduction to the circular economy

Presentation notes

Use these notes together with the 'Introduction to the circular economy' slides to introduce the key concepts, principles, and examples of the circular economy to your colleagues, team members or employees.

*We have prepared the **script** for you to accompany each slide. You can supplement the script with additional information provided in the **resources** section.*

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1 • Introduction to the circular economy

Script

The way we design and make things is changing. There is a new system emerging that can meet our needs within planetary boundaries.

In the presentation today you will get insights into why our current economy is ripe for disruption. You will learn the three principles of the circular economy, and explore the circular economy system diagram. Finally, you will hear various examples of circular economy in business and what benefits this new way of doing things can provide to our economy, the environment, and society.

Resources

Re-thinking Progress • The Circular Economy video (3:48)
The surprising thing I learned sailing solo around the world • A TED talk by Dame Ellen MacArthur (16:47)

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2 • The linear economy is ripe for disruption

Script

In today's economy, most of the materials we use, we lose, and most products are disposed of after a single, short use. In this system, we also lose the value of the resources, and the energy and work that went into creating those products and components.

In the next few slides we will see why we describe this type of economy as linear, why most of our responses can't fix structural waste, and what economic and environmental loss we incur as a result.

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3 • Wasted opportunities in today's economy

Script

There are a lot of wasted opportunities in today's economy. These are just a few examples:

- 30% of the world's food is wasted. The equivalent of six garbage trucks of edible food is lost or wasted every second.
- In Europe, the average car sits unused 92% of the time, and only 1 in 5 seats are used even when it's in use.
- In Europe, the average office is used only 50-65% of the time, even during office hours.
- 86% of plastic packaging is landfilled, incinerated or leaks into natural systems. 8 million tonnes of plastic enter the ocean every year.

These examples illustrate that our current economic model is massively wasteful, and most of this waste is a structural waste. It's not waste that you can 'clean up' or 'collect', as it's built into the system.

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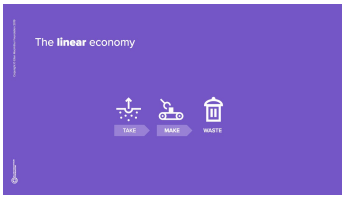
Resources

Cities and the circular economy of food • A summary of findings
The New Plastics Economy: Catalysing action • A report



4 • The linear economy

Script

The source of structural waste is deeply rooted in our current economic system that follows a linear take-make-waste approach.

We take resources from the ground to make products. We use these products, when we no longer want them, we throw them away. Take-make-waste. We call this a linear economy.

Resources

The story of where we came from • A video on industrial revolution (0:39)
How things look today • A video on the effects of incredible growth (3:03)

5 • Current responses don't work

Script

Our common response to the challenges of the linear economy is to address problems after they have happened. Take plastic waste: a common approach is to use less, ban plastics, do beach cleans, recycle more, etc. But by themselves, none of these will solve the problem in the long run, as they treat symptoms rather than the root cause.

The recycling symbol has been around for 40 years, but we collect about 14% of material for recycling - and only 2% closed loop.

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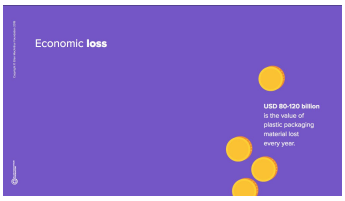
Resources

The New Plastics Economy: Catalysing action • A report



6 • Economic loss

Script

The structural waste of the linear economy comes at a high economic loss.

- Each year, USD 80-120 billion plastic packaging material value is lost to the economy.
- USD 5.7 trillion are lost due to the linear nature of modern food production, which extracts finite resources, is wasteful and polluting, and harms natural systems.

Resources

Cities and the circular economy of food. • A summary of findings
The New Plastics Economy: Catalysing action • A report

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7 • Environmental loss

Script

We now know that our current economic system is also contributing to a range of environmental problems, including climate change and the loss of biodiversity.

- Climate change: A temperature rise from 2 to 4°C is projected.
- Loss of biodiversity: There's been an overall decline in species of 60% over the last 40 years.
- Land degradation: Soil quality losses are expected to cost USD 40 billion annually.
- Ocean pollution: An estimated 8 million tonnes of plastic waste enter the oceans every year, a figure predicted to rise to 17.5 million tonnes per annum by 2025.

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8 • The linear model is ripe for disruption

Script

It is important to acknowledge that the current way of doing things has brought great prosperity to millions if not billions of people around the globe. We have enjoyed incredible technological innovations, and many citizens have access to almost anything they desire, quickly and at relatively low cost.

However, the environmental losses, structural waste and its economic implications indicate that we must transform all the elements of the take-make-waste system: how we manage resources, how we make and use products, and what we do with the materials afterwards.

Only by changing the system we can create a thriving economy that can benefit everyone within the limits of our planet.

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9 • An economy that is restorative and regenerative by design

Script

How does this new economic system look like in practice?

The circular economy presents new opportunities for distributed and inclusive growth that is decoupled from resource consumption.

It offers a systemic approach in which economic activity actually builds and rebuilds overall system health while eliminating the concept of waste.

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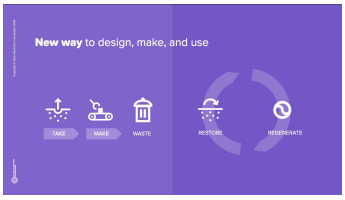

10 • New way to design, make, and use

Script

At its heart, the circular economy is a new way to design, make, and use things within planetary boundaries.

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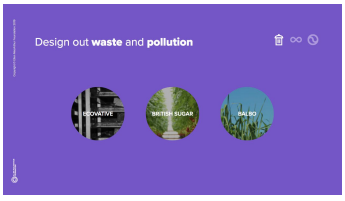
11 • Three principles of the circular economy

Script

Shifting the system involves everyone and everything: businesses, governments, and individuals; our cities, our products, and our jobs.

By designing out waste and pollution, keeping products and materials in use, and regenerating natural systems we can reinvent everything.

Let's look at each principle in more detail.



12 • Design out waste and pollution

Script

Did you know that waste and pollution are largely a result of the way we design things?

Waste and pollution are not accidents, but the consequences of the decisions made at the design stage, where around 80% of the environmental impacts are determined.

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By changing our mindset to view waste as a design flaw and harnessing new materials and technologies, we can ensure that waste and pollution are not created in the first place.

Here are three examples to help you understand this principle better.

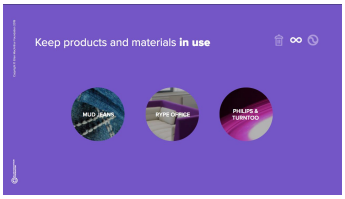
Ecovative produce packaging products that are fully compostable alternatives to synthetic materials. They are made of mycelium grown in and around agriculture by-products with low economic value, acting thereby as a glue, and can take any shape needed. At the end of use, products can be composted at home.

British Sugar plc is a startup that doesn't rely on new tech, but instead on the gradual evolution of processes and a precise understanding of energy and resource flows.

Balbo farm has developed its own harvesting equipment with low pressure tyres to avoid harmful compaction, that simultaneously cuts cane and shreds by-products returning them back to the soil. This results in a complete elimination of chemical inputs, mechanical irrigation no longer required and a 20% increase in productivity.

Resources

Ecovative • A video (2:07)
Ecovative • A case study
British Sugar plc • A case study
Balbo • A video (20:01)
Balbo • A case study



13 • Keep products and materials in use

Script

What if we could build an economy that uses things rather than uses them up?

We can’t keep wasting resources. Products and materials must be kept in the economy. We can design some products and components so that they can be reused, repaired and remanufactured. But making things last forever is not the only solution. When it comes to products like food or packaging, we should be able to get the materials back, so that they don’t end up in the landfill.

Here are three examples to help you understand this principle better.

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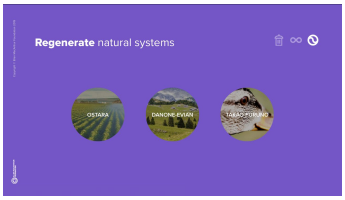
Mud Jeans are offered on a subscription model, so that repairs are free and users can swap their jeans for a new pair. Besides, each pair is made from 40% recycled content and the material is derived from discarded jeans. The subscription model gives more flexibility for customers as well as a more predictable material supply chain for Mud. It results in lower environmental impact associated with jeans.

Rype Office has shown that office furniture market is ripe for disruption, by giving their customers three options: purchase new furniture and return it in a buy-back scheme, purchase remade furniture from existing feedstock, or have existing furnishings refreshed and returned to an as-new condition.

Philips & Turntoo: Architect Thomas Rau worked with Philips to purchase light as a service. The end result was a bespoke 'pay-per-lux' intelligent lighting system to fit the requirements of the space, at a manageable price. Philips retain control over the items they produce, enabling better maintenance, reconditioning, and recovery.

Resources

Mud jeans • A case study
Rype Office • A case study
Philips & Turntoo • A case study



14 • Regenerate natural systems

Script

What if we could not only protect, but actively improve the environment?

In nature, there is no concept of waste. Everything is food for something else - a leaf that falls from the tree feeds the forest. Instead of simply trying to do less harm, we should aim to do good. By returning valuable nutrients to the soil and other ecosystems, we can enhance our natural resources.

Here are three examples to help you understand this principle better.

Ostara has developed a technology that can be incorporated into treatment plants allowing phosphorus and other nutrients to be recovered from industrial and municipal wastewater streams. In the current linear approach to agriculture, these important nutrients are removed from the soil, and pass through a value chain and are discarded in a way that can lead to

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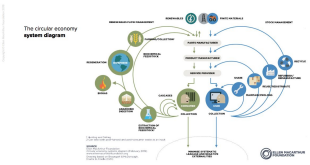
unproductive soil and negative environmental impacts. For phosphorus, there is no synthetic alternative and the natural resources are finite. Thus, Ostara's solution allows the product to be marketed, distributed and sold to blenders, growers and farmers as a pure and effective fertiliser, produced from resources that would otherwise be wasted.

Danon-Evian initiated a collection scheme and built an anaerobic digestion plant that produces biogas and converts hazardous raw manure to benign but regenerating bio-solids. This allowed to preserve the purity of the water supply for Danone's Evian bottled water while supporting other activities in the catchment. As a result, water contamination risks are eliminated, meadows are naturally fertilised and 1 million cubic metres of bio-gas is injected into the local gas grid. The value is cascaded from organic matter and residual bio-solids are distributed to farmers closing the nutrient loop and regenerating pastureland in the region, thus making it a circular solution.

Takao Furuno: A small-scale, organic farming system in Japan is currently providing a rice yield that exceeds industrial rice systems' harvests by 20-50%. The higher yield combined with the production of a variety of other food stuffs, grown synergistically with the rice, means that with just six acres, Japanese farmer Takao Furuno sometimes eclipses the gross income of a typical 600 acre rice farm in Texas.

Resources

Ostara • A case study
Danon-Evian • A case study
Takao Furuno • A case study



15 • The circular economy system diagram

Script

To understand the circular economy in more detail, let's look at the circular economy diagram.

This diagram captures the flow of materials, nutrients, components, and products.

There are three important aspects to notice about this diagram:

- The distinction between biological and technical cycles.
- The strategies to keep products, materials and components at highest value, that differ on both sides.
- The distinction between the user and consumer.

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1.

The first thing to notice is the separation into two distinct halves. These represent two distinct flows of material: biological and technical.

Technical materials such as metals, plastics, and synthetic chemicals, are represented in blue on the right hand side. These materials should not re-enter the environment, and must continuously cycle through the system so that their value can be recaptured and retained.

Biological materials such as food, wood, and biopolymers are represented in green on the left side of the diagram. These materials can safely re-enter the natural world, once they have gone through one or more use cycles, where they will biodegrade over time, returning the embedded nutrients to the environment.

2.

There are a number of ways to keep technical materials in the economy:

- Maintain/prolong/share. This innermost loop of the technical cycle shows the strategy of keeping products and materials in use by prolonging their lifespan for as long as possible through designing for durability as well as maintenance and repair. These longer-lasting products can then be shared amongst users who are able to enjoy access to the service they provide, removing the need to create new products.
- Reuse/redistribute. Technical products and materials can also be reused multiple times and redistributed to new users in their original form or with little enhancement or change. Marketplaces such as eBay are proof of this already well-established approach.
- Refurbish/remanufacture. Remanufacturing and refurbishment are two similar, yet slightly different, processes of restoring value to a product. When a product is remanufactured it is disassembled to the component level and rebuilt (replacing components where necessary) to as-new condition. Refurbishment is largely a cosmetic process whereby a product is repaired as much as possible, usually without disassembly and the replacement of components.
- Recycle. Recycling is the process of reducing a product all the way back to its basic material level, thereby allowing those materials (or a portion of them at least) to be remade into new products. While this is undoubtedly an important process in a circular economy, the necessary cost and energy to remake products entirely, and the inevitable material losses, mean that it is a lower value process than those closer to the centre of the system diagram, such as reuse and remanufacturing.

Strategies are different in the biological cycle. The cascading loop, refers to the process of putting used materials and components into different uses to maximise the value they create. At the end, the material is returned to the natural environment as nutrients. A cascade, for example, might be a pair of cotton jeans being turned into furniture stuffing and then into insulation material, before being anaerobically digested so that it may be returned to the soil.

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3.

In a circular economy, biological materials are the only ones that can be thought of as consumable, while technical materials are used. We don't 'consume' our washing machines and cars in the same way that we consume food. This is a subtle, but important distinction in how we view our relationship to materials. We are users of clothes and equipment and consumers of food.

Resources

What is the circular economy • A podcast exploring the difference between biological and technical cycles (19:15)

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16 • Benefits of the circular economy

Script

As we have seen, the circular economy presents an inspiring vision for an economy that can work in the long term. Let's explore in more detail what opportunities it offers for business, how it benefits society, and regenerates the environment.

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17 • Benefiting environment, society, and business

Script

Some of the economic, societal and environmental benefits include:

- 48% reduction of carbon dioxide emissions by 2030 across mobility, food systems, and the built environment
- Increased disposable income for EU households by €3,000, or 18% higher than the current development path
- The economic gain from materials savings alone is estimated at over a trillion dollars a year

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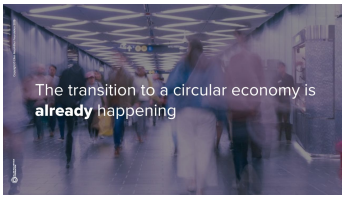

18 • The transition to a circular economy is already happening

Script

There are countless examples of businesses operating according to the principles of a circular economy, and we are only at the beginning of the journey of making the shift from linear to circular.