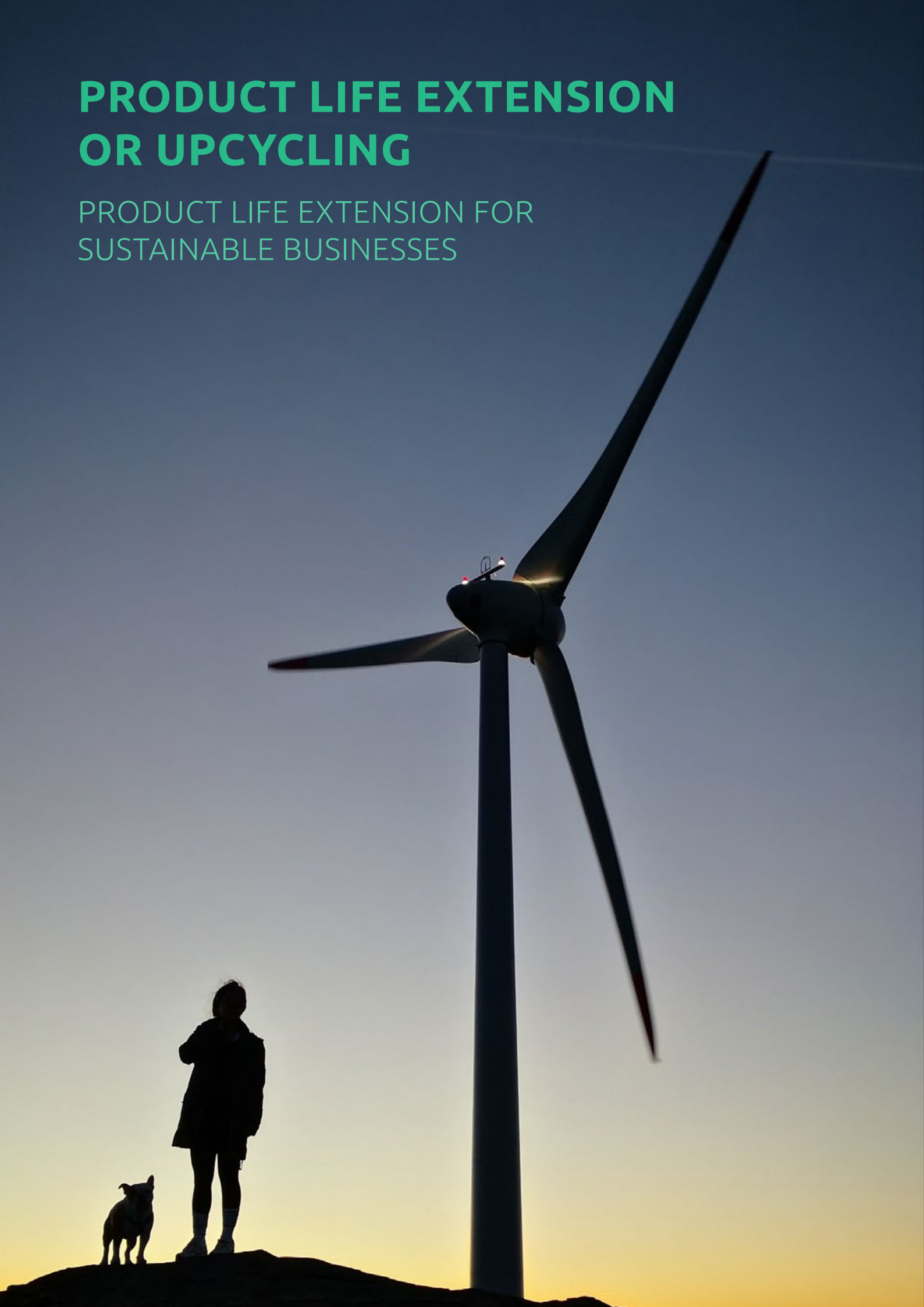


PRODUCT LIFE EXTENSION OR UPCYCLING

PRODUCT LIFE EXTENSION FOR
SUSTAINABLE BUSINESSES



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INTRODUCTION

This video explains Product life extension and upcycling processes and introduces one of the tools for developing a product life extension business model.



EXPECTED LEARNING OUTCOMES

KNOWLEDGE	<ul style="list-style-type: none">• Knowledge of opportunities from product life extension• Knowledge of upcycling and business models relating to product life extension
SKILLS	<ul style="list-style-type: none">• Defining the differences between product life extension processes and upcycling processes• Developing your own product life extension business model concept
ATTITUDES	<ul style="list-style-type: none">• Importance of product life extension business models and the impact of such businesses in circular economy processes



SELF-REFLECTION EXERCISE

Welcome! You can access our initial quiz via the link that will map your basic knowledge in this topic. And do not worry, by the end of the chapter you will know the answer to everything!

<https://forms.gle/SkQRpi3JGRJ3UvA38>



AN INTRODUCTION TO PRODUCT LIFE EXTENSION/UPCYCLING

Product Life Extension is one of 5 paths to an effective circular business model. It is based on maximising any product's "utilisation" rate and duration. That rate defines how long a product or item can be used for.

Upcycling can be defined as any measure and action in the design phase targeted at optimal treatment of products as nutrients. This refers to the act of reusing used or abandoned materials to create something as useful and valuable as the original product, giving it greater usage and enhancing its quality through time. The upcycling concept is related to the circular economy, which refers to the ongoing recycling of goods and resources through biological and technological cycles, giving them a better value than when they were first used.

We essentially waste all of the energy and materials used to produce a thing every time we throw it away. Even if recycling a product is occasionally an option, reuse and repair have a considerably greater environmental impact than recycling. For businesses across different sectors that are considering entering the circular economy the transition can involve many different elements. However the core principles are designing out waste and pollution (waste reduction), retaining goods and materials in use (upscaling and maintaining value), regenerating natural systems (loops, transition), and social aspects like fostering wellbeing are common denominators.



5 ROADS TO A CIRCULAR BUSINESS MODEL DESIGN

1. Product life extension

extending the current lifecycle of a product, repairing, upgrading or reselling.

2. Product as a service

Products are used by one or many customers by means of lease or pay-for-use arrangement.

3. Reusing waste (resource recovery)

Eliminating material leakage and maximising economic value

4. Sharing

Stimulating collaboration among product users via platforms.

5. Circular supplies

Supplying fully renewable, recycle, or biodegradable resource inputs to support circular production.



DESIGNING PRODUCTS FOR EASE OF DISASSEMBLY

Design for disassembly is a key concept that influences decisions and material selections by altering how materials are layered, joined, and connected in a way that is durable, reversible, and accessible. The concepts of what defines resource efficiency are expanding beyond merely looking for items with recycled material as the green construction sector continues to develop. One of the six guiding principles of the Built Positive movement is “Design for Disassembly,” which refers to the deliberate design of structures and goods for material recovery, value retention, and meaningful next use. The simplicity of disassembly should be one of the main considerations. Users will be discouraged from reusing parts and will instead choose to discard the product if disassembling it is difficult. Facilitate their task! Humans are simple creatures who enjoy convenience.

Guidelines for Simple Disassembly

- Utilize fewer parts
- Use common components
- Lessen the type of fasteners that are employed in an assembly
- Use universal fasteners that can be removed without specific tools
- If at all possible, avoid using glue or other adhesives
- If you must use glue, think about using a soluble adhesive to make disassembling simpler
- Include product with disassembly instructions
- Create a YouTube training video for disassembly and broadcast it on social media



Design for disassembly aims to produce long-lasting structures and projects, add value for building owners, and reduce waste through closed loops. The final result is more adaptable structures that are simple to renovate, repair, or reconfigure; structures that serve as material banks; and goods and materials that are valuable and can be used again beyond their useful lives. Cradle-to-cradle design is facilitated by design for disassembly and reuse, which is why it should be promoted whenever possible.



HOW TO DESIGN PRODUCTS FOR RECYCLABILITY

One eco-design tactic is to design for recycling. Eco-design is a methodical technique that enables the creation of products that are more favourable to the environment. The first step for a business with an environmental impact reduction plan is to analyse all the processes that are involved in product design and come up with ideas to lessen the effects on the product's life cycle. During the selection of the materials phase, one can select less impactful materials, minimise the number of materials used, enhance the methods used during the manufacturing, transportation, and usage phases, and enhance the product's life cycle and end of life.



It's likely that your product will end up in a landfill if recycling isn't easy or obvious. Remember: For some consumers, recycling is not obvious. Remember to remind them! Make it known that your business shares the values of those customers that place a high value on sustainable products and that your products are created with the welfare of the environment in mind. Your potential clients won't look for this information; they want to see it right away. Use your website, social media profiles, and other online media platforms, such as YouTube, to communicate with prospects and consumers.



The recommendations are listed below, and each one includes a variety of design tactics as well as specific recommendations on how to design products for recycling.

- **Rule 1:** Don't use potentially dangerous substances
- **Rule 2:** Make hazardous or polluting parts simple to access and remove.
- **Rule 3:** Make use of recyclable materials
- **Rule 4:** Carefully pre-sort materials before bringing them to recycling centres by using material combinations and connections that facilitate liberation.



The background is a solid teal color with two large, overlapping, curved shapes in a slightly lighter shade of teal. One shape starts from the bottom left and curves towards the top right, while the other starts from the bottom right and curves towards the top left, creating a central area where they overlap.

DESIGNING PRODUCTS FOR UPGRADEABILITY AND RECONDITIONING

Product upgrading refers to enhancing a product's functionality and overall capabilities to increase its service life under the new technological standards and functional requirements that have been imposed. Design for Upgradability, or DFU, is a technique that defines the emphasis and course of design decision-making by integrating the virtue of upgradability into product development. One of the main goals of DFU is to help designers come up with an appropriate design solution for the entire product as well as to create a long-term upgrade plan for multiple generations of a product during its use or reutilisation stage.

Product upgrade—achieved by enhancing the functioning of previously owned or remanufactured goods—is frequently acknowledged as an efficient strategy for achieving a competitive reutilization. A tool called “design for upgradability” (DFU) aims to make products more useful and physically suited for straightforward upgradeability.

The goal of design upgradability is to only replace the parts that erode the product's value over time. As a result, it raises the value of the product and prevents complete product replacement, achieving a more sustainable economy.



**HOW CAN SUSTAINABLE
PRODUCT DESIGN CAN ALSO
LEAD TO SUSTAINABLE
INCOME STREAMS?**

Recycling is a rapidly expanding industry with substantial economic growth potential. A stronger economy is advantageous for your company since it boosts consumer confidence. Customers will likely spend more money overall and they might be more likely to spend more on your products or services. In the long run, recycling can also help businesses save money. Recyclable materials allow for the production of new goods with fewer energy and raw materials. As a result, the cost of producing new goods will decrease the more individuals and companies choose to recycle. Manufacturing businesses will be able to offer products to consumers at a lower price due to lower manufacturing expenses. You might very easily use many of these recycled goods in your daily work. This will assist in lowering business expenses.

Fast-growing economies are frequently depicted as sustainability underachievers, more concerned with lifting their people out of poverty than with preserving the environment. The industrialised world has never had a monopoly on visionaries, though, and corporate sustainability initiatives have emerged as a source of innovation in areas where the stresses of resource depletion are felt most strongly.

Businesses find it challenging to understand how cost-effective sustainable production may be. This is partially due to the fact that companies must fundamentally alter the way they think about cost reduction and take a leap of faith in the hope that initial investments in more expensive materials and processes would result in larger savings in the long run.



You can significantly raise the profitability of your company by selling the items that you would otherwise discard. Additionally, a successful recycling programme frequently generates more interest in your company, allowing you to profit more from your green drive. Simply, recycling for financial gain is a smart business decision.

But we can conclude that Businesses gain from sustainable product design by having lower costs for raw materials, increasing profitability, and lowering their carbon impact. Additionally, it can contribute to the development of a positive workplace culture, which attracts top personnel. These are simply a few advantages that recycling can provide to a company and increase income.



FINAL ASSESSMENT TASK

Title of the Task:

Make your own Product life extension business model concept

Aim of the Activity:

The aim of the activity is to understand an advanced level product life extension 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

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 product life extension

<https://www.youtube.com/watch?v=u8SjmTUh-ik>

<https://www.youtube.com/watch?v=FcX7pVCgz9E>

<https://www.youtube.com/watch?v=2oFNI7L77Ks>

<https://www.youtube.com/watch?v=9xk8W70vnLw>

2. Following, within a group of three or four people, please, brainstorm ideas of product life extension business model or business model which contains upcycling.

3. With your team members agree on one idea
4. For this idea develop a product life extension business model concept or business model which contains upcycling in an infographic format using digital tool (for example: 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

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

<https://forms.gle/SkQRpi3JGRJ3UvA38>



FUTHER READING AND RESOURCES

4 Benefits of Business Recycling! | Growing City. <https://www.growingcity.com/blog/business-benefits-recycling>

Extending product life to build a circular economy | Greenbiz. <https://www.greenbiz.com/article/extending-product-life-build-circular-economy>

Haanaes, K., Michael, D., Jurgens, J., & Rangan, S. (2014, August). Making Sustainability Profitable. Harvard Business Review. <https://hbr.org/2013/03/making-sustainability-profitable>

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Mary-Kerstin Hassiotis. (2015). How to Design Sustainable Products for Recycling by the End User. Ewmfg.com. <https://news.ewmfg.com/blog/how-to-design-sustainable-products-for-recycling-by-the-end-user>

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Study Report 1: Product Life Extension REDUCES -Rethinking Sustainable Development in European Regions by Using Circular Economy Business Models. (n.d.). Retrieved September 11, 2022, from https://projects2014-2020.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1596441115.pdf

What Is Design for Disassembly? - News - Cradle to Cradle Products Innovation Institute. (2017, October 10). C2ccertified.org. <https://www.c2ccertified.org/news/article/what-is-design-for-disassembly>

Xing, K., & Belusko, M. (2008). Design for Upgradability Algorithm: Configuring Durable Products for Competitive Reutilization. Journal of Mechanical Design, 130(11). <https://doi.org/10.1115/1.297644>





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