Cities Going Green:

Application for the Development of a Green and Smart City

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Project Erasmus+:

Cities Going Green: Application for the Development of a Green and Smart City

Project No.: 2021-1-PL01-KA220-SCH-000029823

Project Result 2:   Composition of Building blocks theory, decisions, rulers of the game and points system

Topic: Design of the Game

1   Introduction

The report includes the composition of the basic elements to be integrated in the "Cities Going Green" game and the actual design of the game. For this reason, a list of various components that comprise an electronic game have been developed, through which the most suitable options will later on be included in the game.

- The second chapter of the output presents the theory behind selected game elements adequate for the goals of the game.
- The third chapter presents the different building blocks the students will have available to build in their city.
- The fourth chapter presents the different campaigns that the students have to decide which ones to run in their cities.
- The fifth and final chapter presents the design of the UI of the game, integrating gamification elements.

2   Theory

In this chapter a variety of possible gaming elements are presented which will be included in the Cities Going Green app and contribute in the education of pupils 10-12 years old on topics related to environmental sustainability. The information provided for each gaming element will have a significant role in the integration of the component in the game, as well as the way in which it will interact with the user in each "Green City".

These include:

- **City Values:** consist of the different indicators of each "Green City". These indicators will demonstrate the degree upon which each pupil/ group will take the right decisions, thus creating a positive impact in their cities.
- **Point System – Reward System**: players can earn points for completing specific tasks or achievements within the game. Points can be used to unlock new levels, items, or abilities, or to compete against other players for high scores.
- **Missions' system:** a set of pre-defined objectives or tasks that players must complete in order to progress through the game.
- **Conflict**: it is a common gaming element that creates tension and challenge for players, driving the narrative and gameplay forward. Conflict can take many forms in games, such as combat, puzzles, obstacles, or **strategic decision-making**.

2.1   City Values

Title of Gaming Element	City Values
Short description of Gaming Element *(min 150 words max 250 words)*	In the context of the Cities Going Green application, city values will consist the different indicators of each "Green City". These indicators will demonstrate the degree upon which each pupil/ group will take the right decisions, thus creating a positive impact in their cities. The four indicators (city values) that are most likely to be integrated in the game are the following: • Air Quality • Water Quality • Recycling • Life Quality Each indicator will fluctuate depending on the decisions and actions of the users. In this way, the users (pupils) will have to consider the pros and cons of each decision and manage their available resources in such way, which will ensure the best possible outcome (more points, successful missions etc.). For example, an action taken in favor of the life quality value, might have a negative effect on the air quality of the city. As a different example, a mission might come up, where the user will have to increase the water quality value. In this case, all decisions and actions of the user will have to ensure that will benefit the overall water quality of their city.
Aim and objectives of Gaming Element	City values will have a crucial role in the game, since they will act as indicators for the users. Ultimately, the success or failure of each player will be determined by the city values.
Technical specifications	The four City Values will not need any additional hardware or software in order to be integrated in the game. The creation and modification of these values will be carried out by OMEGATECH, the partner responsible for the development of the application.
Inclusive Methodology (e.g. For people with	The essence of the city values will be the fact that they will act as indicators for the improvement of the overall life quality in their "Green Cities". This promotes, in a sense, the concept of belonging in

disabilities etc.)	a social structure, where the decisions of each citizen have a direct impact in the overall well-being of all people. In this context, the personal sense of environmental and social responsibility could be considered as a means for promoting inclusion, empathy and collectiveness.
Impact of gaming element on the city	As mentioned above, the city values will be the determinant of the overall wellbeing of the "Green City". This can be translated as the determinant of success or failure in the game, since low indications in the city values will lead to a poor performance in the game. This, hopefully, will stimulate the use to reflect on what they might have done wrong. Through trial and error, and by trying different sets of decisions and actions in their city, eventually the user will come to understand how adaptability and environmental responsibility can have a beneficial impact in their digital city but, more importantly, in the actual world.
Advantages of the Gaming Element	1. Transparency (the indicators are visible on the user's screen and display their performance at any given time) 2. City values act as a guide on how to do better (more environmentally-friendly decisions lead to better results) 3. City values illustrate the importance of personal responsibility, and how different decisions can lead to different outcomes.
Weaknesses of the Gaming Element *(E.g. complexity, technical specifications etc.)*	1. Specific instructions must be given on how these values affect the city – need for instructions to be very clear due to the young age of the pupils 2. The user might need time to figure out how one indicator can affect another
Additional comments for the integration of the Gaming Element in the Cities Going Green App	The "City Values" is one of the most important gaming elements of the game. These indicators, among other elements, will affect the degree to which the learning outcomes, which were set during the initial phase of the project, will offer the desired knowledge to the pupils. Hence, it is very important to ensure that these indicators will be explained sufficiently to the user through a tutorial, pop-up window or any other means for the provision of information.

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2.2   Point System – Reward System

Title of Gaming Element	Point System – Reward System
Short description of Gaming Element *(min 150 words max 250 words)*	A point system in a video game is a mechanism by which players can earn points for completing specific tasks or achievements within the game. Points can be used to unlock new levels, items, or abilities, or to compete against other players for high scores. Points are typically awarded for actions such as defeating enemies, completing quests, or reaching certain milestones within the game. The more difficult or rare the accomplishment, the higher the number of points awarded. Point systems can add an additional layer of engagement and motivation for players, encouraging them to explore the game's mechanics and content in order to earn as many points as possible. They can also provide a sense of achievement and progression, as players work to accumulate points, and unlock new rewards.
Aim and objectives of Gaming Element	Aim of Gaming Element: ● Motivating player engagement: By providing points for completing tasks and achievements within the game, a point system can motivate players to continue playing and exploring the game's content. ● Encouraging skill development: Points can be awarded for specific skills or actions within the game, encouraging players to develop and hone these skills in order to earn more points. ● Providing a sense of achievement: Accumulating points within the game can provide a sense of accomplishment and progression, as players work towards unlocking new levels, items, or abilities. ● Promoting competition: A point system can promote competition among players, as they compete to earn the highest number of points or to reach the top of leaderboards. ● Enhancing replayability: By providing incentives to complete tasks and achievements within the game, a point system can enhance the replayability of the game, as players work to earn more points and unlock new rewards.
Technical specifications	● Points calculation: The system needs to be able to calculate and keep track of the number of points earned by the player, based on the specific tasks or achievements completed within the game. ● Point allocation: The system must have rules for allocating points based on the difficulty, or rarity of the task or achievement

	completed, as well as the player's performance.
	● Point storage: The system must have a way to store the points earned by the player, either locally on the player's device or remotely on a server.
	● Point display: The system must have a way to display the number of points earned by the player, either through an on-screen counter, a progress bar, or a leaderboard.
	● Point redemption: The system must have rules for redeeming points for rewards, such as unlocking new levels, items, or abilities within the game.
	● Point sharing: The system may allow players to share their points or achievements with others, either through social media or in-game messaging.
Impact of gaming element on the city (min. 150 and max. 250)	● Increased motivation: A reward point system can increase player motivation, as it provides a tangible incentive for players to complete tasks and achievements within the game.
	● Improved engagement: By providing rewards for completing tasks and achievements, a point system can improve player engagement and encourage them to spend more time playing the game.
	● Sense of accomplishment: A reward point system can provide players with a sense of accomplishment and progression, as they work towards earning more points and unlocking new rewards.
	● Competitiveness: A reward point system can make the game more competitive, as players compete to earn more points and move up the leaderboard.
	● Increased replayability: A reward point system can increase the replayability of the game, as players try to earn more points and unlock new rewards.
	● Enhanced player retention: A reward point system can enhance player retention, as players are more likely to continue playing the game in order to earn more points, and unlock new rewards.
Advantages of the Gaming Element	● Motivates player engagement: A point system can motivate players to engage with the game, and complete tasks and achievements in order to earn points and rewards.
	● Encourages skill development: Points can be awarded for specific skills or actions within the game, encouraging players to develop and

	improve these skills.
	● Provides a sense of achievement: Accumulating points within the game can provide a sense of accomplishment and progression, as players work towards unlocking new levels, items, or abilities.
	● Promotes competition: A point system can promote healthy competition among players, as they compete to earn the highest number of points or reach the top of leaderboards.
	● Enhances replayability: By providing incentives to complete tasks and achievements within the game, a point system can enhance the replayability of the game, as players work to earn more points and unlock new rewards.
	● Improves player retention: A point system can help to improve player retention, as players are more likely to continue playing the game in order to earn more points and unlock new rewards.
	● Provides valuable data: The point system can provide valuable data to game developers, such as which tasks and achievements are most popular and which areas of the game need improvement.
Weaknesses of the Gaming Element *(E.g. complexity, technical specifications etc.)*	● May incentivize the wrong behaviors: A point system may incentivize players to focus on earning points rather than playing the game in a way that is fun or rewarding in its own right. This can lead to players engaging in repetitive or unenjoyable tasks simply to earn points.
	● Can be demotivating: While a point system can motivate some players, it may also be demotivating for others if they perceive the rewards as too difficult to achieve or not worth the effort.
	● May lead to exploitation: Some players may attempt to exploit the point system by finding loopholes or hacks to gain an unfair advantage in earning points.
	● Can be unfair: If the point system is not well-designed, it can be unfair to some players who may not have the same opportunities to earn points due to skill level or other factors.
	● May not fit with game design: A point system may not fit with the overall game design, theme, or mechanics, and may detract from the experience rather than enhance it.
	● May not be sustainable: If the point system does not provide enough variety or incentive for players to continue playing over the long-term, it may not be sustainable and could lead to a decline in player engagement and retention.

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2.3   Missions' system

Title of Gaming Element	Missions system
Short description of Gaming Element *(min 150 words max 250 words)*	A mission system in a video game is a set of pre-defined objectives or tasks that players must complete in order to progress through the game. These objectives can vary widely depending on the game, but typically involve defeating enemies, completing puzzles, exploring new areas, or interacting with non-playable characters (NPCs). The mission system is usually structured around a central narrative or storyline, and completing missions will often unlock new areas, items, or abilities for the player. The mission system provides a structured framework for players to engage with the game, and can help to guide them through the various challenges and obstacles they will encounter along the way.
Aim and objectives of Gaming Element	Aim of Gaming Element: ● Providing a sense of progression: A mission system can give players a clear sense of progression as they work through a series of objectives and tasks. This can help to keep players engaged with the game and motivated to continue playing. ● Guiding player experience: A mission system can help to guide players through the game,+ and ensure they experience the content in the intended order. This can help to ensure a smooth and enjoyable player experience. ● Encouraging player exploration: Missions can be designed to encourage players to explore different areas of the game world, interact with NPCs, and discover new items and abilities. ● Enhancing story and immersion: A mission system can be used to enhance the game's narrative and immerse players in the game world. Missions can be designed to reveal new plot points, develop characters, and create a sense of drama and tension. ● Providing challenge and difficulty: Missions can be designed to provide players with a challenge and a sense of accomplishment when they are completed. They can also be used to gradually increase the difficulty of the game over time.
Technical specifications	● Mission tracking and management: The game must have a system for tracking the player's progress through the various missions and objectives. This includes storing data on completed objectives, tracking mission progress, and providing feedback to the player on

	their status.
	● Objectives and tasks: The game must have a way to define the objectives and tasks associated with each mission. This includes setting conditions for mission completion, specifying the required resources and abilities, and defining the rewards associated with mission completion.
	● Non-playable character interactions: Missions often involve interacting with non-playable characters (NPCs). The game must have a way to define the behavior and responses of NPCs, as well as a way for players to interact with them.
	● Artificial intelligence: Some missions may require the use of artificial intelligence (AI) to create challenging enemies or obstacles. The game must have a way to implement AI behaviors and decision-making processes to create a compelling and challenging experience for the player.
	● User interface: The game must have a user interface (UI) that allows players to track their progress through the mission system, view objectives and rewards, and interact with NPCs and other game elements.
	● Event triggers and scripting: Missions often involve complex sequences of events that must be triggered in a specific order. The game must have a scripting system that allows developers to create and manage these events.
Impact of gaming element on the city (min. 150 and max. 250)	● Increased player engagement: A mission system can provide players with clear goals and objectives, which can help to increase engagement and motivation to play the game.
	● Enhanced player satisfaction: When players complete missions and achieve objectives, they can experience a sense of accomplishment and satisfaction, which can enhance their enjoyment of the game.
	● Improved player retention: A well-designed mission system can help to keep players engaged with the game over time, which can lead to improved player retention.
	● Increased replayability: A mission system can provide players with a reason to replay the game, as they can try to complete missions in different ways or achieve higher scores.
	● Enhanced narrative and world-building: A mission system can be used to build and enhance the game's narrative and world-building, providing players with a deeper and more immersive experience.

Advantages of the Gaming Element	● Clear objectives: The mission system provides players with clear goals and objectives to achieve, which can help to guide their gameplay experience and provide a sense of purpose. ● Structured gameplay: The mission system helps to structure gameplay by providing players with a series of tasks to complete, which can help to keep them engaged and motivated to continue playing. ● Increased replayability: A well-designed mission system can provide players with a reason to replay the game, as they can try to complete missions in different ways or achieve higher scores. ● Enhanced storytelling: The mission system can be used to build and enhance the game's narrative, providing players with a deeper and more immersive experience. ● Reward system: Completing missions often provides rewards such as experience points, items, or in-game currency, which can incentivize players to continue playing and completing missions. ● Skill development: Missions often require players to use different skills or abilities, which can help to develop those skills and provide a sense of progression as players become more proficient.
Weaknesses of the Gaming Element *(E.g. complexity, technical specifications etc.)*	● Repetition: If the missions are too repetitive or the mission system is too limited, players may become bored or frustrated with the game. ● Linear gameplay: The mission system may force players to follow a linear path through the game, limiting their ability to explore and discover the game world on their own terms. ● Lack of creativity: If the mission system is too rigid or limiting, it may stifle player creativity and limit their ability to approach the game in their own unique way. ● Time-consuming: Completing missions can be time-consuming, and some players may not have the time or patience to complete lengthy missions. ● Unbalanced rewards: If the rewards for completing missions are unbalanced, it can lead to players feeling that some missions are not worth completing, which can reduce player engagement. ● Frustration: If missions are too difficult or frustrating, it can lead to players feeling discouraged and frustrated with the game. ●

2.4   Conflict

Title of Gaming Element	Conflict
Short description of Gaming Element *(min 150 words max 250 words)*	Conflict is a common gaming element that creates tension and challenge for players, driving the narrative and gameplay forward. Conflict can take many forms in games, such as combat, puzzles, obstacles, or strategic decision-making.
	In games where combat is a central element, conflict often involves battles with enemies, requiring players to use a variety of weapons, abilities, and tactics to defeat them. These battles may take place in various settings, such as open fields, dungeons, or arenas.
	In puzzle-based games, conflict may arise from the need to solve challenging puzzles or overcome obstacles, such as locked doors or hidden pathways. Players may need to use their problem-solving skills and critical thinking to progress through the game.
	In strategy games, conflict may involve managing resources, making tactical decisions, and engaging in battles with other players or enemies. Players may need to build armies, manage economies, and make strategic decisions to gain an advantage and achieve their objectives.
	In narrative-driven games, conflict may be presented through dialogue, cutscenes, or character interactions, driving the story forward and creating emotional engagement for the player. Players may need to make choices that affect the outcome of the story, creating a sense of agency and immersion.
	Overall, conflict is an essential gaming element that provides challenge, excitement, and engagement for players, driving the gameplay and narrative forward and creating a memorable gaming experience.
Aim and objectives of Gaming Element	Aim of Gaming Element: To create a compelling and immersive gameplay experience that keeps the player engaged and motivated to continue playing.
	Objectives of Gaming Element:
	• To create challenge: Conflict is often used to provide players with a challenge, testing their skills and abilities in a variety of scenarios.
	• To create tension: Conflict can create a sense of tension and excitement, making the gameplay more engaging and memorable for the player.
	• To advance the story: Conflict can be used to drive the narrative

	forward, providing the player with a sense of progression and purpose.
	● To encourage player agency: Conflict can encourage player agency by presenting choices and consequences that affect the outcome of the game.
	● To promote player skill development: Conflict can be used to promote player skill development by providing opportunities to practice and master different gameplay mechanics.
	● To create a sense of accomplishment: Conflict can provide players with a sense of accomplishment and satisfaction when they overcome obstacles, defeat enemies, or solve challenging puzzles.
	● To provide replayability: Conflict can provide replayability by presenting different challenges and scenarios that encourage players to play the game multiple times.
Technical	There are several technicalities involved in using conflict as a gaming element, depending on the game's genre, design, and platform. Here are some common technical considerations when using conflict as a gaming element:
	● Combat mechanics: If combat is a central element of the game, developers must design and implement combat mechanics that are responsive, intuitive, and balanced. This includes designing the game's controls, hit detection, enemy AI, and weapon balancing.
	● Difficulty balancing: Developers must balance the game's difficulty to ensure that it is challenging without being frustrating or inaccessible to players. This involves adjusting the game's enemy encounters, puzzle difficulty, and obstacles to provide an appropriate level of challenge for players.
	● Environmental design: Developers must design the game's environments to accommodate conflict-based gameplay. This includes designing maps, arenas, and levels that provide opportunities for combat, exploration, and puzzle-solving.
	● Narrative integration: Developers must integrate conflict elements into the game's narrative in a way that makes sense and drives the story forward. This involves writing dialogue, cutscenes, and other narrative elements that reflect the game's conflict-based gameplay.
	● Performance optimization: Developers must optimize the game's performance to ensure that it runs smoothly and without issues. This includes optimizing graphics, sound, and other technical

	aspects of the game to provide a seamless and immersive experience for players. ● Multiplayer integration: If the game includes multiplayer elements, developers must design and implement networking and matchmaking systems that ensure fair and enjoyable gameplay for all players.
Inclusive Methodology (e.g. For people with disabilities etc.)	When using conflict as a gaming element, it is important to consider an inclusive methodology that ensures that all players feel comfortable and welcome in the game environment. Here are some suggestions for inclusive methodologies when using conflict as a gaming element: ● Provide multiple difficulty levels: Consider providing multiple difficulty levels to accommodate different skill levels and playstyles. This allows players to adjust the game's challenge to their comfort level and ensures that all players can enjoy the game regardless of their skill level. ● Avoid stereotypes and offensive language: Avoid using stereotypes and offensive language in the game's narrative, dialogue, and character design. This includes avoiding harmful or derogatory representations of race, gender, sexual orientation, and other identities. ● Provide accessibility options: Consider providing accessibility options such as closed captions, audio descriptions, and colorblind mode to accommodate players with different abilities and preferences. ● Use non-violent conflict: Consider using non-violent conflict such as puzzles, challenges, and obstacle courses instead of combat-based conflict to create challenges and obstacles for players. ● Promote diversity and representation: Promote diversity and representation in the game's character design, narrative, and world-building. This includes representing a variety of identities, cultures, and backgrounds in the game's design and narrative. By following these inclusive methodologies, game developers can ensure that all players feel welcome and comfortable in the game environment, allowing them to enjoy the game's conflict element while avoiding harmful or exclusionary practices.
Impact of gaming element on the city (min. 150 and max.	When teaching about "green turn," or the shift towards sustainable practices and environmental consciousness, the use of conflict as a gaming element can have a significant impact on the way players learn and

250)	understand the subject matter.
	By incorporating conflict into a game, developers can create challenges and obstacles that require players to think critically and creatively about environmental issues and sustainable practices. For example, a game that challenges players to reduce their carbon footprint or manage a sustainable farm requires players to make decisions and take actions that have real-world implications, encouraging them to learn about sustainable practices and their impact on the environment.
	Additionally, conflict can be used to create emotional engagement and a sense of urgency around environmental issues, motivating players to take action and make positive changes in their own lives. For example, a game that simulates the impact of climate change on a community can create a sense of urgency and motivate players to take action to mitigate the effects of climate change in the real world.
	The use of conflict as a gaming element can also create a sense of ownership and agency among players, allowing them to see the impact of their decisions and actions on the game world and the environment as a whole. This can be a powerful tool for teaching players about the importance of sustainable practices and environmental consciousness.
	Overall, the impact of conflict as a gaming element when teaching about "green turn" is significant, allowing players to learn about sustainable practices and environmental issues in an engaging, interactive, and impactful way. By incorporating conflict into a game, developers can create an immersive and memorable learning experience that encourages players to make positive changes in their own lives and in the world around them.
Advantages of the Gaming Element	There are several advantages to using conflict as a gaming element, including: 1. Engagement: Conflict-based gameplay can create a sense of engagement and immersion among players, drawing them into the game world and motivating them to overcome challenges and obstacles. 2. Challenge: Conflict-based gameplay can provide a sense of challenge and achievement for players, allowing them to test their skills and improve their abilities. 3. Emotional investment: Conflict-based gameplay can create a sense of emotional investment in the game's narrative and characters, encouraging players to care about the game world and its inhabitants.

	4. Learning: Conflict-based gameplay can provide a platform for learning and education, allowing players to learn about historical events, social issues, and real-world problems in an interactive and engaging way.
	5. Agency: Conflict-based gameplay can create a sense of agency and ownership among players, allowing them to make decisions and take actions that have real-world implications within the game world.
	6. Replayability: Conflict-based gameplay can provide a high level of replayability, encouraging players to revisit the game and try new strategies and approaches.
	7. Social interaction: Conflict-based gameplay can facilitate social interaction among players, whether through cooperative or competitive gameplay, encouraging players to form communities and engage with each other.
Weaknesses of the Gaming Element *(E.g. complexity, technical specifications etc.)*	1. Violence: Conflict-based gameplay can often involve violent or aggressive behavior, which can be off-putting or disturbing to some players.
	2. Desensitization: Prolonged exposure to violent or aggressive conflict-based gameplay can lead to desensitization, reducing the impact of the game's message and undermining its educational value.
	3. Inaccuracies: Conflict-based gameplay can sometimes simplify complex historical events or social issues, leading to inaccuracies or misrepresentations that can be misleading or harmful.
	4. Repetitiveness: Conflict-based gameplay can become repetitive or monotonous if the game mechanics or objectives are not varied enough.
	5. Accessibility: Conflict-based gameplay may not be accessible to all players, particularly those with physical or cognitive disabilities or those who are sensitive to violent content.
	6. Escapism: Conflict-based gameplay can sometimes encourage players to escape from real-world problems or challenges rather than facing them directly.
	7. Social isolation: Competitive conflict-based gameplay can sometimes lead to social isolation or exclusion, particularly for players who do not have access to online communities or who are not skilled enough to compete at a high level.

Additional comments for the integration of the Gaming Element in the Cities Going Green App	To integrate conflict as a gaming element when teaching sustainability, developers can create games that challenge players to make decisions and take actions that have real-world environmental implications. For example, a game that simulates the impact of climate change on a community could require players to make decisions about resource management, energy consumption, and waste reduction in order to mitigate the effects of climate change.
	The game could also include obstacles and challenges that represent real-world environmental problems, such as natural disasters, pollution, and habitat destruction. By presenting these challenges in a gamified format, players can learn about the impact of their decisions and actions on the environment in a fun, interactive, and engaging way.
	To ensure that the use of conflict as a gaming element is inclusive, developers should consider the potential impact of violent or aggressive content on different types of players and design their games in a way that is accessible to players with a range of abilities and sensitivities. Additionally, developers should strive to create games that are based on accurate and nuanced representations of environmental issues and sustainable practices, avoiding oversimplifications or misrepresentations that could be misleading or harmful.

3 Budling Blocks

This chapter aims to present a variety of possible building blocks which will
be included in the Cities Going Green app and contribute in the education of pupils 10-12 years old on environmental topics. The information provided for each building block will have a significant role in the integration of the element in the game and the way in which it will interact as an element of each "Green City".

3.1 Solar panel park

Short description of Building Block	Solar farms are also known as solar parks and solar power stations. They operate as power plants, just like a natural gas power plant or other sources of energy generation that have generated electricity for consumers for the last century. A solar panel park is known as a group of solar panels connected, generally, to an electrical distribution network. They are spaces made up of a large number of individual photovoltaic panels and each one has a different power.
Aim and objectives of Building block	Energy production by using solar energy
Main beneficiaries/ users of Building Block	Citizens
Impact of Building Block	Energy produced is then distributed to households and other facilities. Solar energy is not polluting at all. However, the problem is found in the manufacture of the panels and in the generation of waste that they can cause once their useful life has finished. At the moment there is no definitive way to be able to decrease the environmental impact that this generates, although it is known for sure that the damage is infinitely less and that work continues to find the ideal solution. Once the problems of manufacturing solar panels are overcome, their massive installation in places of consumption (such as cities and rural areas) will generate short-term benefits, both in the flora and in the fauna, in the air and, in general, in nature in its purest state.
Advantages of Building Block	● clean energy production ● less air pollution
Weaknesses of Building Block *(e.g. complexity*	● The cost of the solar panels' construction is very expensive. ● ...takes a lot of space ● needs sunny days

etc.)	

3.2   Wind energy park

Title of Building Block	Wind energy park
Short description of Building Block	A wind energy park is a large area where tall, slender machines called wind turbines are set up to catch the wind. When the wind blows, it makes the turbines spin, and this movement generates electricity. The electricity produced by the wind energy park can be used to power homes, schools, and businesses, helping to reduce the use of fossil fuels and protect the environment.
Aim and objectives of Building block	Aim of Building Block: The aim of a wind energy park is to harness the power of the wind to generate clean and renewable electricity. By utilizing the wind's natural energy, these parks contribute to reducing greenhouse gas emissions and dependence on fossil fuels, which helps combat climate change and protect the environment. They provide a sustainable source of electricity that can be used to power communities and industries, promoting a more environmentally friendly and sustainable energy future. Objectives of Building Block: ● Generate Electricity: The primary objective is to produce electricity from the wind's kinetic energy. The spinning turbines convert the wind's mechanical energy into electrical energy, which can then be distributed and used to power homes, businesses, and industries. ● Promote Renewable Energy: Wind energy parks aim to promote the use of renewable energy sources. Unlike fossil fuels, which are finite and harmful to the environment, wind energy is sustainable and has minimal environmental impacts. ● Reduce Greenhouse Gas Emissions: By replacing fossil fuel-based electricity generation with clean wind energy, these parks help reduce greenhouse gas emissions, such as carbon dioxide, that contribute to global warming and climate change. ● Contribute to Energy Independence: Utilizing wind energy reduces reliance on imported fossil fuels, enhancing energy security and independence for a country or region.

Main beneficiaries/ users of Building Block	Citizens
Impact of Building Block	One of the most significant impacts of wind energy parks is the generation of clean electricity. By harnessing the power of wind, these parks produce electricity without burning fossil fuels, which helps reduce air pollution and greenhouse gas emissions.
Advantages of Building Block	● Clean and Green: Wind energy is clean and does not produce harmful pollutants or greenhouse gases, helping to protect the environment and combat climate change. ● Renewable: Wind is an infinite resource, so we won't run out of it like fossil fuels, ensuring a sustainable energy supply for the future. ● Minimal Water Usage: Unlike many other energy sources, wind energy requires very little water for its operation, making it a water-efficient option. ● Low Operating Costs: Once installed, wind turbines have relatively low operating and maintenance costs, making them cost-effective in the long run. ● No Fuel Costs: Wind is a free resource, so wind energy parks do not incur ongoing fuel costs, helping stabilize electricity prices.
Weaknesses of Building Block **(e.g. complexity etc.)**	● Location Dependence: Wind energy parks require specific windy locations to be effective. ● Visual Impact**:** Some people find wind turbines visually intrusive, especially when they are located near residential areas or scenic landscapes ● Land Use**:** Wind energy parks require significant land area, potentially impacting local ecosystems and agriculture.

3.3   Waste management plant

Title of Building Block	Waste management plant

Short description of Building Block	A waste management plant is a facility that is used to process and dispose of waste materials in an environmentally friendly and safe manner. The specific processes and technologies used at a waste management plant will vary depending on the types of waste being treated, but common operations include: ● Sorting and separating recyclable materials such as paper, plastic, glass, and metal. These materials can be sent to recycling facilities to be transformed into new products. ● Composting organic waste such as food scraps, yard waste, and agricultural waste. Composting breaks down organic matter into a nutrient-rich soil amendment that can be used in gardening and agriculture. ● Incineration or thermal treatment, which involves burning waste to generate heat or electricity. This process reduces the volume of waste, but generates ash and pollutants that must be properly managed. ● Landfilling: which is the process of disposing of solid waste by burying it in the ground. This method is considered as the last resort, because of its negative impact on the environment and the limited space available for landfilling. Other processes that may be used at a waste management plant include anaerobic digestion, which converts organic waste into biogas, and mechanical biological treatment, which uses mechanical processes to separate recyclable materials and prepare the remaining waste for landfilling or incineration.
Aim and objectives of Building block	Aim of Building Block: The ultimate goal of a waste management plant is to reduce the volume and toxicity of waste, to recover valuable resources from it, and to protect public health and the environment. The facility is also designed to manage the waste in a way that conserves natural resources and reduces pollution. Objectives of Building Block: ● Reducing the volume of waste ● Recycling and recovering resources ● Protecting public health and the environment ● Conserving natural resources ● Compliance ● Reducing dependency on landfills ● Promoting sustainable practices

Main beneficiaries/ users of Building Block	The main beneficiaries and users of a waste management plant include: ● Municipal and governmental agencies ● Locals/Citizens ● Businesses and industries ● Environmental organizations ● Recycling and composting industries. ● Farmer and agriculture ● Energy sector The waste management plants services benefit a wide range of stakeholders including individuals, communities, businesses and industries, and government agencies.
Impact of Building Block	Waste management plants can have both positive and negative impacts on the environment and communities. Some of the potential impacts include: ● Positive impact on the environment: Waste management plants can reduce the volume of waste sent to landfills, which can help to conserve limited land resources and reduce pollution. They can also help to recover valuable resources from the waste stream, such as metals, paper, and plastics, which conserves natural resources. Additionally, composting and anaerobic digestion can help to reduce greenhouse gas emissions by converting organic waste into biogas. ● Positive impact on public health: Waste management plants can help to protect public health by properly managing hazardous waste, such as medical waste and electronic waste, which can contain harmful contaminants. They also help to minimize the release of pollutants into the air, water, and soil, which can cause health problems. ● Positive impact on local economies: Waste management plants can create jobs and support local businesses, such as recycling and composting industries. They also provide services that are essential for the functioning of society. Overall, waste management plants can have both positive and negative impacts on the environment and communities, and it is important for them to be operated and regulated in a way that minimizes negative impacts and maximizes positive impacts.

Advantages of Building Block	● Waste Reduction: Waste management plants help reduce the amount of garbage that ends up in landfills or gets burned, making the environment cleaner. ● Energy Generation: Some plants can turn waste into energy like electricity or heat, helping to produce power without using fossil fuels. ● Resource Recovery: These plants can find valuable materials in the garbage and recycle or reuse them, saving natural resources. ● Pollution Control: Waste management plants prevent pollution by properly treating and handling waste, avoiding harmful effects on the environment.
Weaknesses of Building Block *(e.g. complexity etc.)*	● Negative impact on the environment: Waste management plants can also have negative impacts on the environment, particularly if they are not operated or regulated properly. For example, landfills can release pollutants into groundwater and surrounding soil if not properly lined and managed. Incineration can release pollutants and ash into the air if not properly controlled, and can also generate noise and odors that can be a nuisance to nearby residents. ● Negative impact on public health: Waste management plants can also have negative impacts on public health if they are not properly operated and regulated. For example, if a landfill is not properly managed, pollutants can leach into groundwater and contaminate drinking water sources, which can cause health problems. Incineration can release pollutants and ash into the air which can cause respiratory problems.

3.4   Vehicle charging stations

Title of Building Block	Vehicle charging stations
Short description of Building Block	A vehicle charging station, also known as an electric vehicle (EV) charging station, is a device that supplies electric energy to charge the batteries of electric vehicles. These stations can be found in various locations such as public parking lots, shopping centers, and along highways. They come in different types, levels of power, and connectors, the most common being Level 1, Level 2 and DC fast charging. Level 1 charging is the slowest and uses a standard 120-volt household outlet, Level 2 charging is faster and uses a 240-volt outlet, while DC fast charging can charge an electric vehicle to 80% in under an hour and requires a special high-voltage station. Some charging stations are free to use while others require payment, and they are increasingly being installed as governments and private

	companies look to support the growth of electric vehicles on the road.
Aim and objectives of Building block	Aim of Building Block: The main aim of a vehicle charging station is to support the growth of electric vehicles by providing a convenient, reliable, and cost-effective way for EV drivers to charge their vehicles, promoting sustainable transportation and encouraging the use of renewable energy. Objectives of Building Block: - Supporting the growth of electric vehicles - Convenience for EV drivers - Reliability - Cost-effective - Promoting sustainable transportation - Encouraging the use of renewable energy
Main beneficiaries/ users of Building Block	The beneficiaries and users of vehicle charging stations include: - Electric vehicle (EV) drivers - Government agencies - Power utilities - Businesses and property owners - Environmental organizations - Electric vehicle manufacturers and suppliers Overall, vehicle charging stations are beneficial for a wide range of stakeholders, including EV drivers, government agencies, power utilities, businesses, property owners, environmental organizations, and electric vehicle manufacturers and suppliers. By providing a convenient and reliable way to charge EVs, vehicle charging stations can help to support the growth of electric transportation, reduce emissions and promote the use of renewable energy sources.
Impact of Building Block	Vehicle charging stations can have a range of impacts on the environment, economy, and society. Some of these impacts include: Positive impact on the environment: By supporting the growth of electric vehicles, charging stations can help to reduce emissions of harmful pollutants

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	and greenhouse gases, thus helping to improve air quality and mitigate the effects of climate change. Charging stations can also be connected to renewable energy sources, such as solar or wind power, which can further reduce the environmental impact of charging EVs.
	● Positive impact on the economy: Vehicle charging stations can create jobs in the manufacturing, installation and operation of the stations, and can also help to support the growth of the electric vehicle industry.
	● Positive impact on society: Charging stations can help to make electric vehicles more viable for drivers, which can promote sustainable transportation and reduce dependence on fossil fuels. They can also be installed in low-income areas, helping to promote access to clean transportation options.
	Overall, vehicle charging stations can have a range of impacts on the environment, economy, and society, and it is important for them to be operated and regulated in a way that minimizes negative impacts and maximizes positive impacts.
Advantages of Building Block	● Electric vehicles produce zero tailpipe emissions, helping to reduce air pollution and combat climate change.
	● Electric vehicles are quieter than traditional vehicles, which can contribute to quieter and more peaceful urban environments.
	● Less air pollution from electric vehicles means improved air quality, leading to potential health benefits for people living in cities and urban areas.
Weaknesses of Building Block *(e.g. complexity etc.)*	● Negative impact on the environment: Vehicle charging stations can have negative impacts on the environment if they are not operated or regulated properly. For example, if a charging station is not properly managed, pollutants can leach into groundwater and contaminate drinking water sources, which can cause health problems.
	● Negative impact on the economy: Vehicle charging stations can have negative impacts on the economy if they are not properly managed or regulated. For example, if a charging station is not properly maintained, it can become a safety hazard, which can result in costly repairs or liability lawsuits.
	● Negative impact on society: Vehicle charging stations can have negative impacts on society if they are not properly located or designed. For example, if a charging station is installed in a location that is not easily accessible for EV drivers, it may not be well used, and if it's not designed with accessibility

in mind, it could be difficult for people with disabilities to use it.

3.5   Recycle / compost bins

Title of Building Block	**Recycle / compost bins**
Short description of Building Block	**A compost bin is a container into which you place organic waste to turn into compost (organic material) over time.**
Aim and objectives of Building block	● Improves the structure and health of your soil by adding organic matter. ● Helps the soil retain moisture and nutrients. ● Attracts beneficial organisms to the soil and reduces the need for pesticides and fertilizers. ● Reduces the potential for soil erosion.
Main beneficiaries/ users of Building Block	Citizens
Impact of Building Block	Proper composting of the organic waste we generate in our daily lives – inedible or unused food – can **reduce the dependence on chemical fertilizers, help recover soil fertility, and improve water retention and the delivery of nutrients to plants**.

Advantages of Building Block	● Composting significantly cuts down on the amount of trash in a landfill and reduces the costs and carbon emissions it takes to haul and process those materials. Meanwhile, the valuable nutrients in your compostable materials make composting a favorable alternative to shipping your organic waste to a landfill. ● Composting enriches the soil with nutrients, which reduces the need for fertilizers and pesticides. Fertilizers and pesticides require fossil fuels for their production and shipping, and some of them are potentially harmful to our health. ● Compost increases soil's ability to retain moisture, thus helping to prevent erosion by reducing runoff. And compost prevents and suppresses plant diseases and pests.3 Moister, healthier soil improves the workability of the soil and reduces fossil fuel emissions that would otherwise be needed to produce and ship soil-maintenance products. Composting can help sequester carbon, meaning that composting can help remove carbon from the atmosphere.
Weaknesses of Building Block *(e.g. complexity etc.)*	Drawbacks of composting by-products are cost for site preparation and equipment, the lengthy treatment period, targeting final use of compost product, and environmental issues such as odors and dust. Some investment in equipment and site preparation is required or recommended.

3.6   Environmental centre

Title of Building Block	**Environmental centre**
Short description of Building Block	An environmental center is a facility that is dedicated to educating the public about environmental issues and promoting sustainable practices. These centers can be found in a variety of settings, such as parks, zoos, museums, schools, and universities. They typically offer a range of educational programs, such as field trips, lectures, workshops, and hands-on activities, that aim to raise awareness about environmental issues and inspire people to take action to protect the environment. Environmental centers may also have exhibits and displays that showcase the natural environment, local wildlife, and conservation efforts. Some may also have research and monitoring programs, and provide opportunities for volunteer work and internships.

Aim and objectives of Building block	Aim of Building Block: The main aim of an environmental center is to educate and inspire the public to take action to protect the environment and promote sustainable practices, by providing information and resources, building community, supporting scientific research and monitoring, and providing opportunities for learning and volunteer work. Objectives of Building Block: ● Raising awareness about environmental issues ● Inspiring people to take action ● Promoting sustainable practices ● Conserving natural resources ● Building community ● Supporting scientific research and monitoring ● Providing opportunities for learning and volunteer work
Main beneficiaries/ users of Building Block	The beneficiaries of an environmental center can include local communities, schools and educational institutions, government agencies, and research organizations. Users of the center may include scientists, educators, students, and members of the general public who participate in educational programs or visit the center for research or recreational purposes.
Impact of Building Block	An environmental center can have a variety of positive impacts on the community and the environment. Some potential impacts include: ● Education and awareness: Environmental centers often offer educational programs and resources for people of all ages to learn about environmental issues and conservation. ● Research and monitoring: Environmental centers may conduct research on local ecosystems, wildlife, and other environmental topics. This research can help inform conservation and management decisions. ● Conservation and restoration: Environmental centers may work to protect and restore local habitats and ecosystems, which can help preserve biodiversity and improve the health of the environment. ● Community engagement: Environmental centers can also serve as a hub for community engagement and volunteer opportunities, allowing individuals to get involved in environmental conservation efforts in their local area. ● Economic benefit: Environmental centers can also provide benefits to the local economy through job creation, visitor spending and increased property values.

	Overall, an environmental center can play an important role in promoting environmental stewardship, preserving natural resources, and educating the public about ways to protect the environment.
Advantages of Building Block	An environmental center provides valuable information and educational programs about the environment, helping people understand the importance of conservation and sustainable practices. It also raises awareness about environmental issues, such as pollution, climate change, and biodiversity loss, encouraging people to take action and make positive changes. They serve as a hub for community engagement, bringing people together to work towards a greener and more sustainable future.
Weaknesses of Building Block (e.g. complexity etc.)	Environmental centers often rely on funding from government agencies, foundations, and private donors. If funding is not secure, the center may not be able to meet its goals or sustain its operations.

3.7   Trees/plants

Title of Building Block	Trees/plants
Short description of Building Block	Trees have a single, hard woody stem (called trunk). Plants usually have multiple stems which are comparatively softer than trees. Some even have pseudostems. Trees have few leaves or branches on the lower sections of their body. Some plants are entirely made of leaves, and even some have leaves closer to the ground.
Aim and objectives of Building block	Aim of Building Block: To introduce in the city as many trees and plants as possible in order to make the city greener. Objectives of Building Block: Tree planting is a solution that mayors, and other municipal leaders around the world can implement within their communities, reducing air pollution and curbing climate change.

Main beneficiaries/ users of Building Block	Citizens and atmosphere
Impact of Building Block	Trees give off oxygen that we need to breathe. Trees reduce the amount of storm water runoff, which reduces erosion and pollution in our waterways and may reduce the effects of flooding. Many species of wildlife depend on trees for habitat. Trees provide food, protection, and homes for many birds and mammals.
Advantages of Building Block	● Reducing Climate Change ● Purifying Air ● Cooling Down the Streets ● Natural Air Conditioning ● Saving Water ● Preventing Water Pollution ● Providing Shelters for Wildlife ● Renewable Energy Source ● Reinforcing Soil ● Erosion Control
Weaknesses of Building Block (e.g. complexity etc.)	● Trees are expensive. ● They'll wreak havoc above and below ground. ● Trees tend to grow slowly ● Maintenance is a must with trees.

Title of Building Block	**Parks**
Short description of Building Block	An area of land, usually in a largely natural state, for the enjoyment of the public, having facilities for rest and recreation, often owned, set apart, and managed by a city, state, or nation.

Aim and objectives of Building block	• Apply safe design principles in order to make neighborhood parks safer and to increase citizen usage • Provide walking, biking, running and other activities with trails, paths, and bikeways • Bring children and families into our parks and give them great reasons to stay and play for a lifetime • Balance nature and man-made environments in town
Main beneficiaries/ users of Building Block	Citizens
Impact of Building Block	City parks help clean the air and improve public health. Green spaces also filter rain, reducing water pollution, protecting drinking water, and decreasing the rates of waterborne illness. Green spaces in cities also help cool our cities, reducing the heat-island effect.
Advantages of Building Block	Parks provide intrinsic environmental, aesthetic, and recreation benefits to our cities. They are also a source of positive economic benefits. They enhance property values, increase municipal revenue, bring in homebuyers and workers, and attract retirees.
Weaknesses of Building Block (e.g. complexity etc.)	Maintenance costs

3.8   Bicycle Roads

Title of Building Block	Bicycle Roads
Short description of Building Block	Cycle lanes are on-road spaces for people who cycle, with road markings separating them from other road traffic. A cycle lane is a part of a road that is separated by a line from the rest of the road, for the use of people riding bicycles. It does not typically have physical barriers preventing motorised traffic from using it. It can also be a part of a pavement. In urban areas, cycle lanes are placed along roads joining different districts of the city, usually in red colour to be well-seen, with white pavement markings. A bicycle symbol is often used at the beginning and the end of the cycle lane or repeated throughout the entirety of the lane.

	In its extensive version the system of bike roads has junctions with road signs or even roundabouts. Lots of cycling roads go out of the cities to form long distance tourist routes. Some of them cross the country borders in Europe to become parts of the project called EuroVelo.
Aim and objectives of Building block	Aim of Building Block: ● Limiting the use of cars- reducing car exhaust fumes ● Contributing to the air purity ● Health benefits
Main beneficiaries/ users of Building Block	Citizens of the area. Tourists.
Inclusive Methodology (e.g. For people with disabilities etc.)	The cycle lanes must be wide enough for going both ways, also for wheelchairs and tricycles.
Impact of Building Block	**Environment** Positive impact on the environment by noticeable reduction of the emission of harmful substances into the air. Improving the air quality. "Zero-consumption" of fossil fuels. Development of sustainable transportation. **Society** Promoting the healthy lifestyle. Saving time while commuting. Saving money spent on transportation. Getting mobility freedom and flexibility. **Economy** Development of bike factories. Creating new jobs in services for bikers.
Advantages of Building Block	● Easy to build ● Cheap to build and maintain.
Weaknesses of Building Block *(e.g. complexity etc.)*	● The place for bike lane should be included in the infrastructure of the city in advance. ● The necessity of placing bicycle stands.

Additional comments for the integration of the building block in the Cities Going Green App	Cycle lanes may be able to support the mobility of seasonal peaks in tourists by offering routes to and around tourist sites. Students often live within cycling distance of their education facility and so cycle lanes may also encourage the use of bicycles and improve the safety of existing cycling students. Cycle lanes can be relatively inexpensive to implement. They use existing road space and utilise paint to visually separate the cycle lane from motor vehicles. The cost will vary depending on length of cycle lane and the amount of material/paint used. Consider the indirect costs of supporting measures such as signage, intersections and enforcement, and also the cost of feasibility studies and design.

4   Decisions

This chapter aims to present a variety of possible decision points
which will be included in the Cities Going Green app and contribute in the education of pupils 10-12 years old on environmental topics. The information provided for each decision will have a significant role in the integration of the element in the game, as well as the way in which it will interact as a component of each "Green City".

4.1   Car withdrawal

Title of Decision	Car withdrawal
Short description of decision	When the player chooses the option 'car withdrawal', the game will then start to reduce the number of cars moving in the city as it is an incentive for the inhabitants of the city to sell their old cars. This activity will reduce the traffic within the city and thus reduce the number of old cars in the city. Older cars are producing a lot more carbon dioxide than newer cars and thus the more old cars that are in circulation the more carbon dioxide will be produced. Car withdrawal is an incentive being used in various countries in the last decades and recently many countries are using it as an incentive for people to buy electric vehicles.
Aim and objectives of Decision	Aim of decision: For children to understand the concept of 'car withdrawal' and how it is used. Objectives of decision: ● Reduce number of old cars ● Reduce traffic ● Increase electric vehicles and charging stations
Main beneficiaries from this decision	The main beneficiary from this decision is the whole city
Inclusive Methodology (e.g. For people with disabilities etc.)	An additional benefit of this decision is that the city becomes more accessible and safe for people with disabilities as parking and other traffic violations are also going to decrease. The reduction of old cars also means that the air quality has improved too.
Impact of decision on the city	The decision of 'car withdrawal' is going to impact the city greatly. It is suggested to see the changes sporadically, and by the end the player will be

	able to see a significant increase of traffic and lower air pollution. Additionally, in the game the concept of electric charges should be added for electric vehicles to charge. As electric cars tend to still be expensive, it is advised to not have the compassion engine cars number replaced with the exact number of electric vehicles. Also, public transports can be more frequent.
Advantages of the decision	● Cleaner air ● Low traffic ● More public transportation
Weaknesses of the decision *(E.g. complexity etc.)*	● Expensive ● Willingness might be low ● Time consuming
Additional comments for the integration of the decision in the Cities Going Green App	*As mentioned above, once the decision is selected a chain reaction should start, where fewer and fewer cars should appear as the concept of 'car withdrawal' is starting. Specific metrics should be effected.*

Promotional poster	

4.2   Bicycle Funding

Title of Decision	Bicycle Funding
Short description of decision	'Bicycle Funding' is another incentive given to the inhabitants of a city, where individuals are offered a grant in order to buy a new bicycle in order to boost the numbers of people who commute daily by bicycle. Usually those grants refer to electric bicycles which are equipped with electric boosters which helps the rider, ride with more ease and increased speed in order to make daily biking more attractive to a city's inhabitants. This incentive is expensive for a city but it is not as expensive as the 'car withdrawal' incentive. However like the 'car withdrawal' the city has to also invest in certain infrastructure such as safe bike lanes.
Aim and objectives of Decision	Aim of decision: Make children understand the concept of daily commuting with a bicycle. Objectives of decision: • Reduce traffic

	- Recuse air pollution - Increase bicycle usage
Main beneficiaries from this decision	The whole city is the beneficiary of this decision
Inclusive Methodology (e.g. For people with disabilities etc.)	People who can not afford a car, now have the chance to afford a good bike and so they can travel from one point to another faster.
Impact of decision on the city	This will reduce the air pollution, decrease traffic and maybe also decrease the number of people using public transportation during pick hours. This decision is going to be cheaper than the 'car withdrawal' decision.
Advantages of the decision	- Cleaner air - Low traffic - safer roads
Weaknesses of the decision *(E.g. complexity etc.)*	- Expensive - Willingness might be low, depending on climate - Critical Infrastructure is needed
Additional comments for the integration of the decision in the Cities Going Green App	*This incentive can be done quicker, but if the game is going to include bike lanes it can become more time consuming, and the player can see the progress of expanding the bikelanes.*

Promotional poster	

4.3   Recycling promotion

Title of Decision	Recycling promotion
Short description of decision	A recycling campaign is an initiative that aims to encourage and promote the recycling of waste to reduce environmental impact and promote sustainability. The campaign can be organized by a government, non-profit organization, business, school, or community group, and can take many different forms. The recycling campaign can include the distribution of information and educational materials on how to recycle and why it is important to do so, the organization of community events such as waste collections or street cleanings, the implementation of recycling programs in schools or companies, and the promotion of recycled and eco-friendly products. Some common goals of a recycling campaign may include reducing the amount of waste sent to landfills, reducing air and water pollution, conserving natural resources, and educating the community about sustainable practices.
Aim and	● Reduce the amount of waste sent to landfills and minimize environmental

objectives of Decision	impact. - Promote the conservation of natural resources, such as water and energy, through recycling. - Educate the community about the importance of recycling and the environmental and economic benefits it brings. - Motivate people to change their habits and behaviors to reduce waste and increase recycling. - Encourage community participation in waste management, including the organization of collection and clean-up events. - Increase the amount of recycled materials collected and processed for reuse. - Promote the adoption of recycled and eco-friendly products by the community. - Reduce waste disposal costs and improve the efficiency of waste management programs.
Main beneficiaries from this decision	All the city and the citizens
Impact of decision on the city	Waste Reduction: A recycling campaign can help reduce the amount of waste generated in a community, which in turn reduces the amount of trash sent to landfills and reduces air, water, and pollution. floor. Saving natural resources: Recycling materials reduces the need to extract natural resources, such as wood, minerals and oil, which in turn contributes to the conservation of natural resources and the preservation of biodiversity.
Advantages of the decision	Pollution reduction: Recycling materials can reduce air and water pollution, since processing and manufacturing products from recycled materials emit fewer pollutants than producing new materials. Job Creation: Recycling campaigns can create jobs in the collection, sorting, processing, and sale of recycled materials, which can contribute to the economic development of a community. Education and Awareness: Recycling campaigns can also help educate and raise awareness in the community about the importance of recycling and the environmental impact of their actions, which can encourage positive change in behavior and everyday practices.
Weaknesses of the decision	Upfront Costs: Implementing a recycling program may require a significant investment of resources, such as collection equipment, bins, and collection

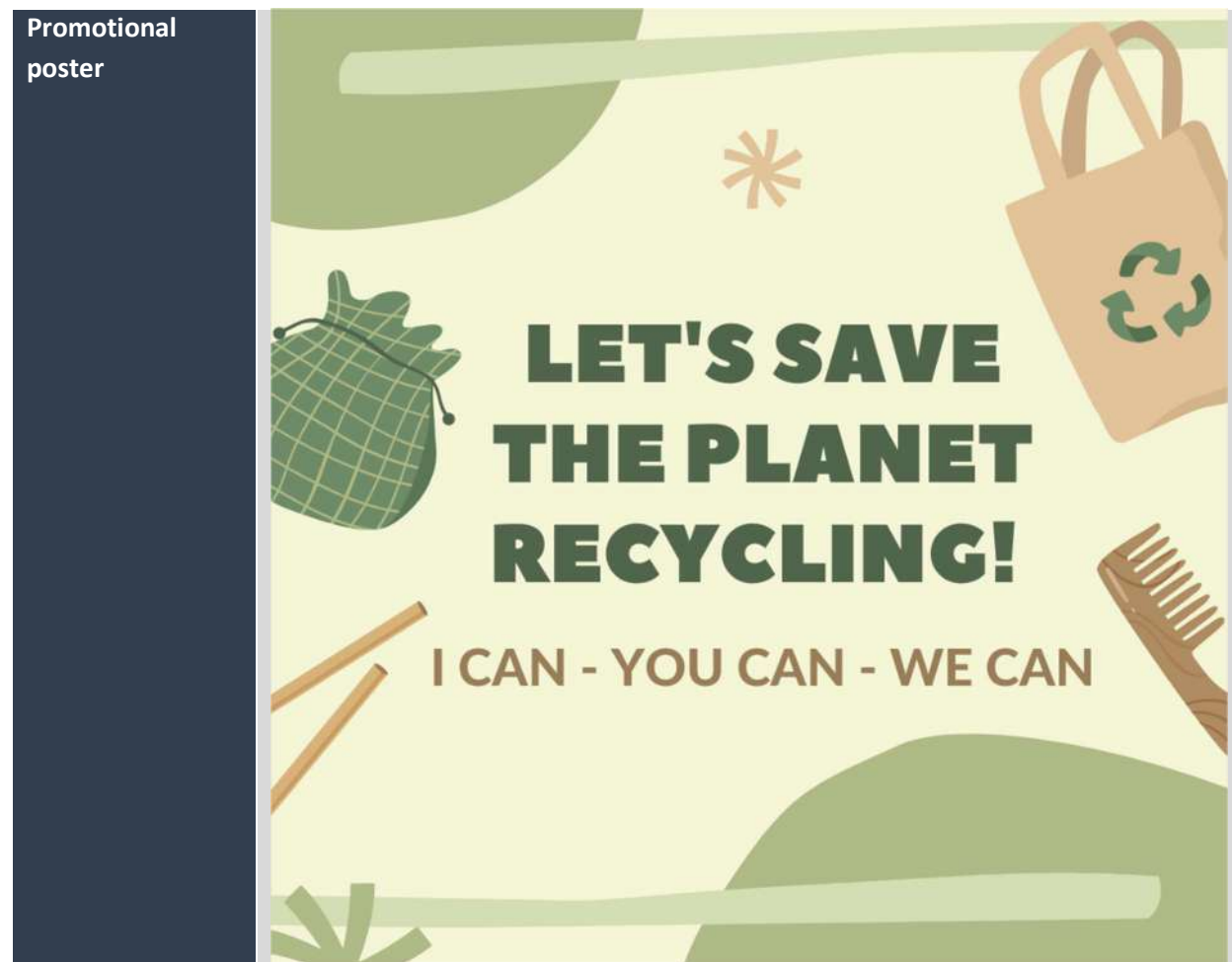|	
(E.g. complexity etc.)	personnel. Complex logistics: The logistics of collecting, transporting, and processing recyclable materials can be complex and expensive, especially in rural or hard-to-reach areas. Sorting Difficulties: Sorting recyclables can be difficult or confusing for citizens, which can result in a low participation rate and contamination of recyclables. Quality issues: The quality of recyclable materials may be lower than that of virgin materials, which may limit their usefulness in the manufacture of new products. Environmental pollution: If recyclable materials are not handled properly, they can cause environmental pollution, including the release of greenhouse gases, water and air pollution, and soil contamination. Lack of incentives: In some cases, a lack of incentives to recycle, such as a lack of rewards programs or exchange programs, can limit the rate of citizen participation. Capacity Issues: Recycling programs may have limitations in terms of processing and storage capacity for recyclable materials, which can limit the effectiveness of the program and increase operating costs.

Promotional poster	

4.4   Zero waste promotion

Title of Decision	Zero waste promotion
Short description of decision	A "Zero Waste" campaign aims to minimize the amount of waste generated in a community, home or business. The campaign is centered around the idea that waste is a valuable resource and should be treated as such rather than simply thrown away. The idea is to promote reuse, recycling and composting to minimize the amount of waste sent to landfills and thus reduce the negative environmental impact associated with waste generation. The "Zero waste" campaign can include different initiatives, such as education and

	awareness about waste reduction, the promotion of responsible consumption habits, the reuse of materials and products, the recycling of recyclable materials and the implementation of composting practices. to reduce the amount of organic waste. It can also include rewards programs to encourage citizens to reduce their waste footprint and the implementation of government policies that encourage waste reduction.
Aim and objectives of Decision	Promote education and awareness about waste reduction and the importance of responsible consumption. Promote the reuse and recycling of materials to minimize the amount of waste sent to landfills. Implement composting practices to reduce the amount of organic waste. Encourage citizens to reduce their waste footprint through reward programs and awareness campaigns. Implement government policies that encourage waste reduction, such as a ban on certain single-use plastic products. Collaborate with companies and organizations to promote sustainable waste production and disposal practices.
Main beneficiaries from this decision	All the city and the citizens
Impact of decision on the city	Waste Reduction: The campaign can help reduce the amount of waste sent to landfills, which in turn reduces soil and water pollution. Environmental Protection: The campaign can help protect the environment by promoting sustainable consumption and waste disposal practices. Resource Savings: The campaign can help save resources by promoting the reuse and recycling of materials, which reduces the need for new resources.
Advantages of the decision	Cultural change: The campaign can help change the culture of consumption and waste disposal, promoting more sustainable and responsible practices. Reducing Greenhouse Gas Emissions: The campaign can help reduce greenhouse gas emissions by promoting sustainable waste disposal practices and encouraging businesses to produce more sustainably.
Weaknesses of the decision *(E.g. complexity etc.)*	Cost: The implementation of a "Zero waste" campaign can be expensive, since it may require investment in special equipment and technologies for waste disposal, as well as personnel training. Logistical difficulties: Disposing of waste sustainably can be more complicated than

simply sending it to a landfill, which may require changes to existing infrastructure and the way waste is collected and disposed of.

Compliance Difficulties: Some people may be unwilling or unable to comply with sustainable waste disposal practices, which can make campaign implementation difficult.

Lack of support: Without adequate community and government support, the campaign may not be successful and it may be difficult to achieve the desired objectives.

Promotional poster

OUR MISSION:

Zero Waste

WILL YOU JOIN US IN OUR ADVENTURE?

4.5   solar panel funding

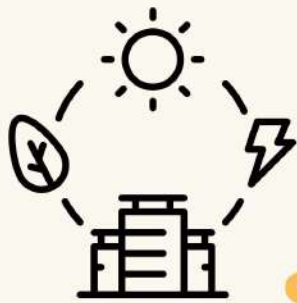|	
Title of Decision	Solar panel funding
Short description of decision	Solar panel funding refers to the financial resources provided by governments, organizations, or individuals to support the installation, maintenance, and management of solar energy systems. This funding can be used to cover the costs of equipment, labor, permits, and other expenses associated with the deployment of solar panels. The goal of solar panel funding is to promote the use of renewable energy sources, reduce dependence on fossil fuels, and mitigate the environmental impact of energy consumption. By providing financial support for solar energy projects, funders can help accelerate the transition to a cleaner and more sustainable energy future.
Aim and objectives of Decision	Aim of decision: Objectives of decision: ● Reduce electricity power ● More people use energy from solar panels ● Increase electric vehicles and charging stations
Main beneficiaries from this decision	● Lower Energy Costs: One of the most significant benefits of solar panel funding is the potential for lower energy costs. Once solar panels are installed, they can generate clean energy for many years, reducing or eliminating the need to purchase electricity from the grid. This can result in substantial savings on energy bills over time. ● Environmental Benefits: Solar panels generate electricity using sunlight, a renewable and sustainable resource. By using solar panels, individuals and communities can reduce their carbon footprint and contribute to the fight against climate change. ● Increased Property Value: Homes and businesses with solar panels installed often have increased property values, as potential buyers or renters may be willing to pay more for properties with lower energy costs and a reduced carbon footprint. ● Job Creation: The installation and maintenance of solar panels can create jobs in various industries, including manufacturing, installation, and maintenance. This can help support local economies and create new employment opportunities. ● Energy Independence: Solar panel funding can help individuals and communities become more energy independent by generating their own electricity. This can reduce dependence on foreign oil and other non-renewable energy sources, and increase energy security.
Impact of	● Environmental impact: Solar panels produce clean energy without emitting harmful

decision on the city	pollutants, which can help reduce the city's carbon footprint and improve air quality. • Economic impact: Investing in solar panels can create jobs in the installation, maintenance, and management of solar energy systems. Additionally, it can help reduce energy costs for city-owned buildings, which can save money in the long run. • Community impact: Solar panels can help increase the resiliency of the city's energy infrastructure and reduce the risk of power outages. It can also demonstrate the city's commitment to sustainability, which can improve community morale and attract businesses and residents who prioritize environmental responsibility.
Advantages of the decision	• Cleaner air • Low traffic • More public transportation
Weaknesses of the decision *(E.g. complexity etc.)*	• Expensive • Willingness might be low • Time consuming

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4.6   Energy monitoring systems

Title of Decision	Energy monitoring systems
Short description of decision	This tool allows players to track and manage their in-game energy consumption. It typically displays information such as the amount of energy remaining, the rate of energy depletion, and the sources of energy consumption. This system can help players make strategic decisions about their energy usage, such as which actions or abilities to prioritize based on their energy cost. It may also provide feedback on energy efficiency, such as suggesting ways to reduce energy usage or rewarding players for energy-saving behaviors. The goal of an energy monitoring system in a video game is to enhance the player's experience by promoting engagement, challenge, and resource management skills, while also raising awareness about energy conservation and sustainability.
Aim and objectives of Decision	Aim of decision: ● Enhancing player experience: By allowing players to manage their energy consumption, an energy monitoring system can help to create a more immersive and engaging gameplay experience. Players must strategize and prioritize their actions based on their energy usage, adding an extra layer of challenge and decision-making to the game. ● Promoting energy efficiency: By providing feedback on energy usage, an energy monitoring system can encourage players to adopt energy-saving behaviors, such as using lower-cost abilities or taking breaks to recharge. This can help to raise awareness about energy conservation and promote sustainable habits. ● Providing data for analysis: An energy monitoring system can generate data on player behavior and energy usage, which can be analyzed to improve the game's design, balance, and player experience. This data can also be used to inform research on energy conservation and behavior change.
Main beneficiaries from this decision	● Players: Players are the primary beneficiaries of an energy monitoring system, as it allows them to better manage their in-game energy consumption, prioritize actions based on energy cost, and improve their overall gameplay experience. By learning how to conserve energy, players can also develop skills that are transferable to real-world situations, such as resource management and energy conservation. ● Energy efficiency organizations: Energy efficiency organizations may also benefit from an energy monitoring system in a video game, as it can help to promote awareness about energy conservation and sustainable habits among players. By encouraging players to adopt energy-saving behaviors, an energy monitoring system can help to reduce energy consumption and carbon emissions, which can have positive environmental impacts.

Impact of decision on the city (min. 150 and max. 250)	- Enhanced gameplay experience: An energy monitoring system can add an additional layer of strategy and decision-making to a game, enhancing the overall gameplay experience. Players must carefully manage their energy consumption, prioritize actions based on energy cost, and develop resource management skills. - Increased engagement: By providing real-time feedback on energy consumption, an energy monitoring system can increase player engagement and motivation. Players are encouraged to experiment with different play styles, explore alternative energy sources, and develop energy-saving habits, leading to increased interest and investment in the game. - Improved sustainability awareness: An energy monitoring system can help to raise awareness about energy conservation and sustainability among players, encouraging them to adopt energy-saving behaviors both in-game and in the real world. This can have positive environmental impacts, such as reduced energy consumption and carbon emissions. - Valuable data analysis: An energy monitoring system can generate data on player behavior and energy usage, which can be analyzed to improve game design, balance, and player experience. This data can also be used to inform research on energy conservation and behavior change.
Advantages of the decision	- Enhanced gameplay experience: An energy monitoring system can add an additional layer of strategy and decision-making to a game, making it more challenging and engaging for players. - Improved sustainability awareness: By promoting energy conservation and sustainability, an energy monitoring system can raise awareness about these issues among players and encourage them to adopt energy-saving behaviors both in-game and in real life. - Data collection and analysis: An energy monitoring system can generate valuable data on player behavior and energy usage, which can be analyzed to improve game design, balance, and player experience. This data can also be used for research on energy conservation and behavior change. - Energy efficiency: By encouraging players to adopt energy-saving behaviors, an energy monitoring system can help reduce energy consumption and carbon emissions associated with video game play. - Competitive advantage: A game that incorporates an energy monitoring system can differentiate itself from other games, attracting players who are interested in sustainability and energy conservation.
Weaknesses of the	Sometimes difficult to install

decision *(E.g. complexity etc.)*	

Application for the Development of a Green and Smart City

Promotional poster

INSTALL AN ENERGY MONITORING SYSTEM

AND HELP US SAVE THE ENVIRONMENT!

WHY SHOULD WE SAVE ENERGY?

By saving energy, we help our environment to stay clean and reduce pollution that damages nature.

PLEASE TURN OFF THE LIGHTS!

Lighting accounts for a significant amount of energy costs and using light from the sun is an intuitive way to reduce your energy consumption.

4.7   Remote work promotion

Title of Decision	Remote work promotion
Short description of decision	Remote work promotion refers to the encouragement of employees and organizations to adopt a work arrangement that allows employees to work outside of a traditional office setting. This can include working from home, co-working spaces, or other locations outside of a centralized office. Remote work has become increasingly popular in recent years due to advances in technology that make it easier to communicate and collaborate with colleagues from a distance. Promoting remote work can offer many benefits for both employers and employees. For example, remote work can reduce costs associated with office space, commuting, and other related expenses. It can also provide greater flexibility for employees to balance work and personal responsibilities, which can lead to increased job satisfaction and reduced burnout. Remote work can also help organizations attract and retain top talent by offering greater work-life balance and flexibility. It can also promote diversity and inclusion by allowing individuals with disabilities or other constraints to participate in the workforce. However, remote work promotion can also present challenges, such as maintaining effective communication and collaboration, ensuring data security, and maintaining a positive company culture. Therefore, organizations need to carefully consider the advantages and disadvantages of remote work before implementing such arrangements. In summary, remote work promotion refers to the encouragement of remote work arrangements, which can offer many benefits for both employers and employees. However, it also presents challenges that need to be carefully considered and addressed.
Aim and objectives of Decision	The aim and objectives of promoting remote work can vary depending on the organization and its specific goals. However, some common objectives include: ● Increased productivity: Remote work can provide employees with greater flexibility and autonomy, which can lead to increased productivity and performance. ● Cost savings: Promoting remote work can reduce costs associated with office space, commuting, and other expenses. ● Improved work-life balance: Remote work can allow employees to better balance their work and personal responsibilities, leading to improved job satisfaction and reduced burnout. ● Attracting and retaining top talent: Offering remote work arrangements can help organizations attract and retain top talent by providing greater work-life

	balance and flexibility.
	● Environmental benefits: Remote work can also have environmental benefits by reducing the need for commuting and associated carbon emissions.
	● Business continuity: Remote work arrangements can also provide a level of business continuity in the event of unforeseen circumstances, such as natural disasters or pandemics.
	In summary, the aim and objectives of promoting remote work can include increased productivity, cost savings, improved work-life balance, attracting and retaining top talent, environmental benefits, and business continuity. By promoting remote work arrangements, organizations can create a more flexible and adaptable work culture that benefits both employees and the organization as a whole.
Main beneficiaries from this decision	The main beneficiaries of promoting remote work are diverse and can include:
	● Employees: Remote work can offer employees greater flexibility and autonomy, leading to improved work-life balance, reduced commuting time and costs, and potentially increased job satisfaction.
	● Employers: Employers can benefit from promoting remote work by reducing costs associated with office space and facilities, increasing productivity and employee retention, and potentially attracting top talent from a wider pool of candidates.
	● Environment: Remote work can help reduce carbon emissions by reducing the need for commuting, leading to positive environmental impacts.
	● Local communities: Remote work can also benefit local communities by reducing traffic congestion, potentially reducing air pollution, and providing economic benefits to areas where remote workers choose to live.
	● Individuals with disabilities: Remote work can provide greater accessibility and opportunities for individuals with disabilities, who may face challenges with traditional office settings.
	● Caregivers: Remote work can provide greater flexibility and support for individuals who have caregiving responsibilities, such as caring for children or elderly relatives.
	In summary, promoting remote work can have a wide range of beneficiaries, including employees, employers, the environment, local communities, individuals with disabilities, and caregivers. By promoting remote work arrangements, organizations can create a more flexible and inclusive work culture that benefits a wide range of stakeholders.
Inclusive Methodology (e.g. For people	Promoting remote work can also involve implementing inclusive methodologies to ensure that individuals with disabilities have equal access to remote work opportunities. This can include providing accommodations such as assistive

with disabilities etc.)	technology, flexible work arrangements, and accessible digital platforms. Remote work can offer many benefits for individuals with disabilities, including greater flexibility to accommodate medical appointments and reducing the need for physical accommodations in a traditional office setting. However, remote work can also present new challenges for individuals with disabilities, such as the need for accessible technology and the potential for isolation or lack of social interaction. To ensure that remote work opportunities are inclusive for individuals with disabilities, organizations can take a variety of steps. For example: ● Providing assistive technology: Organizations can provide assistive technology such as screen readers, speech-to-text software, and ergonomic equipment to support individuals with disabilities. ● Offering flexible work arrangements: Remote work can provide greater flexibility to accommodate medical appointments or other needs. Organizations can also offer flexible work schedules or part-time opportunities to support individuals with disabilities. ● Ensuring accessibility: Organizations can ensure that digital platforms and communication channels are accessible to individuals with disabilities by following accessibility guidelines, providing captions for video content, and offering alternative formats for written materials. ● Encouraging social interaction: Remote work can potentially lead to social isolation, which can be particularly challenging for individuals with disabilities. Organizations can promote virtual social interaction, such as online communities or video conferences, to promote social connection and a sense of community. In summary, promoting remote work can offer many benefits for individuals with disabilities, but it is important to ensure that remote work opportunities are inclusive and accessible. By implementing inclusive methodologies and providing accommodations as needed, organizations can create a more equitable and supportive work environment for individuals with disabilities.
Impact of decision on the city	The impact of promoting remote work on the city can be significant. One potential impact is the reduction in traffic congestion and air pollution, as remote work can reduce the number of commuters on the road. This can have positive effects on the environment and public health. In addition, promoting remote work can also impact the local economy. Remote workers may choose to live in areas outside of city centers, which can lead to increased economic activity in suburban and rural areas. This can provide economic benefits to these areas and help to redistribute economic activity more evenly

	across the region.
	Furthermore, remote work can also impact the demand for office space in the city center, potentially leading to a decrease in demand and reduced costs for businesses. This can free up space for other uses and potentially lead to more diverse and vibrant urban neighborhoods.
	Overall, promoting remote work can have a range of impacts on the city, including positive effects on the environment, public health, and the economy. However, it is important to consider potential trade-offs and to implement policies and strategies that ensure a balanced and equitable approach to remote work promotion.
Advantages of the decision	Promoting remote work can offer several advantages, including:
	● Increased productivity: Remote workers can have fewer distractions and interruptions, leading to increased productivity and efficiency.
	● Greater flexibility: Remote work can offer employees greater flexibility to balance work and personal responsibilities, leading to improved work-life balance and potentially reducing stress and burnout.
	● Cost savings: Remote work can reduce costs associated with office space and facilities, such as rent, utilities, and maintenance, leading to potential cost savings for employers.
	● Improved employee retention: Remote work can offer employees greater job satisfaction and work-life balance, leading to increased employee retention and potentially reducing recruitment and training costs for employers.
	● Access to a wider talent pool: Remote work can potentially attract top talent from a wider pool of candidates, including those who may not be able to work in a traditional office setting due to location, transportation, or other constraints.
	● Positive environmental impact: Remote work can reduce carbon emissions by reducing the need for commuting, leading to positive environmental impacts.
	Overall, promoting remote work can offer many advantages for both employees and employers, including increased productivity, flexibility, cost savings, improved employee retention, access to a wider talent pool, and positive environmental impacts.
Weaknesses of the decision *(E.g. complexity etc.)*	While promoting remote work can offer many advantages, there are also potential weaknesses and challenges that organizations and individuals may face, including:
	● Technical difficulties: Remote work relies heavily on technology and digital platforms, which can be subject to technical difficulties such as network disruptions, hardware malfunctions, and cybersecurity threats. These issues can impact productivity and may require significant technical support.

- Communication challenges: Communication among remote workers and with managers can be more challenging due to the lack of face-to-face interaction. This can lead to misunderstandings and miscommunications that may impact productivity and collaboration.
- Isolation and loneliness: Remote work can be isolating, which can impact mental health and well-being. Workers may miss out on the social connections and sense of community that comes with working in a traditional office setting.
- Potential for overwork: Remote work can blur the lines between work and personal life, leading to potential for overwork and burnout. It can be difficult for workers to establish clear boundaries between work and personal time, leading to potential for stress and fatigue.
- Inequities and disparities: Remote work may not be accessible or feasible for all workers, particularly those with disabilities or those who lack access to reliable technology or internet connectivity. This can create inequities and disparities in access to remote work opportunities.

Overall, promoting remote work can face challenges related to technical difficulties, communication, isolation and loneliness, potential for overwork, and potential for inequities and disparities. Organizations and individuals must carefully consider these challenges and develop strategies to address them in order to effectively promote remote work.

Promotional poster

4.8 Saving water

Title of Decision	Saving water
Short description of decision	Saving water means using water efficiently and responsibly to reduce wastage and preserve this valuable natural resource. It involves adopting practices that minimize water consumption in homes, industries, agriculture, and other sectors. Water conservation is becoming increasingly crucial due to the rapidly growing population and the adverse effects of climate change. According to the United Nations, by 2025, nearly two-thirds of the global population could be under stress due to water scarcity. Hence, saving water is not an option but a necessity for our survival. There are several ways to save water, such as fixing leaky pipes, installing low-flow fixtures, reducing shower time, using a bucket instead of a hose to wash cars, planting drought-resistant plants, and harvesting rainwater. These practices not only save water but also reduce water bills, energy bills, and carbon footprint. Water conservation has numerous benefits, including preserving ecosystems, reducing pollution, mitigating the impacts of droughts, and promoting economic growth. For instance, water-efficient technologies and practices can save industries millions of dollars in water and energy costs, creating jobs and boosting the economy. In conclusion, saving water means using water wisely and responsibly to meet our present and future needs while preserving this valuable natural resource. It is a collective responsibility that requires individual and collective actions to ensure a sustainable future for all.
Aim and objectives of Decision	The aim of the decision of saving water is to promote responsible and efficient use of this valuable natural resource to meet present and future needs while preserving ecosystems and promoting sustainable development. The objectives of the decision to save water include: ● Reducing water wastage: By adopting practices that minimize water consumption, we can reduce wastage and ensure that water is available for future generations. ● Mitigating the impacts of climate change: Saving water can help mitigate the impacts of climate change, such as droughts, floods, and water scarcity, by promoting water efficiency and conservation. ● Promoting sustainable development: Water conservation can promote sustainable development by ensuring the availability of water for human needs and ecosystems, reducing pollution, and promoting economic growth. ● Preserving ecosystems: Water is essential for the survival of ecosystems, and saving water can help preserve them and the biodiversity they support.

	● Ensuring food security: Agriculture is the largest water user, and saving water can help ensure food security by promoting efficient irrigation practices and reducing water use in food production. Overall, the decision to save water aims to promote responsible and sustainable use of this vital resource to ensure a sustainable future for all.
Main beneficiaries from this decision	The main beneficiaries of the decision to save water are: ● People: Saving water benefits people by ensuring that there is enough water available for their daily needs, such as drinking, cooking, and hygiene. It also helps mitigate the impacts of climate change, such as droughts and floods, which can have severe consequences for human well-being. ● Ecosystems: Water is essential for the survival of ecosystems, and saving water can help preserve them and the biodiversity they support. Healthy ecosystems provide numerous benefits, such as clean air and water, climate regulation, and recreation. ● Industries: Water is a critical input for many industries, and saving water can help reduce their water and energy costs, creating jobs and boosting the economy. ● Agriculture: Agriculture is the largest water user, and saving water can help ensure food security by promoting efficient irrigation practices and reducing water use in food production. ● Future generations: Saving water is crucial for future generations' well-being by ensuring that there is enough water available for their needs and preserving ecosystems for their enjoyment and use. In summary, the decision to save water benefits people, ecosystems, industries, agriculture, and future generations by promoting responsible and sustainable use of this vital resource.
Inclusive Methodology (e.g. For people with disabilities etc.)	Water-saving initiatives should be inclusive of people with disabilities to ensure that everyone has equal access to water and can contribute to water conservation efforts. Here are some ways to make water-saving initiatives more inclusive for people with disabilities: ● Accessible information: Information about water-saving initiatives should be accessible to people with disabilities. This can include using plain language, providing information in multiple formats such as Braille or audio, and ensuring that websites and documents are accessible. ● Accessible infrastructure: Infrastructure such as water-saving devices and fixtures should be designed to be accessible to people with disabilities. This can include installing grab bars near sinks and toilets, lowering faucet handles,

	and using accessible designs for rainwater harvesting systems.
	● Inclusive participation: People with disabilities should be included in water-saving initiatives and their perspectives and needs should be considered. This can include involving people with disabilities in water conservation education and training programs, and providing opportunities for them to participate in water-saving activities such as rainwater harvesting.
	● Consideration of specific needs: People with different types of disabilities have different needs. For example, people with mobility impairments may need assistance to access water-saving devices, while people with visual impairments may need information in alternative formats. Water-saving initiatives should take into account these specific needs and provide appropriate accommodations.
Impact of decision on the city	The decision to save water can have a significant impact on a city, both in the short and long term. Here are some of the impacts of saving water on a city:
	● Water availability: By saving water, a city can ensure that there is enough water available to meet the needs of its residents, businesses, and industries. This can help prevent water shortages, reduce the need for water rationing, and promote water security.
	● Reduced water bills: Saving water can also help reduce water bills for residents and businesses by promoting efficient use of water and reducing wastage. This can help alleviate financial burdens and increase disposable income for households and businesses.
	● Improved infrastructure: Saving water can also lead to improvements in water infrastructure, such as the repair and maintenance of water supply and distribution systems. This can lead to improved water quality, reduced leaks, and more reliable water supply.
	● Mitigating climate change impacts: Saving water can also help mitigate the impacts of climate change, such as droughts and floods. By reducing water use, a city can help ensure that water is available during periods of water scarcity and reduce the risk of flooding during heavy rainfall events.
	● Preserving ecosystems: Saving water can also help preserve ecosystems by reducing water withdrawals from rivers, lakes, and other water sources. This can help maintain aquatic habitats, reduce pollution, and promote biodiversity.
	In summary, the decision to save water can have a range of positive impacts on a city, including increased water availability, reduced water bills, improved infrastructure, mitigated climate change impacts, and preserved ecosystems. By promoting sustainable water use, a city can contribute to a more resilient and

	sustainable future for its residents and the environment.
Advantages of the decision	The decision to save water has numerous advantages, including:
	● Environmental benefits: Saving water can help protect the environment by reducing water pollution, preserving aquatic habitats, and conserving natural resources. This can also help mitigate the impacts of climate change by reducing the carbon footprint associated with water treatment and transportation.
	● Financial benefits: Saving water can also have financial benefits, such as reducing water bills for households, businesses, and industries. It can also help reduce costs associated with repairing and maintaining water infrastructure, such as pipes and treatment plants.
	● Improved public health: Saving water can also improve public health by reducing the risk of waterborne illnesses and improving the quality of drinking water. This can lead to a healthier population and reduced healthcare costs.
	● Increased water security: Saving water can help ensure that there is enough water available to meet the needs of a growing population, industries, and agriculture. This can help promote water security and reduce the risk of water scarcity and drought.
	● Social benefits: Saving water can also have social benefits, such as promoting community engagement and education around sustainable water use. It can also lead to improved quality of life, as access to clean and reliable water is essential for many daily activities, such as cooking, cleaning, and personal hygiene.
	In summary, the decision to save water has numerous advantages, including environmental, financial, public health, water security, and social benefits. By promoting sustainable water use, communities can contribute to a more resilient and sustainable future for all.
Weaknesses of the decision *(E.g. complexity etc.)*	While saving water has many advantages, there are also potential weaknesses associated with the decision. Here are some examples:
	● Complex implementation: Saving water often requires significant changes in water use behavior and may involve the installation of water-saving devices and infrastructure. Implementing such changes can be complex and challenging, requiring significant investment of time and resources.
	● Potential cost: While saving water can lead to financial benefits, it may also require some initial investment in water-saving devices and infrastructure. This may be a barrier for some households and businesses, particularly those with limited financial resources.
	● Water quality concerns: In some cases, water-saving measures such as

rainwater harvesting or greywater reuse can pose potential health risks if not implemented properly. This may require additional education and training to ensure that water quality is not compromised.

- Potential inequities: Water-saving initiatives may not be equally accessible to all communities and may disproportionately benefit certain groups. For example, low-income households may not be able to afford water-saving devices or may lack access to education and training on sustainable water use.
- Limited impact: Water-saving measures may have a limited impact on water use and conservation if not implemented on a large scale. This may require coordinated efforts from multiple stakeholders, including governments, businesses, and households.

In summary, while the decision to save water has many advantages, there are also potential weaknesses such as complex implementation, potential cost, water quality concerns, potential inequities, and limited impact. It is important to consider these weaknesses and develop strategies to address them when implementing water-saving initiatives.

4.9   Stop littering

Title of Decision	Stop littering
Short description of decision	Littering is any kind of trash thrown away in small amounts, especially in places where it doesn't belong. In addition to its negative environmental and health impacts, litter abatement costs local and state governments millions of Euro each year. It also portrays a bad picture of the area. The most frequently littered items include fast food packaging, cigarette butts, used drink bottles, chewing gum wrappers, broken electrical equipment parts, toys, broken glass, food scraps, or green waste. Littering is a dangerous activity and it impacts the environment in multiple ways.
Aim and objectives of Decision	Aim of decision: Littering causes problems and has serious consequences for the environment and the community. People intentionally litter due to: ● Laziness or carelessness ● Lack of access to trash receptacles ● Lenient law enforcement ● Presence of litter already in the area People have become too lazy and unwilling to throw away trash appropriately. It is common to see people discard trash out of their kitchen windows or balconies, probably because they are too lazy to put it in the rightful places. People who litter out of laziness or carelessness often believe that someone else (a maintenance worker or park employee) will come along and pick up the litter and dispose of it properly. Others may not have been educated on the impact of littering and therefore litter because they don't know it causes harm, while still others may live in an area where littering is an accepted part of the culture. This type of littering behavior is often the hardest to combat. Objectives of decision: ● Raising awareness of the environmental protection. ● Give the opportunity to acquire an ecological and caring approach to their surrounding environment and to nature and society. ● Understanding of how people, nature and society affect each other, and also of how different choices people make in everyday life can contribute to sustainable development. ● Addresses a real world issue, gives the opportunity for students and adults to work together, a hands on experience, that teaches respect for

	the environment responsibilities, recycling, sustainable development
Main beneficiaries from this decision	Citizens, communities, environment
Inclusive Methodology (e.g. For people with disabilities etc.)	The project drew on a theoretical framework encompassing four psycho-social principles: values, embodied learning, efficacy, and perceived social norms. Environmental education is a lifelong process to acquire knowledge and skills that can influence pro-environmental behaviour, environmental activism, and disaster-risk management. Disabled people are impacted by environmental issues, environmental activism, and how environmental education is taught. Including people with disabilities in everyday activities and encouraging them to have roles similar to their peers who do not have a disability is disability inclusion is one of the basis. There should be developed an approach in the process of education and upbringing, the aim of which is to increase the educational opportunities of all learners by providing them with conditions to develop their individual potential, so that in the future they will be able to fully develop their personal skills and be fully included in social life.
Impact of decision on the city	Littering is a huge environmental threat one can witness in all urban areas. Streets, sidewalks, parking lots, roads and highways are mostly covered with food wrappers, soft drink and water bottles, plastic bags, handbills, cigarette butts, tissues, papers etc. Litter affects the environment negatively and the major impacts involve the danger to public health, endangering, or killing wildlife and serious damage to waterways, oceans and marine life. This project could give all children the opportunity to acquire an ecological and caring approach to their surrounding environment and to nature and society. An understanding of how people, nature and society affect each other, and also of how different choices people make in everyday life can contribute to sustainable development. Proper habits formed since childhood represent the ideal head start to help keep the environment clean, although this is not a standalone vital factor for a person to dislike littering behaviour.
Advantages of the decision	● To keep the schools-preschool and neighbourhood litter-free. ● To give students a hands-on experience that teaches them responsibility skills and gives a respect for the environment and their surroundings.

	● To encourage children to take pride in their school and neighbourhood. ● Raise public awareness regarding litter. ● Plan litter picking activities in and outside of the school/home/neighbourhood. ● Recycling will introduce students to the three environmental R's recycle, reuse and reduce and also to a circular economy. ● Students become Litter-Free Ambassadors to take the message home to their siblings, parents and grandparents. ● The school /preschool can initiate programmes like" stop littering" in the neighbourhood and the staff and the students can spend some compulsory hours every week doing community work to clean up the area. ● Involve parents to take action in the preschool/school/creche/ neighbourhood litter free programmes. ● Development pedagogical material for different ages ● Fact material for teachers ● Emigrate the ideas to neighbouring schools, preschools and creches ● Study visits for students to landfills ● Study visits for students to recycling centers ● Safety aspects and risk assessment.
Weaknesses of the decision *(E.g. complexity etc.)*	● Raise awareness of the problem with emphasis that the best action to take is to not litter in the first place. ● Provide tools and programs for people to take part in clean-up activities. ● Train, empower and employ people to recycle collected waste.
Additional comments for the integration of the decision in the Cities Going Green App	The project will give children the opportunity to learn about the environment and the role they can play in improving it. A concrete and important environmental issue such as littering is a good pedagogical starting point in learning for sustainable development. To educate students about the effects of litter and influencing attitudes are key steps towards behaviour change and litter reduction in the community as a whole. Awareness: to help individuals and social groups acquire an awareness of and sensitivity to the total environment and its allied problems. Knowledge: to help individuals and social groups acquire basic understanding of the total environment, its associated problems and humanity's critically responsible presence and role in it. Attitude: to help individual and social groups acquire social values, strong feelings of concern for the environment and the motivation for actively participating in its protection and improvement.

Skills: to help individuals and social groups acquire the skills for solving environmental problems.

Evaluation ability: to help individuals and social groups evaluate environmental measures and education programs in terms of ecological, political, economic, social, esthetic and educational factors.

Participation: to help individuals and social groups develop a sense of responsibility and urgency regarding environmental problems to ensure appropriate action to solve those problems

5 Game Design

5.1 Concept

The user is presented with an already built city. The city has some empty blocks for the user to exploit.

Figure 1: City game concept

5.2 User Actions

The user can intervene in the city life by:

5.2.1 Building large scale buildings.

The building that the user can build will be:

- **Recycling Plant:** A recycling plant, also known as a materials recovery facility (MRF), is a facility that processes and sorts recyclable materials (e.g. paper, glass, plastic etc) collected from households, businesses, and other sources. The purpose of a recycling plant is to sort and separate different types of materials so that they can be processed into new products.

- **Solar Panel Park:** A solar panel park, also known as a solar farm or solar power plant, is a large-scale installation of solar panels used to generate electricity from the sun's energy. Solar panel

parks can range in size from a few acres to several hundred acres and may consist of thousands of individual solar panels.
- **Waste Management Plant:** A waste management facility is a facility designed to manage and process waste materials, including solid waste, hazardous waste, and electronic waste. These facilities are responsible for collecting, transporting, processing, and disposing of waste materials in a safe and environmentally responsible manner.
- **Wind Energy Park:** A wind energy park, also known as a wind farm or wind power plant, is a group of wind turbines that are used to generate electricity from the wind. Wind energy parks can range in size from a few turbines to hundreds of turbines, and they are typically located in areas with consistent and strong wind patterns, such as onshore or offshore locations.

Each one of these buildings has 3 levels. As the player levels-up a building, the budget needed for each level rises as well as the impact to the city.

Figure 2: Selecting which buildings to build

5.2.2   Doing Upgrades

Apart from large buildings the player also has the choice to spend their money to upgrades for the city.

These include:

- **Bicycle Roads:** Cycling infrastructure is all infrastructure cyclists are allowed to use. Bikeways include bike paths, bike lanes, cycle tracks, rail trails and, where permitted, sidewalks. Roads used by motorists are also cycling infrastructure, except where cyclists are barred such as many freeways/motorways. It includes amenities such as bike racks for parking, shelters, service centers and specialized traffic signs and signals. The more cycling infrastructure, the more people get about by bicycle.
- **Environmental Center:** An environmental center is a facility that focuses on environmental education, conservation, and sustainability. These centers may be run by government agencies, non-profit organizations, or private entities. They typically offer educational programs, exhibits, and hands-on activities related to the environment, as well as resources and information about local ecosystems, flora, fauna etc.
- **Parks:** A city park is a public space in an urban area that is designed and maintained for recreational purposes. City parks are typically owned and operated by the local government and can range in size from small playgrounds to large green spaces. They may contain a variety of amenities such as playgrounds, sports fields, picnic areas, walking and biking trails, and nature areas.
- **Recharging Stations:** A car recharging station, also known as an electric vehicle charging station, is a specialized infrastructure that supplies electric energy to recharge the batteries of electric cars and plug-in hybrids. These stations are designed to provide a safe and efficient way for drivers to recharge their vehicles while they are parked, whether at home or in public locations.
- **Recycle Bins:** Recycling bins are an important part of the recycling process, as they allow for the efficient collection and sorting of recyclable materials. By using recycling bins and properly sorting recyclable materials, people can help to reduce waste, conserve resources, and protect the environment.
- **City street trees:** City street trees are typically planted and maintained by municipal governments, and they may be chosen based on factors such as their size, growth rate, and ability to thrive in urban environments. Common types of street trees include maples, oaks, elms, and sycamores, among others.

These upgrades also have visual impact to the city.

5.2.3   Running Campaigns

The users can also use their budget on some campaigns to improve the city.

Every campaign has different levels. Higher levels are more difficult to achieve.

These include:

- **Car Withdrawal:** A car withdrawal campaign is a program or initiative aimed at encouraging owners of old and potentially dangerous cars to trade them in for newer, safer, and more fuel-efficient models. These campaigns are often implemented by government agencies or private organizations as part of efforts to reduce air pollution, improve road safety, and promote sustainable transportation.

- **Bicycle funding:** A bicycle funding campaign is an initiative aimed at raising funds to support the development, promotion, and accessibility of bicycles for transportation, recreation, and exercise. This campaign will help reduce the air pollution, decrease traffic and promote green practices.

- **Solar panel funding:** A solar panel funding campaign aims to accelerate the transition to a sustainable energy future by providing the necessary resources and support to make solar energy more accessible, affordable, and widely adopted. The goal of solar panel funding is to promote the use of renewable energy sources, reduce dependence on fossil fuels, and mitigate the environmental impact of energy consumption.

- **Energy monitoring system: A**n energy monitoring systems campaign is an initiative aimed at promoting the adoption of systems and technologies that monitor and manage energy use in homes, businesses, or communities. These campaigns may be organized by government agencies, non-profit organizations, or private companies to increase awareness of energy consumption and encourage energy efficiency.

- **Recycling campaign:** A recycling campaign may involve providing education and resources on recycling practices, promoting the use of recycling facilities and services, or offering incentives for recycling. Recycling can help conserve natural resources, reduce greenhouse gas emissions, and create jobs in the recycling industry.

- **Remote work promotion:** A remote work promotion campaign may involve providing education and resources on remote work practices, promoting the use of communication technologies that enable remote work, or offering incentives for companies to adopt remote work policies. Remote work arrangements can offer benefits such as increased flexibility, reduced commuting time and costs, and improved work-life balance.

- **Saving water:** A saving water campaign may involve providing education and resources on water conservation practices, promoting the use of water-efficient appliances and devices, or offering financial incentives for the installation of water-saving technologies such as low-flow showerheads or rainwater harvesting systems. Water-saving behaviors such as fixing leaks, reducing shower time, and using drought-tolerant landscaping may also be promoted.

- **Zero Waste Promotion:** A zero-waste promotion campaign may involve providing education and resources on zero-waste practices, promoting the use of reusable products and packaging, or offering incentives for companies to adopt zero-waste policies. Zero waste practices can help conserve natural resources, reduce greenhouse gas emissions, and create jobs in the recycling industry.

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- **Stop Littering:** A stop littering campaign may involve providing education and resources on proper waste disposal practices, promoting the use of waste bins and recycling facilities, or offering incentives for individuals and communities to participate in litter cleanup events. Littering can have negative impacts on the environment, wildlife, and public health, and responsible waste disposal practices can help reduce these impacts.

Figure 3" Examples of lists of available campaigns

Campaigns example:

Car withdrawal

Level 1: Air Quality +10, Life Quality +10, Price: 10,000

Level 2: Air Quality +15, Life Quality +15, Price: 20,000
Level 3: Air Quality +17, Life Quality +17, Price: 30,000

5.3 Game Mechanics

5.3.1 City Values

The following categories of the city will increase or decrease based on the user decisions:

1. Air Quality
2. Recycling
3. Water Quality
4. Life Quality

5.3.2 Intervals

The gameplay revolves around distinct intervals that dictate the progression and development of the player's city. These intervals are defined as specific periods of time, such as days, weeks, months, or game rounds. At the beginning of each interval, the player is presented with the opportunity to manage and upgrade their city. Throughout the interval, players are given a certain amount of credits, this allows players to invest strategically in various city upgrades, ranging from building new structures to enhancing existing infrastructure.

5.3.3 Achievements

As the player enhances their city's quality scores through various actions and upgrades, they will be rewarded with achievements. These achievements act as a triple-purpose system, functioning both as a rewarding mechanism, as a guideline for the intended gameplay progression and as a showcase of accomplishments.

1. **Reward Mechanism**: Achievements are designed to recognize and celebrate the player's accomplishments throughout the game. When the player successfully improves specific quality scores or completes significant milestones, they unlock corresponding achievements. This creates a sense of fulfillment and satisfaction for the player, reinforcing positive gameplay behavior and strategic decision-making.

2. **Guideline for Gameplay**: The achievements also play a role in guiding the player on how the game is intended to be played. They serve as targets and objectives, encouraging players to explore different aspects of city management, engage with various gameplay mechanics, and pursue diverse strategies to succeed in the game. By setting clear goals and objectives, achievements provide a sense of direction and purpose to the player, helping them understand the core features and intricacies of the game.

3. **Showcase of Accomplishments**: The achievements earned by the player can be showcased in a dedicated "Achievement Gallery" or profile section, providing a sense of pride and accomplishment. This allows players to compare their progress with friends and other players, fostering healthy competition and community engagement.

5.3.4   Gamification

Basic achievements(badges) that the users will get as rewards from playing the game and their decisions' affect on the city values (depending on the scores of the city value) are:

- **Air quality**
  - o Aero Knight: Achieve Air Quality 400
  - o Sky Guardian: Achieve Air Quality 800
  - o Ozone Warrior: Achieve Air Quality 1200
  - o Aerial Hero: Achieve Air Quality 1600
  - o Airbender Champion: Achieve Air Quality 2000
- **Water quality**
  - o Water Knight: Achieve Water Quality 250
  - o Hydro Guardian: Achieve Water Quality 500
  - o Aquatic Warrior: Achieve Water Quality 750
  - o Oceanic Hero: Achieve Water Quality 1000
  - o Aqua Champion: Achieve Water Quality 1250
- **Recycling:**
  - o Waste Knight: Achieve Recycling Quality 350
  - o Recycling Guardian: Achieve Recycling Quality 700
  - o Trash Warrior: Achieve Recycling Quality 1000
  - o Reprocessing Hero: Achieve Recycling Quality 1350
  - o Sustainable Champion: Achieve Recycling Quality 1700
- **Life quality:**
  - o Zen Knight: Achieve Life Quality 400
  - o Wellbeing Guardian: Achieve Life Quality 800
  - o Empowered Warrior: Achieve Life Quality 1200
  - o Healthful Hero: Achieve Life Quality 1600
  - o Gratitude Champion: Achieve Life Quality 2000
- **Dual Achievements**
  - o Aero&Water Knight: AirWater_1 Achieve AirQuality 600 and WaterQuality 400
  - o Sky&Hydro Guardian: AirWater_2 Achieve AirQuality 1200 and WaterQuality 800
  - o Ozone&Aquatic Warrior: AirWater_3 Achieve AirQuality 1800 and WaterQuality 1200
  - o Recycling&Life Knight: Achieve RecyclingQuality 500 and Life Quality 600
  - o Recycling&Life Guardian: Achieve RecyclingQuality 1000 and Life Quality 1200
  - o Recycling&Life Warrior: Achieve RecyclingQuality 1500 and Life Quality 1800

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- **Quadra Achievements**
    - City Knight: AirQuality 500, Water Quality 300, Recycling 400, Life Quality 500
    - City Guardian: AirQuality 1000, Water Quality 600, Recycling 800, Life Quality 1000
    - City Warrior: AirQuality 1500, Water Quality 1200, Recycling 1400, Life Quality 1500

Example of text of the badges:

- level 1: Well done! You improved "quality"
- level 2: Keep up the good work! You improved "quality" further!
- level 3: Great! Your citizens are happy about "quality"
- level 4: Excellent! You are close to become the ultimate champion in "quality"
- level 5: Congratulations! You are officially the "quality" CHAMPION