prof. Ing. Zuzana Palkova, PhD.

Green solutions for education, sustainability and ecology in modern society

Green Erasmus at Slovak University of Agriculture in Nitra

October 16, 2023

"Global sustainability will be the driving force changing the way we work and live in the 21st century"

RMIT UNIVERSITY

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Welcome to our Erasmus Environmental Projects

what we do?

ZERO WASTE

Building adult competences in Zero Waste circular economy in Europe

VR WAMA

Improve the Efficiency and the Attractiveness of Environmental Engineering and Waste Management Training with Game Based Virtual Reality

CLEAN AIR 2

Clean air interactive game as a tool for clean environment

Clean Air 2

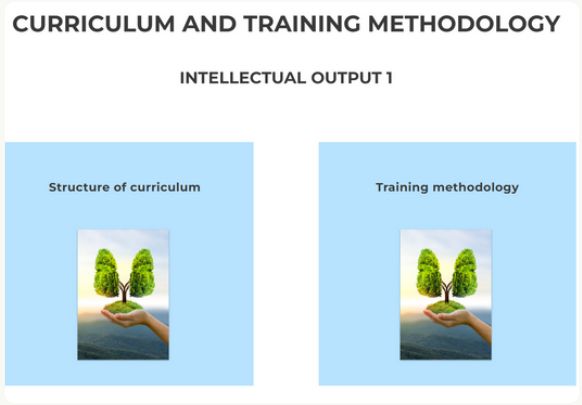
Clean Air 2

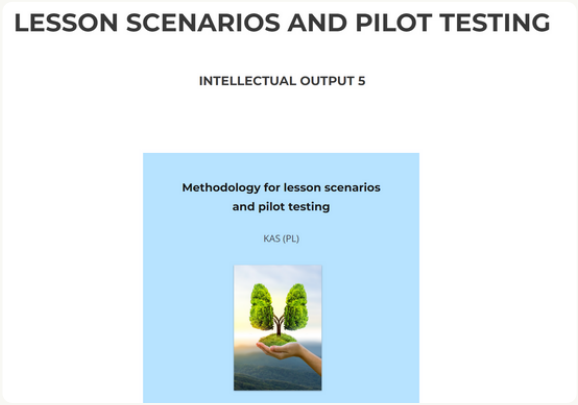
24	7	5
months	*partners*	*deliverables*

Clean Air Interactive Game As A Tool For Clean Environment

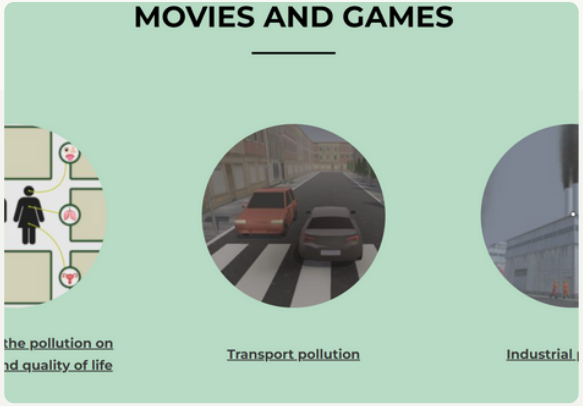
Clean Air 2

- The objective of this project was to raise awareness about the problem of air pollution, its reasons, health effects and possible solutions that can be taken by inhabitants in order to mitigate the problem and reduce local air pollution.
- This objective has been achieved by providing training for teachers in the topic of air pollution and equipping them with innovative, interactive education materials that they use to teach their pupils and students about the problem.



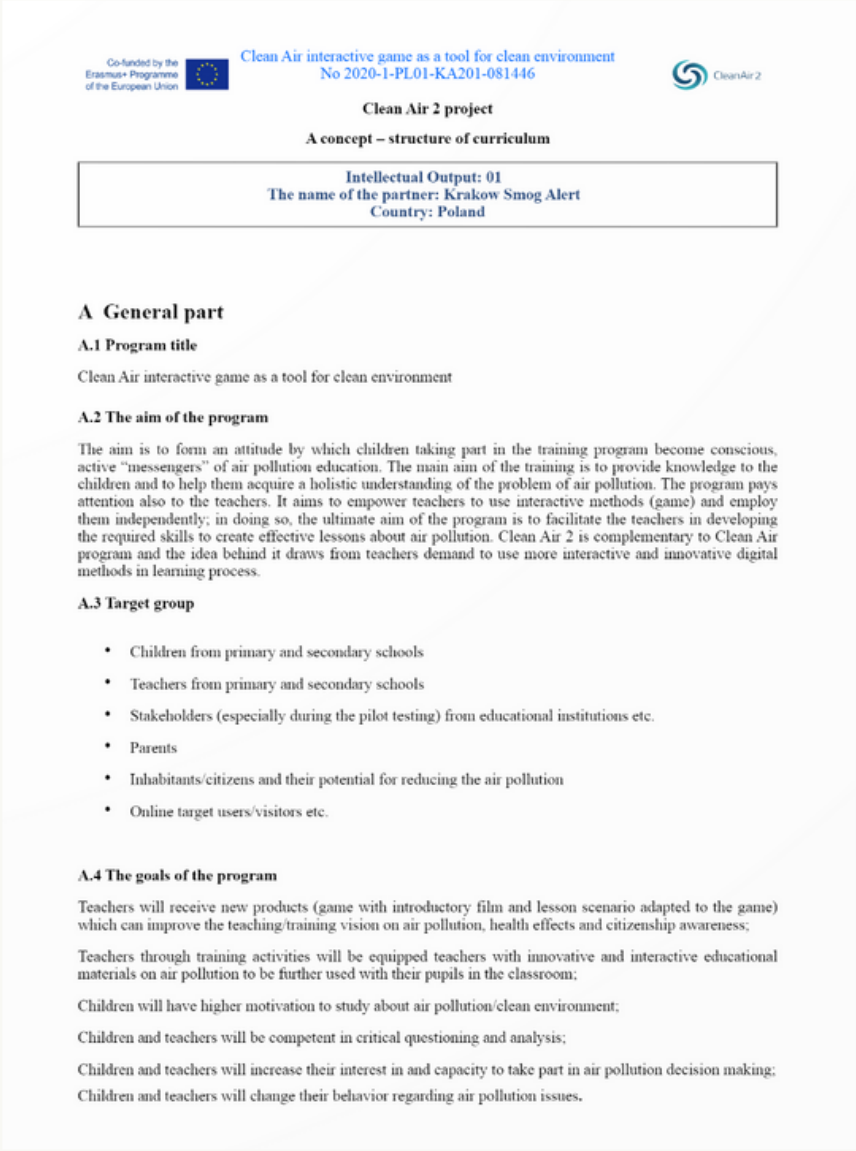


Our outcomes



Curriculum and training methodology

- Training Methodology
- Curriculum:
  - Influence of the pollution on the health and quality of life
  - Transport pollution
  - Industrial pollution
  - Low-stack emission
  - Environment protection campaign
  - Summary evaluation module



Co-funded by the Erasmus+ Programme of the European Union

Clean Air interactive game as a tool for clean environment
No 2020-1-PL01-KA201-081446

CleanAir 2

Clean Air 2 project

A concept – structure of curriculum

Intellectual Output: 01
The name of the partner: Krakow Smog Alert
Country: Poland

A General part

A.1 Program title

Clean Air interactive game as a tool for clean environment

A.2 The aim of the program

The aim is to form an attitude by which children taking part in the training program become conscious, active "messengers" of air pollution education. The main aim of the training is to provide knowledge to the children and to help them acquire a holistic understanding of the problem of air pollution. The program pays attention also to the teachers. It aims to empower teachers to use interactive methods (game) and employ them independently; in doing so, the ultimate aim of the program is to facilitate the teachers in developing the required skills to create effective lessons about air pollution. Clean Air 2 is complementary to Clean Air program and the idea behind it draws from teachers demand to use more interactive and innovative digital methods in learning process.

A.3 Target group

- Children from primary and secondary schools
- Teachers from primary and secondary schools
- Stakeholders (especially during the pilot testing) from educational institutions etc.
- Parents
- Inhabitants/citizens and their potential for reducing the air pollution
- Online target users/visitors etc.

A.4 The goals of the program

Teachers will receive new products (game with introductory film and lesson scenario adapted to the game) which can improve the teaching/training vision on air pollution, health effects and citizenship awareness;

Teachers through training activities will be equipped teachers with innovative and interactive educational materials on air pollution to be further used with their pupils in the classroom;

Children will have higher motivation to study about air pollution/clean environment;

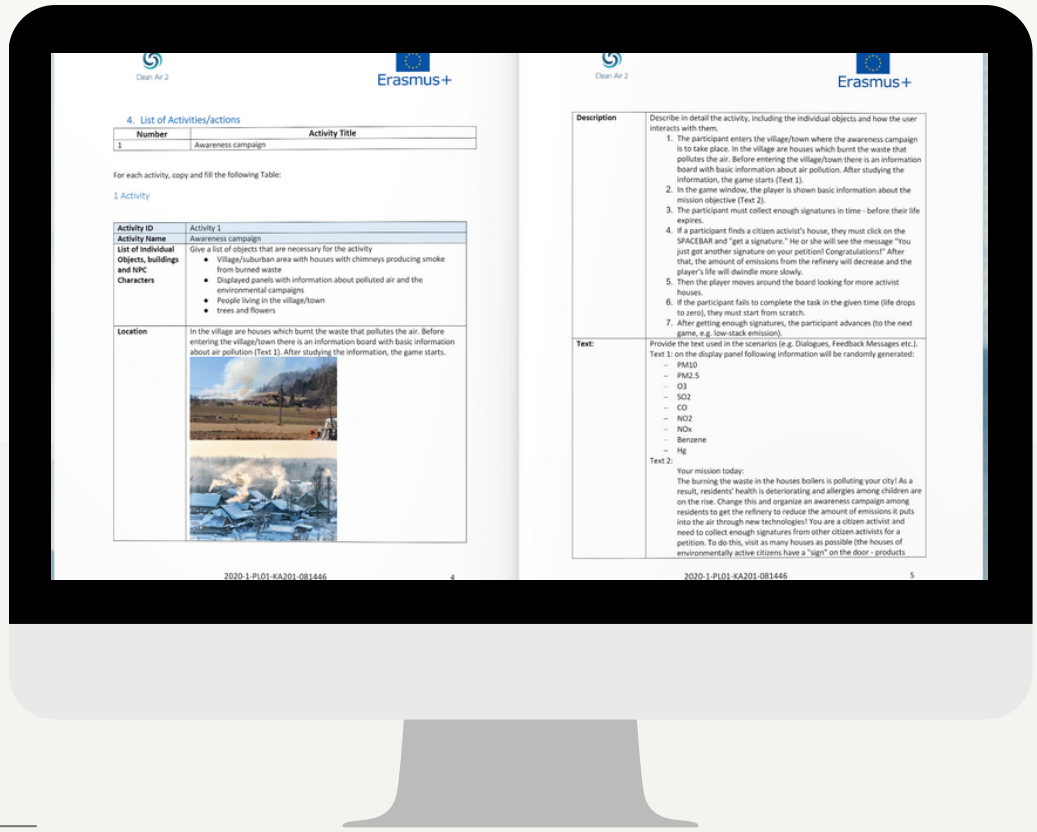
Children and teachers will be competent in critical questioning and analysis;

Children and teachers will increase their interest in and capacity to take part in air pollution decision making;

Children and teachers will change their behavior regarding air pollution issues.

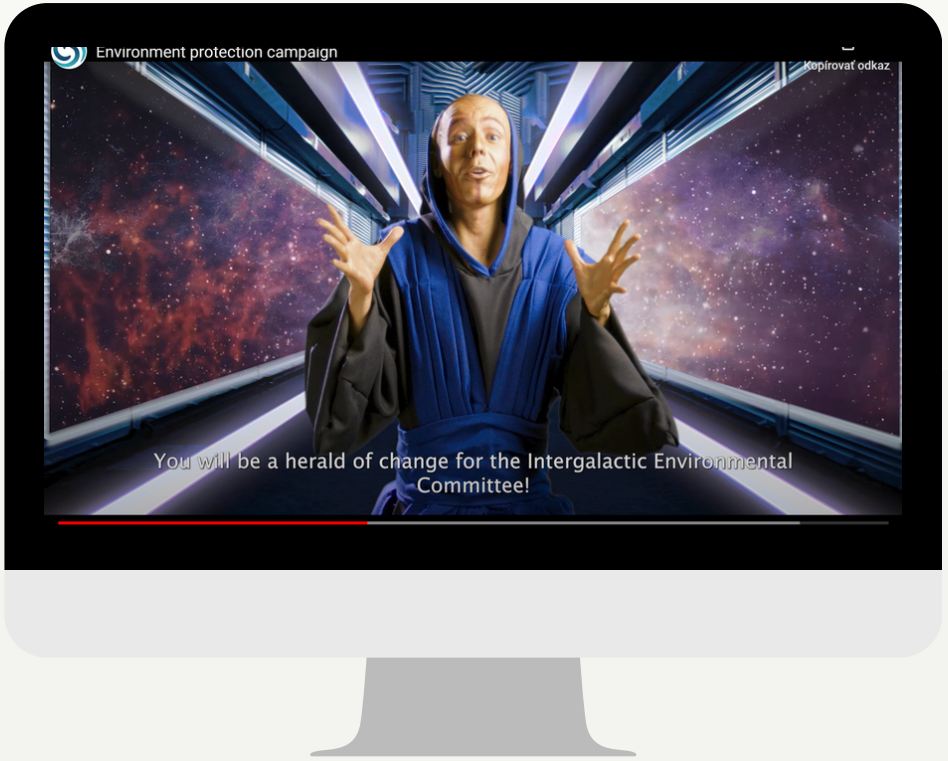
Game scenarios

- A Guide how to technically implemented developed ideas and learning content to the game.
- Developed scenarios for:
  - Influence of the pollution on the health and quality of life
  - Transport pollution
  - Industrial pollution
  - Low-stack emission
  - Environment protection campaign
  - Summary evaluation module



Movies and Games

- Every module consists:
  - Lesson in PowerPoint + Guide for teachers
  - Movie
  - Game



VR WAMA

30	5	4
months	*partners*	*deliverables*

Improve the Efficiency and the Attractiveness of Environmental Engineering and Waste Management Training with Game Based Virtual Reality

VR WAMA

- The project aimed at producing an innovative educational system for teaching and learning **environmental engineering and waste management** topics with the use of **3D virtual reality**.
- Objectives:
  - Raises the quality of training makes educational procedures more attractive, engaging and efficient
  - Offers state-of-the-art courses designes innovative game based 3D educational system based on VR
  - Targets to enhance students' qualifications, expertise and skills improves students' employability

Our Results

Reports

1. Report and roadmaps of Environemntal education and VET
2. Report on using ICT in VET Training
3. Report on SOTA Training in Virtual World Technologies
4. Report on Learning in Virtual Worlds and Gamification

Learning Scenarios

1. Introduction to the Environmental Protection
2. Smart City
3. Waste management
4. Waste Value
5. Circular Economy
6. Waste Treatment

Open Education Resources and Game-based 3D Virtual Reality Educational Environment

Opensimulator has been used to create a 3D Virtual World and adjust it for educational purposes.

3D Virtual World

More videos at VR WAMA YouTube Channel

Zero Waste

24	9	3
months	*partners*	*deliverables*

Building adult competences in
Zero Waste circular economy in Europe

www.zerowaste-project.eu

Zero Waste

- **Zero Waste aims:**
  - to identify the current state of development of zero waste CE in the EU zone
  - to create an innovative curriculum and design a guide to increase the competences of the adult learners on zero waste CE including recycling methods
  - to meet the demands of labour market and municipalities that will aid municipalities to shift zero waste cities

Zero Waste

- **Zero Waste objectives:**
  - to change behaviour
  - and ensure regions maximise recycling in the most costeffective way
  - using a combination of teaching, educational resources and ICT

Our Results

Report

Baseline report, innovative curriculum and training modules for adult educators

Open Educational Resources

The ICT related resources and toolbox to support pilot training

Handbook

European Zero-Waste Handbook wirt Entrepreneurship Manual

Baseline report and innovative curriculum

The state of the art and a baseline report provides information on the waste infrastructure and a baseline for curriculum. The curriculum follow the current zero waste Circular Economy and Zero Waste city concept in each partner country.

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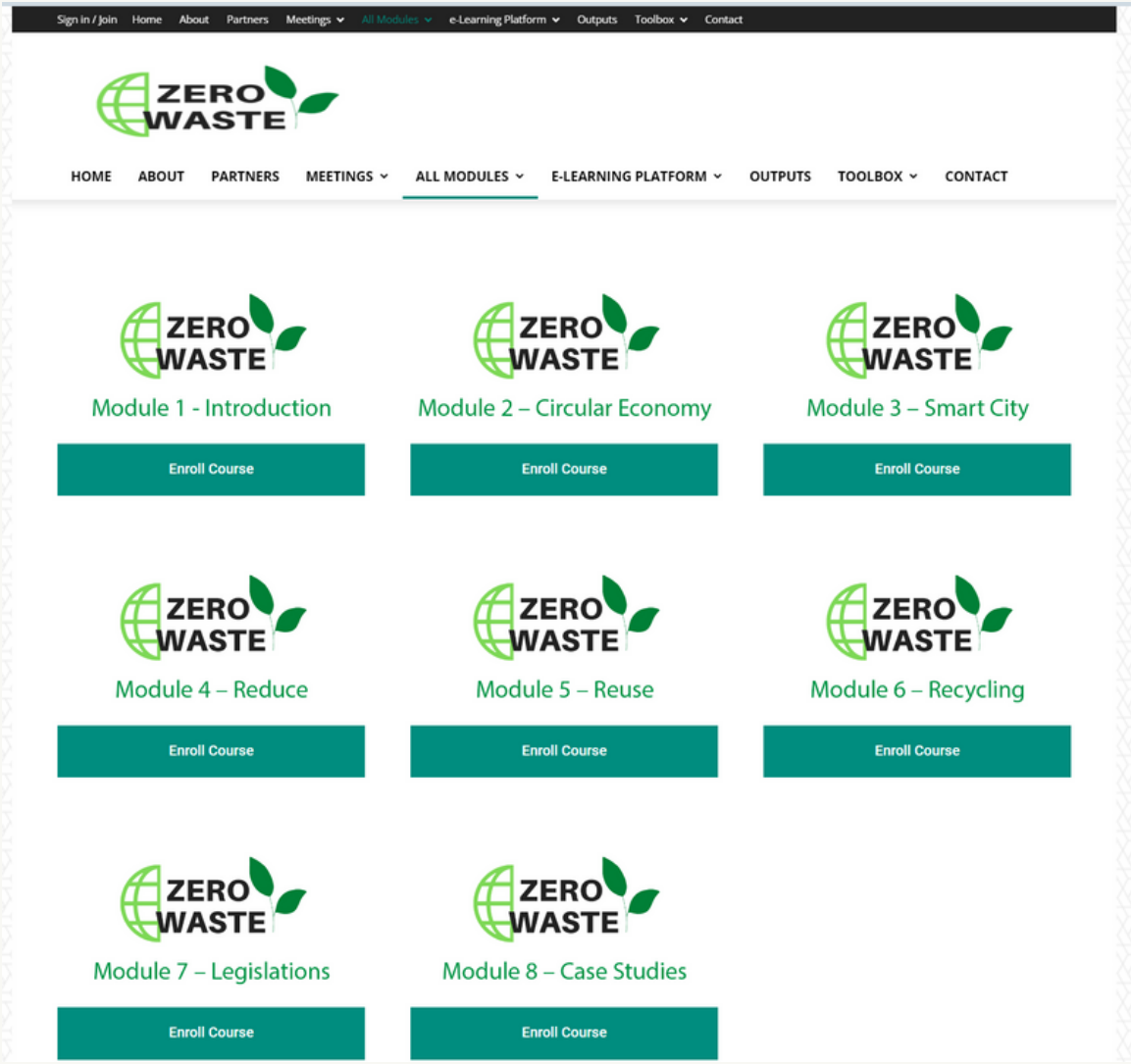
https://zerowaste-project.eu/wp-content/uploads/2023/07/Q1A1-Baseline-Report-EN.pdf

Online training modules



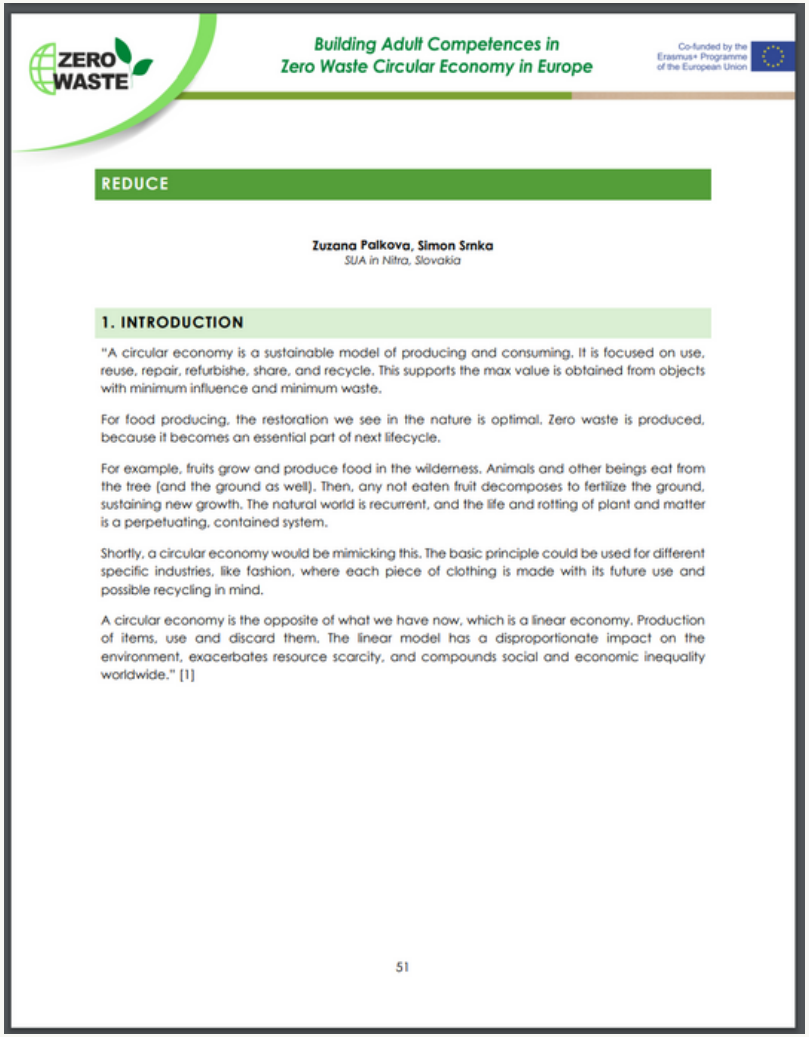
https://zerowaste-project.eu/wp-content/uploads/2023/07/Q1A1-Baseline-Report-EN.pdf

The ICT related resources and toolbox to support pilot training

The Policy Library: Latest European Policies on Zero Waste CE, Policy Advice from Partners and Stakeholders are composed in the searchable collection of relevant policies in Circular Entrepreneurship, Circular Economy. Apart from waste-related policies for business, a significant issue concerning waste and waste processing is the legal frame in the EU and the specific objectives set by the Union.

https://zerowaste-project.eu/wp-content/uploads/2023/07/Q1A1-Baseline-Report-EN.pdf

European Zero-Waste Handbook



ZERO WASTE

Building Adult Competences in Zero Waste Circular Economy in Europe

Co-funded by the Erasmus+ Programme of the European Union

REDUCE

Zuzana Palkova, Simon Srnka
SUA in Nitra, Slovakia

1. INTRODUCTION

"A circular economy is a sustainable model of producing and consuming. It is focused on use, reuse, repair, refurbishe, share, and recycle. This supports the max value is obtained from objects with minimum influence and minimum waste.

For food producing, the restoration we see in the nature is optimal. Zero waste is produced, because it becomes an essential part of next lifecycle.

For example, fruits grow and produce food in the wilderness. Animals and other beings eat from the tree (and the ground as well). Then, any not eaten fruit decomposes to fertilize the ground, sustaining new growth. The natural world is recurrent, and the life and rotting of plant and matter is a perpetuating, contained system.

Shortly, a circular economy would be mimicking this. The basic principle could be used for different specific industries, like fashion, where each piece of clothing is made with its future use and possible recycling in mind.

A circular economy is the opposite of what we have now, which is a linear economy. Production of items, use and discard them. The linear model has a disproportionate impact on the environment, exacerbates resource scarcity, and compounds social and economic inequality worldwide." [1]

ZERO WASTE

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The concept of "design for recycling" is crucial to the circular economy. The primary idea behind recycling is that materials and products have several life cycles because they are made to maintain their value and quality. Recycling can refer to a variety of procedures. When creating a new bottle, a bottle manufacturer would think, "How can I make this bottle so it can be recycled when it is empty and have the highest value for the manufacturer and recyclers?"

Source: https://www.dw.com/en/global-ideas-in-focus-circular-economy/a-59855315

A recent study emphasizes the value of recycling for reducing production-related emissions as well as for material reasons. In terms of plastic materials specifically, one metric tonne of recycled plastic material typically offsets 1.9 tonnes of CO_2 in terms of greenhouse gas emissions. Additionally, as opposed to landfilling and incineration, true circular economy models for materials like reuse, recycling, and production of green jobs all produce income. One of the main tools of the circular economy is recycling, which prevents material waste and lowers the environmental costs of consumption. [2]

3. 3R WASTE MANAGEMENT HIERARCHY

"The 3R (Reduce-Reuse-Recycle) concept is basically a sequence of steps on how to manage waste properly. The top priority is to Reduce, which means to reduce waste generation, then Reuse and then Recycle, to give waste material a second chance before it goes to landfill.

After the 3R concept, the 5R concept is being introduced at the same time. The 5R concept adds two more phases to the waste management process: the first is Recover, the recovery of materials that can no longer be recycled into energy sources/environmentally friendly materials to avoid landfill. The last stage is Disposal, which is the separation of waste that can no longer be recycled or recovered in a landfill.

The inverted triangle 3R (Reduce-Reuse-Recycle) concept illustrates the amount of waste volume that should be treated in each sequence.

This basically means that most waste production should be reduced from the start. Only when waste can no longer be prevented are items reused, one method of reuse being the upcycling process or the production of craft products.

When materials can no longer be reused, the waste is recycled, melted down, chopped up to make a new product that can be reduced in quality.

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https://zerowaste-project.eu/wp-content/uploads/2023/07/HandBOOK-Zero-Waste-EN.pdf

Entrenepreneurship Manual

Best Practice from Slovakia – Second breath

Wine bottles caught Second Breath. Upcycling is the creative transformation of waste materials into new products that have artistic or environmental value.

Source: [20]

Zuzana Kopanicová pours candles from beeswax and virgin coconut oil into wine bottles that caught the Second Breath. This all-natural product is made from 100% beeswax and virgin coconut oil in a 1:1 ratio. Compared to ordinary paraffin candles, beeswax burns significantly longer. The radiation of a flame can be compared to the energy of sunlight. You will appreciate it especially in the cold seasons. It cleans the air, absorbs small bacteria, pollen, dust or allergenic substances. It has positive effects on allergies and asthma symptoms. The beautiful scent of beeswax induces harmonious well-being. [20]

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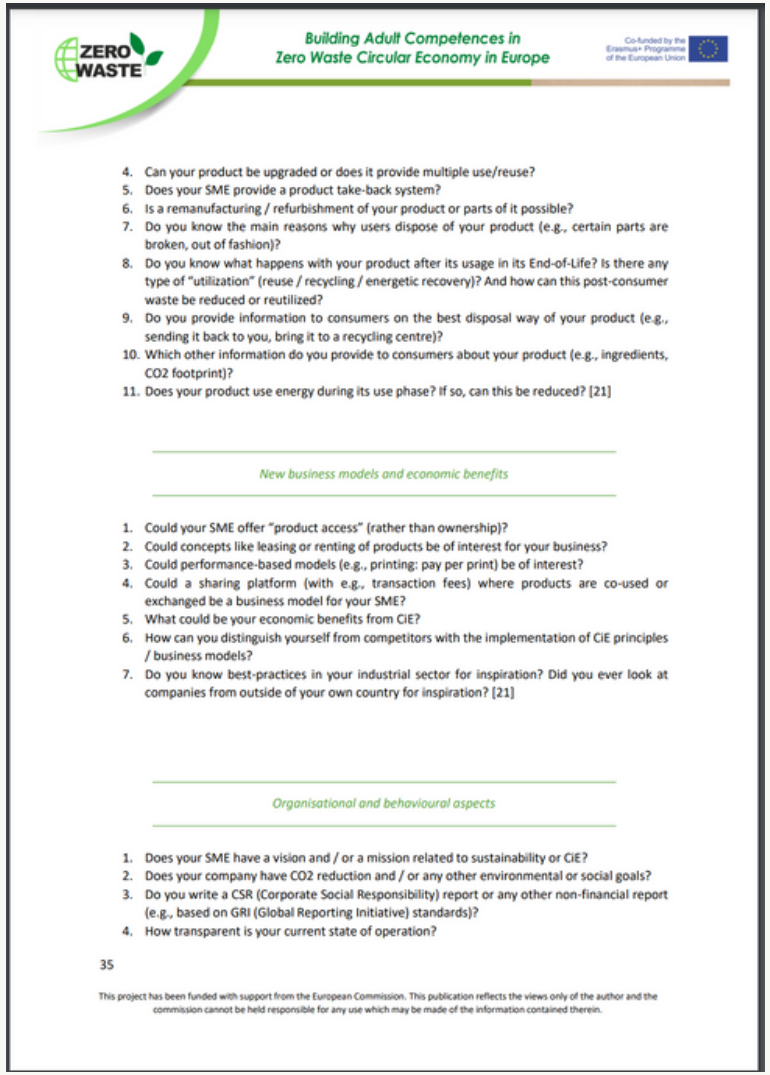

4. Can your product be upgraded or does it provide multiple use/reuse?
5. Does your SME provide a product take-back system?
6. Is a remanufacturing / refurbishment of your product or parts of it possible?
7. Do you know the main reasons why users dispose of your product (e.g., certain parts are broken, out of fashion)?
8. Do you know what happens with your product after its usage in its End-of-Life? Is there any type of "utilization" (reuse / recycling / energetic recovery)? And how can this post-consumer waste be reduced or reutilized?
9. Do you provide information to consumers on the best disposal way of your product (e.g., sending it back to you, bring it to a recycling centre)?
10. Which other information do you provide to consumers about your product (e.g., ingredients, CO2 footprint)?
11. Does your product use energy during its use phase? If so, can this be reduced? [21]

New business models and economic benefits

1. Could your SME offer "product access" (rather than ownership)?
2. Could concepts like leasing or renting of products be of interest for your business?
3. Could performance-based models (e.g., printing: pay per print) be of interest?
4. Could a sharing platform (with e.g., transaction fees) where products are co-used or exchanged be a business model for your SME?
5. What could be your economic benefits from CiE?
6. How can you distinguish yourself from competitors with the implementation of CiE principles / business models?
7. Do you know best-practices in your industrial sector for inspiration? Did you ever look at companies from outside of your own country for inspiration? [21]

Organisational and behavioural aspects

1. Does your SME have a vision and / or a mission related to sustainability or CiE?
2. Does your company have CO2 reduction and / or any other environmental or social goals?
3. Do you write a CSR (Corporate Social Responsibility) report or any other non-financial report (e.g., based on GRI (Global Reporting Initiative) standards)?
4. How transparent is your current state of operation?

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https://zerowaste-project.eu/wp-content/uploads/2023/07/Q3A1-Business-and-entrepneurship-Manual-EN.pdf

Contact me

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Thank you