



Introduction

Virtual Cities is a game about circular economy in cities, where groups of players try to reach the global circularity goal by improving circularity in their own cities.

Circular economy is an economic system aimed at minimising waste and making the most of resources, but the concept of a sustainable world does not mean a drop in the quality of life for consumers and can be achieved without loss of revenue or extra costs for manufacturers.

In this game, the players will work together within circular economy principles and overcome barriers to achieve a circular economy goal.

Target group	University students (age 18-28)
Learning Objectives	Introduction to the principles of circular economy
Players	1-15+ players
Duration	60-90 minutes
Context of use	Classroom

This game is developed by Serious Games Interactive as a co-creation effort within the European Waste4Think project to raise awareness and improve all waste management stages, adopting a global approach and particularly focusing on citizen participation in order to build more sustainable, eco-friendly cities.

The game can be played on its own as an introduction to circular economy in cities, but the teacher can also expand on the game by supporting the teachings and offer deeper insight into the way of circular economy thinking, and thereby create a greater impact.

For more information about the project and other Waste4Think games, go to:
<https://w4t.seriousgames.net/virtual-city/>

Learning principles

To enhance the learning experience for the players, your involvement can greatly support it. Hence, to achieve the strongest learning experience you may benefit from modifying the didactic approach that you might be used to in your teaching.

If you want to be more involved with the teachings of the game, we suggest that you provide an overview of circular economy in cities and some examples of circular economy principles to create some guiding concepts for students while playing.

Next, students are let loose in the game world where they actively explore and make decisions based on the information provided in the game and the guiding concepts you have provided. The active experimentation provides a number of concrete and tangible experiences that serve as a strong background for observation and reflection, that you can address in between chapters.

At the end of the game, you can have an overall debrief where you complete the session, expanding on the students observations and reflections to get a deeper understanding of the circular economy concepts.

Setting up the game

If you want your students to play Virtual Cities, you don't need to prepare anything.

Divide the players into 5 groups, if possible. Each group can enter the game using either a tablet device or their computers by following the link:

<https://w4t.seriousgames.net/virtual-city/>

1. Hosting a session

Choose a group to host the game by selecting the “create session” option, and have the other groups join the session using the room code displayed in the top left corner.

The hosts can change the region name and set a difficulty, depending on how difficult you want the game to be. The descriptions of the difficulties are as follows:

Assist mode is for people new to strategy games and circular economy. This mode categorizes the different projects into the systems they’re a part of. The purpose of this mode is to make it easier to get an overview, and only offers a challenge in figuring out the right sequence of projects to implement.

We recommend that players new to circular economy and strategy games being on assist mode.

Classic mode is for players that aren’t strangers to circular economy and want a challenge. This mode doesn’t categorize projects into the systems they’re a part of. Instead, the players must figure this out themselves using the descriptions of the systems.

2. Joining a session

The other groups choose the option called “join session” and use the room code from the group hosting the game. This lets them join the session.

When a group has successfully joined the session, they can give their city a name and then push the ready button when they’re ready to play. When all players are ready, the game begins.

3. Pre-game questionnaire

Some questions are asked of the user before playing the game, to get a measure of the user’s understanding of circular economy and attitude towards it.

The answers will be very helpful for the Waste4Think research, so please make sure to answer if possible. The questionnaire can be skipped by pressing the skip button.

4. Introducing the players to circular economy in cities

When your students start playing, they will go through a prologue chapter of 3 rounds that introduces the narrative of the game and the mechanics.

At this point, it's fine to let them play the game and get a feel for playing. The chapter is not timed and you have the possibility to help them along if they have questions or you feel the need to provide knowledge about circular economy that can support the game, such as what circular principles are.

5. Gameplay

After the prologue chapter, the game begins and the goal for the players is to increase the circularity of the region to win. To do this, they need the help of the other players.

The way the players increase circularity is by investing in projects that together form systems, that lead to changes in the circularity. Each project has different requirements, such as cost, time to reach effects, barriers, and sequence in which they appear in a system.

Each chapter has its own theme and introduces systems and projects related to those themes:

0. **Prologue** - *Set the project in motion and gain support and traction.*
1. **Sort, Recycle, Reuse** - *Recycling, reuse and sorting systems need to be set in place.*
2. **Traffic and Transport** - *Create infrastructure that reduces emissions.*
3. **Buildings and Materials** - *Building sustainably with recycled materials.*
4. **Reducing Plastics** - *Reduce the use of plastics in everyday life.*
5. **Food Safety** - *Make food more sustainable and healthy for the consumers and nature.*
6. **The Final Push** - *Ensure that consumers are ready and willing to change their ways.*

To play the game the best way possible, players need the ability to understand the way projects and initiatives create a synergy between them, which results in the highest impact possible.

For instance: If you invest in city planning and long-term strategies before involving the right knowledge-partners or interested parties, you might not get the traction or support you need to get the biggest impacts.

SEPARATION OF BIOWASTE (2) [Cost: 100, Support: 20]

COMPOSTING FACILITIES (2) [Cost: 50]

ANAEROBIC DIGESTION FACILITY (4) [Cost: 300, Support: 15]

ENGAGE DECISION MAKERS (2) [Cost: 10, Support: 40]

BIOWASTE CAMPAIGN (1) [Cost: 20, Support: 35]

ENGAGE DECISION MAKERS

INFO
An nation-wide legislation is already in place, but local politicians have to define a medium term strategy and obligations

[Cost: 10, Support: 40, Priority: 2]

INVEST

If players do get projects implemented out of order, they don't need to worry. If they're not getting it right the first time around, the game offers a way to reimplement a project for the amount of a percentage of the original price, but awards players with the same benefits.

Systems

C2C CITY BUILDINGS

DESCRIPTION
The C2C city buildings is an initiative to create a circular way of rising new buildings in the city that can benefit people, environment and economy. An effective strategy and roadmap made in cooperation with experts and designers, adapting it through trials and tests, and creating a new culture is a key to making the system a success.

RESOURCE IMPACT PER ROUND
[Cost: -2, Support: 0]

3%

GLOBAL DESIGN TENDER → ROADMAPS AND STRATEGIES → TEST-BUILD A C2C BUILDING → MEASURING PROGRESS (C2C) → BUY AND BUY-BACK SCHEME

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RESOURCE IMPACT PER ROUND
[Cost: -5, Support: 0]

4%

GLOBAL DESIGN TENDER → ROADMAPS AND STRATEGIES → TEST-BUILD A C2C BUILDING → MEASURING PROGRESS (C2C) → BUY AND BUY-BACK SCHEME

During the game, you can help the players understand the aspects of making cities more circular, but it's important that you let them play the game by themselves as the biggest teachings from the game happens between player discussions and sharing of the knowledge they accumulate throughout the game.

6. Reflection and discussions

Between chapters the game introduces global events. The global events are events that affect all players in the game and require everyone to work together, either by reaching a donation goal, or by gathering the majority in a vote between two options.

Global Event

OLD LANDFILL

50 years ago, a landfill was constructed outside the cities to store waste not suited for recycling or incineration. The landfill has now been shown to pollute the surrounding soil and one of the water reservoirs. The mayor says there is no room in the budget to do much besides preventive measure, and can only get the budget in 5 years time, when it might be too late.

FAILURE
If you fail to reach the donation goal, the foster system effectiveness is affected negatively. Citizens will be affected as well.

SUCCESS
If you reach the goal, you can finance a clean-up, and foster system effectiveness. Public health will be improved as well.

CURRENT PLEDGE: 866

GOAL: 250

BONUS: 500

0 **DONATE**

This phase of the game requires all the players to engage in a discussion, as they all have different situations that might require different approaches to the event. The global events are as follows:

0. **Extra Ressources** - *Players decide on getting more credits or more manpower.*
1. **Business As Usual** - *Should a business man get permission for his factory?*
2. **Old Landfill** - *The old landfill is polluting and something needs to be done!*
3. **Old Water Pipes** - *The old water pipes are leaking, but there's no money for repairs!*
4. **Music Festival** - *Should your region be the official host of a music festival?*
5. **Banning Fossil Fuels** - *Companies are fighting against you. Should you negotiate?*
6. **Paving the Way** - *Ensuring your work to continue in the future.*

No matter the result, the event will have consequences on the game depending on the outcome, and then the chapter ends.

At this point, you can make room for discussion where you and the players can reflect on what happened in the chapter they just played, and discuss their progress.

This is also an opportunity to help your students by giving them tips for improving their approach to the circular economy principles, answer their questions and create interesting discussions that might help them understand the material.

You can also discuss things players did "right" or "wrong", but these are important learning points that are better suited for when the game is over, so keep discussions brief.

7. The end of the game

When the game is over a winner is declared and the game is summarized. Like the chapter intermissions, this is a good chance to enforce the learning of the game by discussing their progress during their session, but now you can go more in depth as to why the game ended the way it did.

Each group/city can open their projects and systems to get an overview of what systems they completed/didn't complete, and what projects they invested in/didn't invest in. Use this to assist in your discussion.

This is the end of the game.