



## CLOSED LOOP RECYCLING (ADVANCED)

CLOSED LOOP RECYCLING FOR  
SUSTAINABLE BUSINESSES

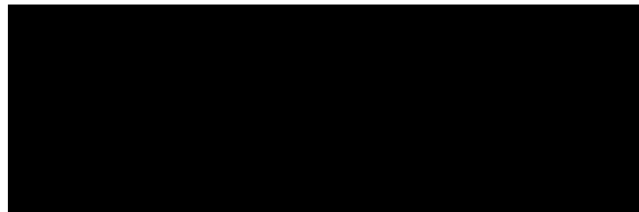
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# INTRODUCTION

This video explains closed loop recycling processes and introduces one of the tools for developing a closed-loop business model.



# EXPECTED LEARNING OUTCOMES

<b>KNOWLEDGE</b>	<ul style="list-style-type: none"><li>• Knowledge of opportunities from closed-loop recycling systems</li><li>• Knowledge of a business model canvas which can be used to develop close loop recycling business</li></ul>
<b>SKILLS</b>	<ul style="list-style-type: none"><li>• Defining the differences between closed-loop recycling processes and open-loop processes</li><li>• Developing your own closed-loop business model concept</li></ul>
<b>ATTITUDES</b>	<ul style="list-style-type: none"><li>• Importance of closed loop business models and the impact of such businesses in circular economy processes</li></ul>





## SELF- REFLECTION EXERCISE

Please fill the self-reflection exercise to test your knowledge about closed loop recycling for sustainable business and circular economy. There are only five questions, be careful, there are questions where the right answers are more than one.

[Click here to be taken to the self-reflection exercise.](#)

# **WHAT IS CLOSED-LOOP RECYCLING AND WHY IS IT IMPORTANT AND NECESSARY?**

Many industries have a long history of planned obsolescence, deliberately designing products that fail prematurely or become out of date to drive consumers to purchase a new product or upgrade. Some make the repair of their products infeasible, which further strengthens linear consumerism, the unsustainable extraction of raw material and pollution.



This model ignores the opportunities brought by the Fourth Industrial Revolution and rapid advances in new technologies that include the Internet of Things, 3D printers and robotics, to create exciting innovations in how resources and products are used and consumed.

In addition, the Circular economy concept has emerged, alongside new consumer attitudes towards waste and pollution. The closed loop business model is a key part of this new economy.

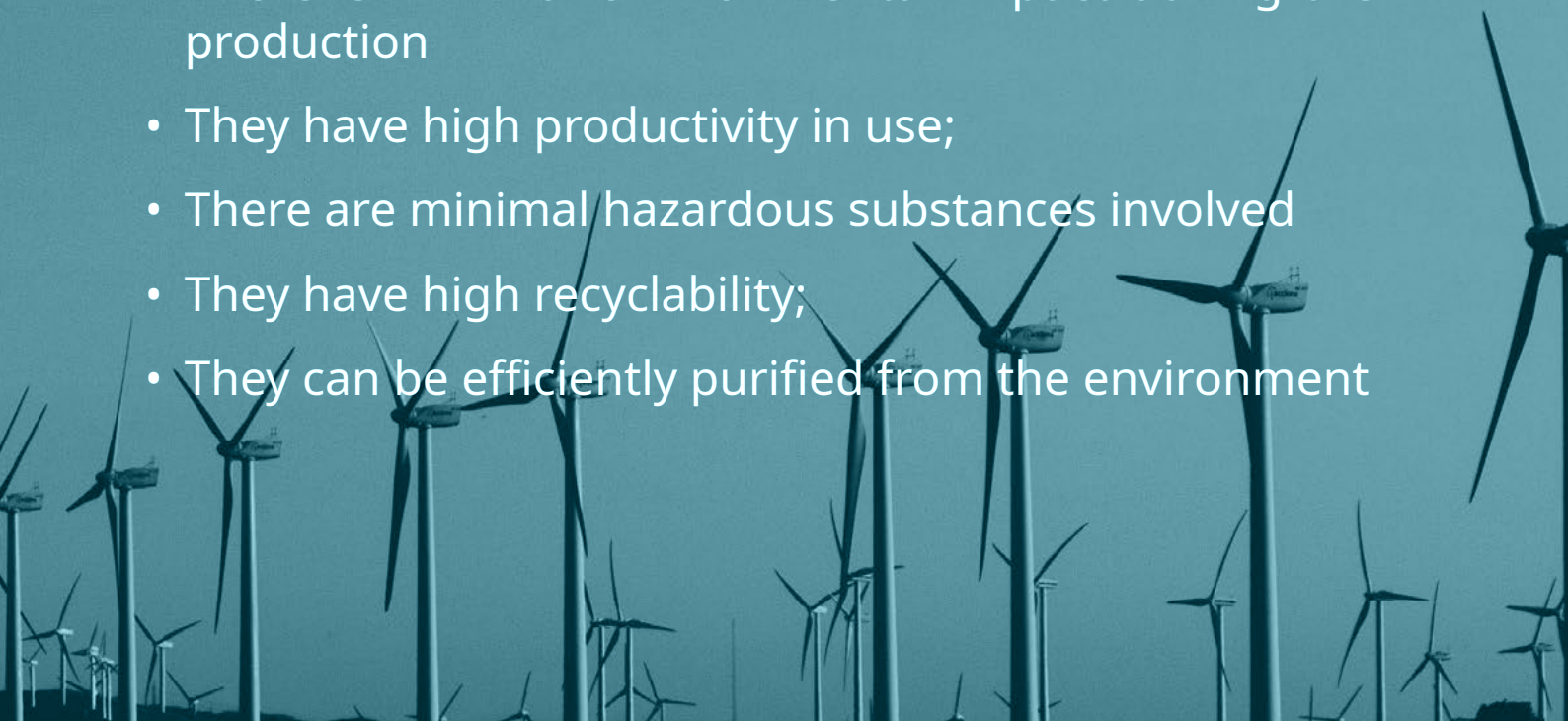
Mastering the closed-loop model is the key to a sustainable future. In a closed-loop business model, waste becomes a new input for new processes, eliminating the need for raw materials. By contrast, in the widely existing open-loop model, products just become waste at the end of their life, of very low or no value and toxic for the air we breathe and the environment we depend on.

In the new model the material flows involved in the production of a product can be seen as mimicking natural systems where biological nutrients have evolved to enter and circulate around the biosphere safely and “can decompose without causing harm to the environment and provide a source of food for the wider system”. In the same way inorganic or synthetic materials can be seen as technical “nutrients” in a closed loop system and be designed to be reused within a production and consumption cycle without losing their value. Regeneration and restoration are built in at all levels. So the business model is focused on creating an inherently regenerative and advanced product that does no harm.

For example a core feature of a closed loop strategy is ease of disassembly. A product designed for disassembly brings efficiencies in re-manufacturing, maintenance, servicing, and recycling.

Another element of the strategy is making technical components with ecoefficient materials. Ecoefficient materials have six important features:

- The raw material has a green profile
- There is minimal environmental impact during their production
- They have high productivity in use;
- There are minimal hazardous substances involved
- They have high recyclability;
- They can be efficiently purified from the environment





For example, textile company DyeCoo has developed a technology for dyeing textiles without using water and therefore eliminates toxic waste water. Instead of water, DyeCoo uses carbon dioxide as a solvent in a closed-loop system. While the initial capital investment in the equipment is higher than for conventional dyeing, the company reports it can reduce operating costs with shorter batch cycles, less dye, and the removal of wastewater treatments. The technology also minimises worker exposure to toxic chemicals. One of DyeCoo's new machines saves 32 million litres of water, 60 tons of chemicals and completely eliminates the release of wastewater into the natural environment.

How many of your materials are ecoefficient?



# DEVELOPING A NEW BUSINESS MODEL

The circular economy is based on a systemic approach and adapting your business model to it will take systemic thinking and collaboration in all corners and at all levels of your business. To future proof your business you will need to consider:

## Company Culture

The closed-loop approach involves all the elements of all your products and their inputs and outputs from cradle to grave. It is not just a box ticking sustainability exercise for one department, but a massive economic opportunity for the whole company. To rethink how your business works so fundamentally you will need to move beyond working in silos and use your human capital to its fullest extent.

According to the Director of Sustainability at Phillips “It’s all about engagement”, tapping into our personal motivation to make things better. To start building awareness and commitment get your story right, why is closing the loop important and why does it matter to your company?

Establishing the right team, evaluating their influence and competencies, and defining the roles they will play throughout different parts of your innovation journey needs to be your priority.



## The wider picture

Successful companies have a laser focus on their user needs. To be a successful closed loop company you need to balance this with an understanding of the impact of your product on stakeholders, the unintended consequences of your company's decisions. At every stage of the business development process you need to both zoom in on the user needs and zoom out to consider the systemic implications, oscillating continuously between these two equally critical perspectives.

The policy landscape is another critical part of the wider picture, for example there are five priority areas highlighted in the EU Action Plan on the Circular

Economy: plastics, food waste, biomass/bio-based, important raw materials, construction & demolition, and the water sector. At some point in your development your business model will be contending with new legislation on these and other green priorities. How much do you know about the EU green strategy and its implications for your business?





## STRUCTURES AND PROCESSES FOR CHANGE

### *Agile leadership*

The circular economy is based on a strong system of values. It also requires companies to adopt systemic thinking and a strong attitude towards innovation.

This places a lot of emphasis on the leadership, which needs to be able to adapt and work with flexible management processes. Agile leadership is a management concept that is also values based and includes a commitment to an equal and open innovation culture where all sorts of ideas can be offered and discussed without criticism.

Leaders who are pioneering the transition to circular business strategy do three main things. They map the potential for circular flows in their existing value chain, select the options that create the most value, and start scaling a circular business and ecosystem.

### *Rapid experimentation*

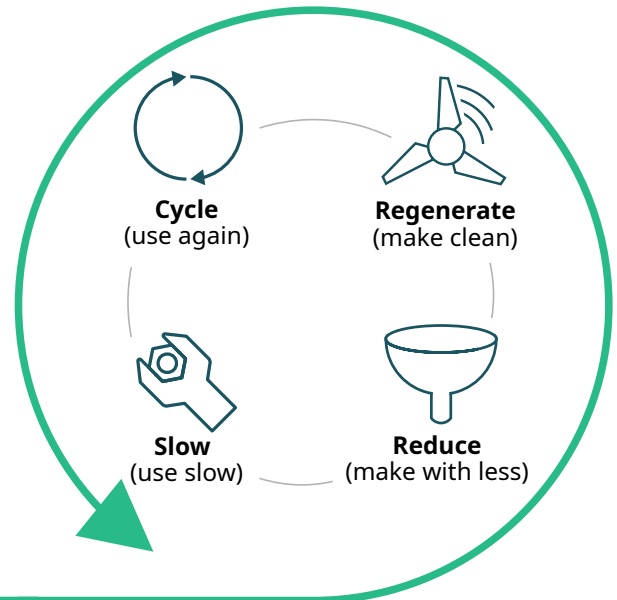
A useful approach to narrow down your options and you can find more information in our Rapid Experimentation eduzine later in the series.



## SCAN OPPORTUNITIES

Map resource use and waste in today's value chain

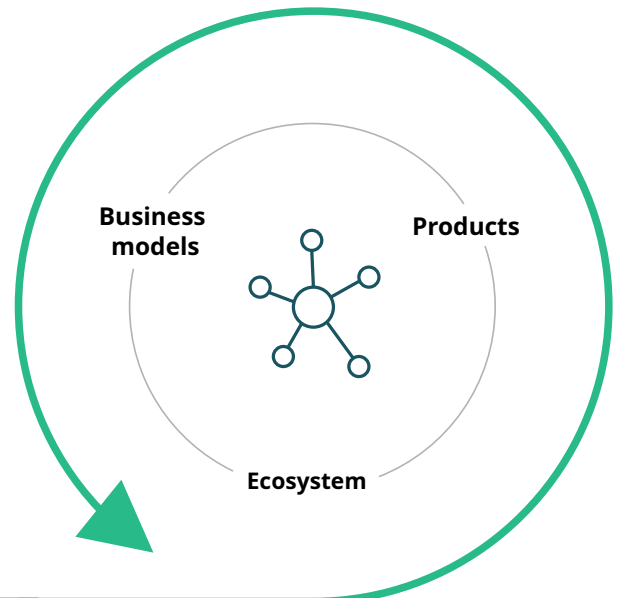
Access customer, regulatory, and competitor trends



## SELECT TARGET SEGMENTS

Guage circular value potential in current and future business models

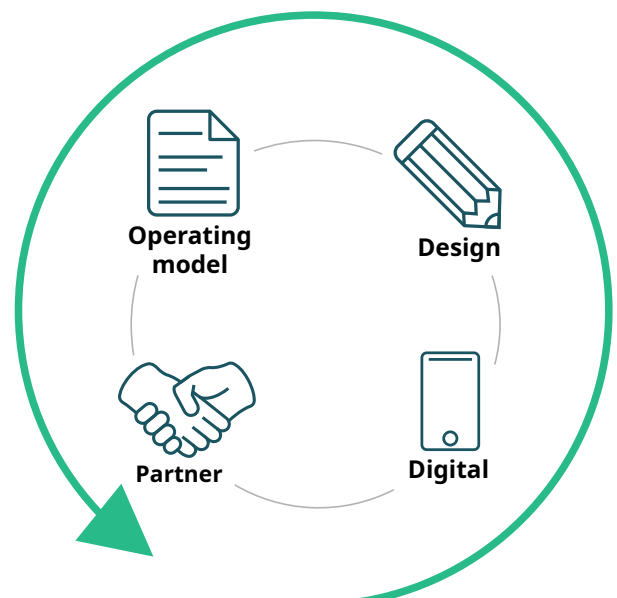
Selec approach and target segments; decide on route to market



## SCAN OPPORTUNITIES

Align the organization and break silos

Tap enablers and grow the partner ecosystem; plan for scale and governance



# HOW TO INTRODUCE A CLOSED LOOP BUSINESS MODEL INTO YOUR BUSINESS – PART 1

*“The circular economy is unique because it connects products to business models. A circular goal cannot be achieved by engineering and product design alone; all other disciplines need to be involved, such as purchasing, finance, marketing and even sales. Circular economy only works if you collaborate.”*

**Eelco Smit** - Senior Director Sustainability, Philips International

Switching an economy to a circular one depends on the one hand, on policymakers and their decisions; on the other hand, it depends on businesses recognising their opportunity and responsibility to make it a priority to introduce circularity into their business models.

Over the last two decades the concept of the business model has been on the rise. They are acknowledged as a “holistic approach towards explaining how firms do business” and critical for new and existing businesses. At a conceptual level, adopting circularity in business seems to be an intuitive business case: closed loop supply chains enable the company to reduce its dependence on increasingly scarce and costly natural resources, and to turn waste into additional sources of revenue and value. But the practical implementation of circularity is not so easy. Most existing company strategies, structures and operations are deeply rooted in the linear approach to growth.

However many traditional business models are still viable today only because of mispriced resources and other market distortions which make them more competitive than they would otherwise be. There is no guarantee this will continue to be the case as natural resources disappear.

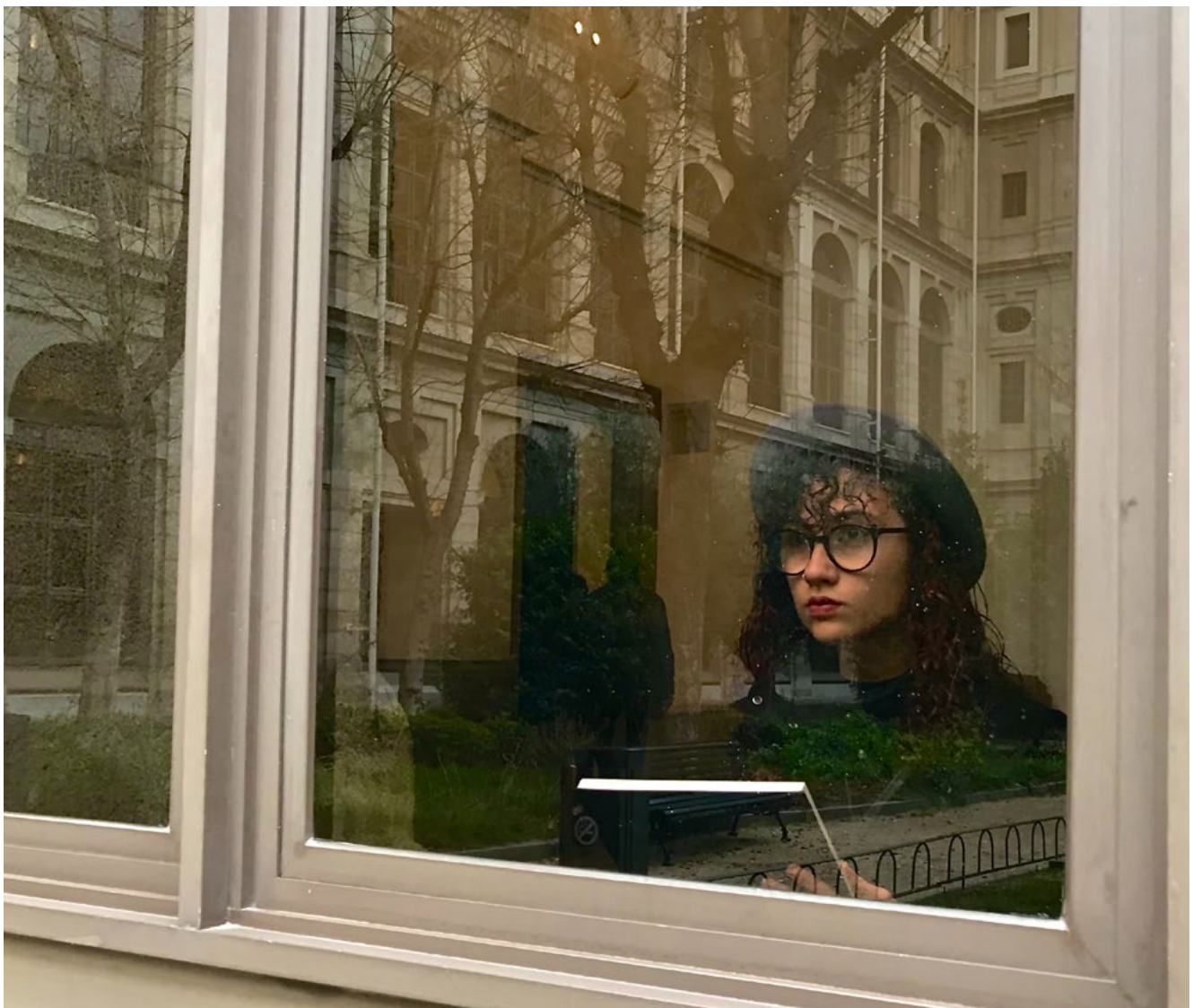




The business model canvas is one established tool for business model innovation. To kick off your thinking about a closed loop model try the circular business model canvas, which adds elements to the established business model canvas that allow you to start factoring in the true impacts and costs of your business and get a true picture of its viability. You will find a download link in the references section.

Furthermore, there is a Circular Business Model Innovation Toolkit which presents the process, worksheets and tools that were selected and/or developed to aid organisation:

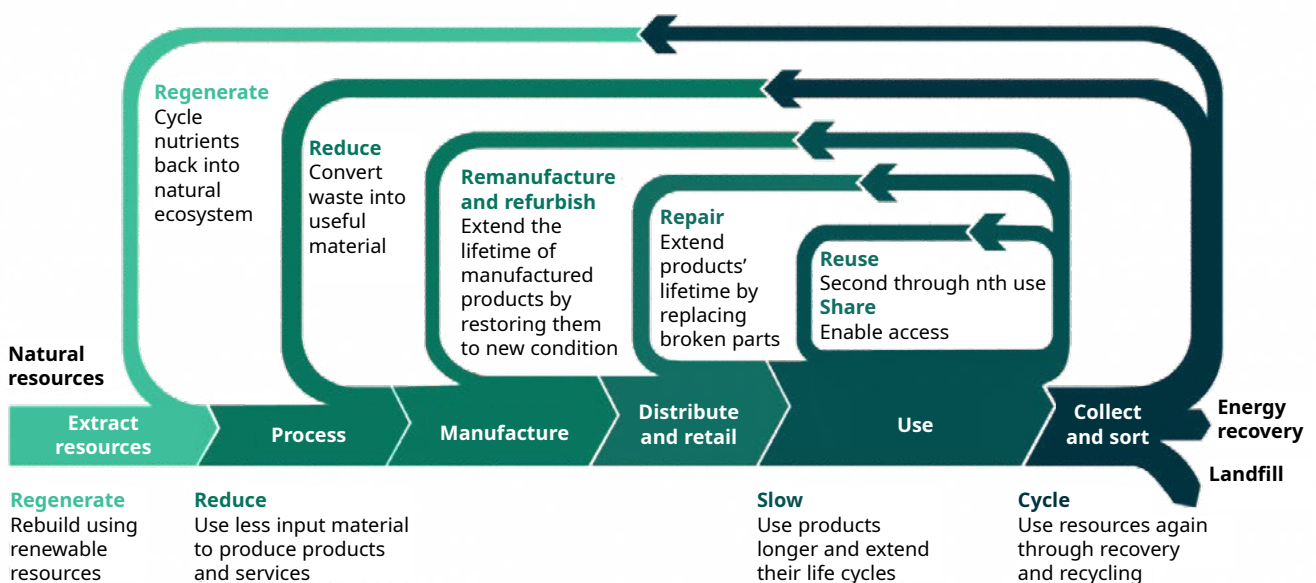
<https://drive.google.com/file/d/1oXoOIGx9VIGMlvT252AXNqBMsrbQJyrf/view?usp=sharing>



# DEVELOPING A CLOSED LOOP BUSINESS MODEL – PART 2

For your circular business model to be successful, you need to involve the right people from across the entire organization. Therefore, establishing the right team, evaluating their influence and competencies, and defining the roles they will play throughout different parts of your innovation journey needs to be your priority. Only then, you can start scoping out the projects: <http://www.r2piproject.eu/wp-content/uploads/2019/08/1.Conditions-for-Success-1.pdf>

Innovation journeys can be long and complex, and therefore you need to define a core team & wider cohort that will participate in each stage of this journey. The core team will likely consist of the decision makers and senior representatives of the organisation. The wider cohort needs to include a range of managers and employees to ensure full coverage and proliferation through every relevant department. This will ensure that every aspect of the business is being considered while working toward a new (circular) business model. Once the team is established, the following tools can be used to give context to everyone and help them understand their role in this whole process: <http://www.r2piproject.eu/wp-content/uploads/2019/08/2.-Get-to-know-your-team.pdf>



**CASE STUDIES  
OF CLOSED LOOP  
RECYCLING BUSINESSES**

MiWa (which stands for Minimum Waste) is a company that started a system made of different components that work together to close packaging loops. The system is suitable for industrial production, large-scale wholesalers, and producers of consumer-related goods. It involves standardised, reusable, intelligent containers, filled by producers with different foods and then sold in bulk in grocery shops. It also has a modular shelf system that allows shops and producers to monitor inventory, the automatic reordering of stock and real-time data on the flow of goods, improving supply-chain efficiency and operational convenience. Furthermore, the company has created reusable, intelligent cups that are used by customers to carry home the needed quantity of food (MiWa cups store the information related to the food they contain and are later collected by MiWa to be recycled). Finally, an app that associates the user to the cups allows them to buy remotely and monitor the quantity and quality of the remaining food.

Shoey Shoes are children's shoes made and produced entirely from waste materials, and engineered to be disassembled, be reused, and recycled. They are the invention of Thomas Leech, an industrial designer in London.

Danone (France; multinational corporation)

The company treats three key resources - water, milk and plastic - as part of closed loops, with a senior executive overseeing Danone's cross-divisional, cross-functional, Strategic Resources Cycles Unit. In the milk cycle, for example, the company is finding new uses internally for acid whey, one of the by-products in making Greek Yogurt, both in its early life nutrition products as well as a feedstock for animal feeds, fertilisers, and energy. In plastic, Danone is



working closely with Veolia to build plants with zero liquid discharge and is working towards using 100% bio sourced second generation plastic, as well as achieving 100% rates of recycled materials in packaging.

Fairphone (The Netherlands; small/medium enterprise)  
One of its key value propositions is an extended usable life span made possible by the ease of repairing the phone, thanks to its various modular components. In addition to its responsible and ethical sourcing policy, Fairphone is beginning to incorporate recycled metals from its various e-waste programmes into its supply chain, with the end goal of ensuring that Fairphones are returned and completely recycled at the end of their lives.

# FAIRPHONE



# FINAL ASSESSMENT TASK

## **TITLE OF THE TASK:**

Make your own closed-loop business model concept

## **AIM OF THE ACTIVITY:**

The aim of the activity is to understand an advanced level closed-loop business model concept where knowledge from all theoretical studies combines at one final task. This task needs to be done in groups of three or four people.

## **TIME REQUIRED:**

5 hours + time for presentation (each team has 10 min)

## **MATERIALS REQUIRED:**

[www.canva.com](http://www.canva.com)

## **FORMAT FOR THE PRESENTATION:**

Infographic in a pdf or jpg (png) format

## **STEPS TO COMPLETE THE TASK:**

**1.** Before the task, please, watch videos about closed loop approach:

<https://www.youtube.com/watch?v=ZXIZgEtRdxc&t=43s>

<https://www.youtube.com/watch?v=zCRKvDyyHmI>

<https://www.youtube.com/watch?v=pY2rQfei2X8>

<https://www.youtube.com/watch?v=EGX9ikJx8S4>

**2.** Following, within a group of three or four people, please, brainstorm ideas of closed-loop recycling business model or business model which contains closed loop approach.







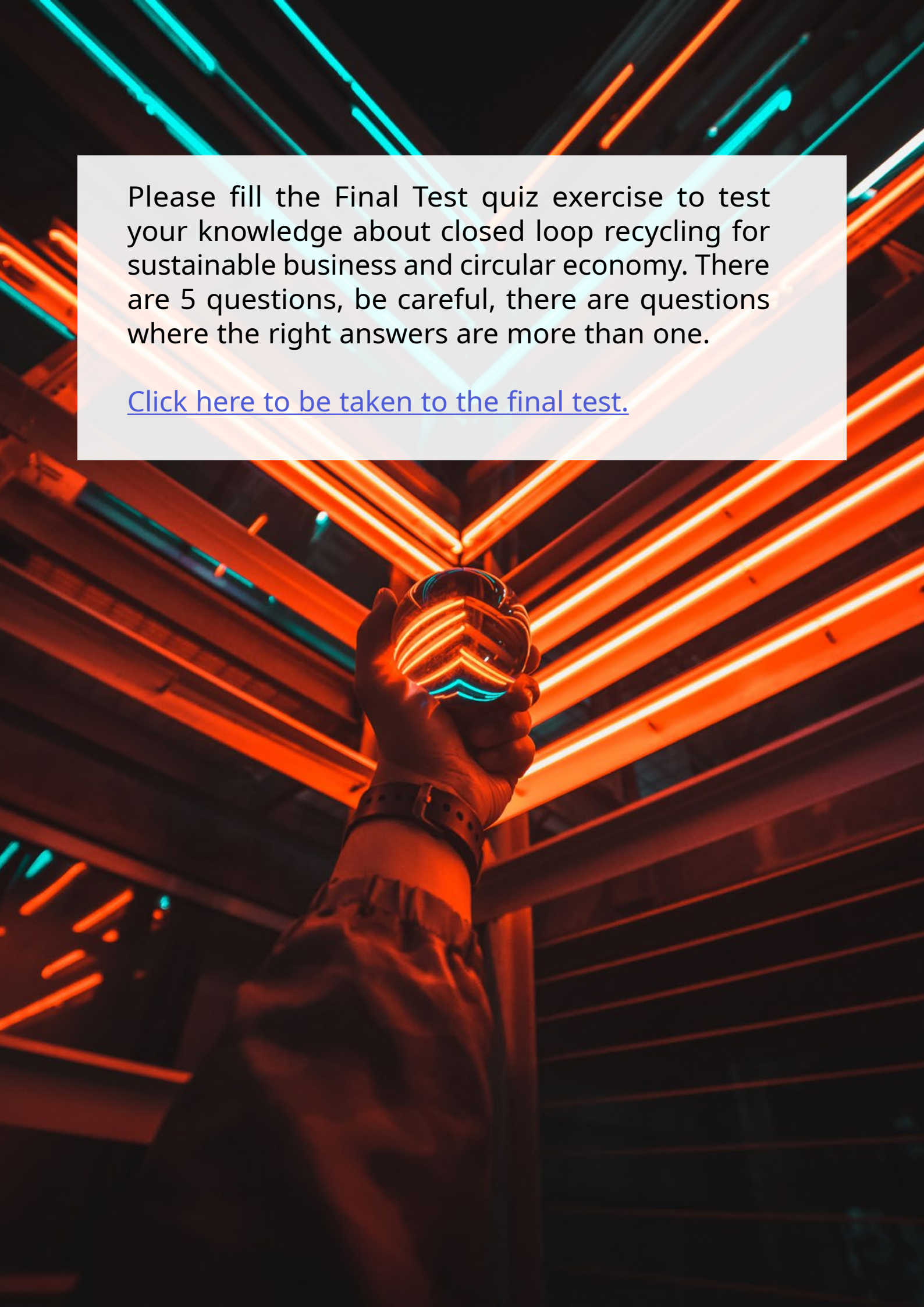
**3.** With your team members agree on one idea

**4.** For this idea develop a closed loop recycling business model concept or business model which contains closed loop approach in an infographic format using digital tool (for example: [www.canva.com](http://www.canva.com); <https://www.altexsoft.com/business-model-canvas-template-online/>) or download your copy: <https://www.businessmodelsinc.com/en/inspiration/tools/business-model-canvas>

**5.** Each team does the presentation (max 10 min)



**FINAL TEST**

A hand holding a glowing, futuristic device in a dark space with orange and blue light streaks. The device is a small, clear, rounded object with a glowing orange and blue light pattern inside. The hand is wearing a dark watch. The background is a dark space filled with numerous bright, diagonal light streaks in shades of orange and blue, creating a sense of depth and movement.

Please fill the Final Test quiz exercise to test your knowledge about closed loop recycling for sustainable business and circular economy. There are 5 questions, be careful, there are questions where the right answers are more than one.

[Click here to be taken to the final test.](#)

# FURTHER READING AND RESOURCES

Foschi, E., & Bonoli, A. (2019). The commitment of packaging industry in the framework of the European strategy for plastics in a circular economy. *Administrative Sciences*, 9(1), 18. <https://doi.org/10.3390/admsci9010018>

Markus Laubscher Director of sustainability at Philips: <https://www.youtube.com/watch?v=xiItdw3Z7x4>

Download a circular business model canvas  
<https://circulab.academy/circular-economy-tools/circular-canvas-business-models/>

Lewandowski, M. Mateusz (2016). Designing the Business Models for Circular Economy—Towards the Conceptual Framework. <https://doi.org/10.3390/su8010043>

About business model canvas: <https://www.businessmodelsinc.com/about-bmi/tools/business-model-canvas/>

Infographics that explain circular economy: <https://www.europarl.europa.eu/.../circ.../public/index.html>

The documentary “Closing the Loop”: <https://www.closingtheloopfilm.com/>

Ran, W., Chen, F., Wu, Q., & Liu, S. (2016). A study of the closed-loop supply chain coordination on waste glass bottles recycling. *Mathematical problems in engineering*, 2016. <https://www.hindawi.com/journals/mpe/2016/1049514/>

Tapper, R. J., Longana, M. L., Yu, H., Hamerton, I., & Potter, K. D. (2018). Development of a closed-loop recycling process for discontinuous carbon fibre polypropylene composites. *Composites Part B: Engineering*, 146, 222-231.

<https://doi.org/10.1016/j.compositesb.2018.03.048>

Nikolaou, I. E., & Tsagarakis, K. P. (2021). An introduction to circular economy and sustainability: Some existing lessons and future directions. *Sustainable Production and Consumption*, 28, 600-609.

<https://doi.org/10.1016/j.spc.2021.06.017>





# LEARNING CIRCLE



cantabria  
perma  
cultura

