



ClairCity: Citizen-led air pollution reduction in cities

D4.9 Fully functional ClairCity Skylines (GAME) -LAST CITY

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Document Details

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Description	An overview of the final multilanguage version of ClairCity Skylines and its underlying systems, available to partners since January 2019. The game now includes the following regions/cities: Bristol, Amsterdam, Ljubljana, Sosnowiec, Aveiro and Liguria in local languages with wide-spread availability via app stores to stakeholders.

Version History

Version	Updated By	Date	Changes / Comments
V1.0	Andrew King	28/01/2019	First version
V1.1	Andrew King	01/02/2019	Minor proofing
V1.2	Enda Hayes	03/02/2019	Final edit

Contributions and Acknowledgements

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Executive Summary

ClairCity Skylines is a serious game, designed to capture citizen decision making about issues in their city, where players travel between areas representing the city’s environment, economy and its citizens health & satisfaction collecting ideas for policies to enact to achieve a low carbon, clean air, healthy future before 2050.

The game is a mobile application available for all Android and iOS devices (Fig 1.1) and works by collecting information on the city areas, ideas and policies favoured and selected by citizens, then packaged anonymously with game feedback for use in other stages of the project, particularly informing elements such as the Delphi process and workshops in WP4.

Bristol was the first of six cities to be included in the game which launched in Bristol in April 2018. An updated, localised version of ClairCity Skylines was launched in Amsterdam followed a significant database upgrade in November 2018. This upgrade allowed the final 4 cities/regions to be launched for Ljubljana, Sosnowiec, Aveiro and Liguria Regions in January 2019, with data capture due to close at the end of March 2019.

To find Skylines on Google Play (<http://play.google.com>) search “ClairCity” or click the following link: https://play.google.com/store/search?q=ClairCity&hl=en_GB

To find Skylines on an iOS device, open App Store and search “ClairCity” or view the following App Store Preview: <https://apple.co/2HknEBM>

Fig. 0-1: Google Play Store listing

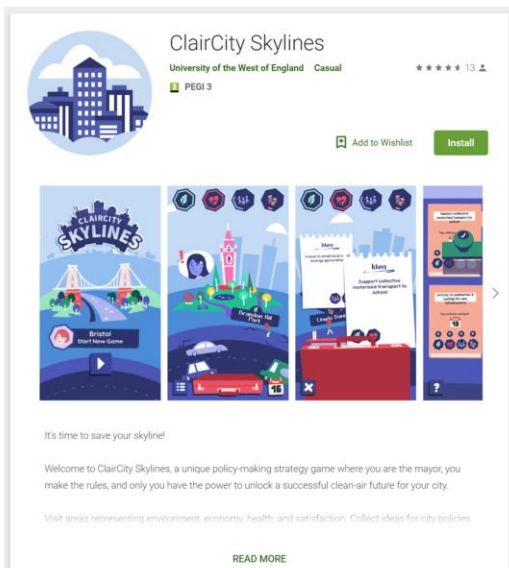


Fig. 0-2: Six playable cities completed



1 ClairCity Skylines: Air Quality Policy Making Game

1.1 Game Overview

Game Purpose

ClairCity Skylines is a unique policy-making strategy game where citizen players take on the role of a virtual city mayor and are responsible for passing new air quality laws to unlock a successful clean-air future. The player must develop policies without bankrupting or polluting the city too much, as well as keeping their virtual inhabitants healthy and satisfied with their lives.

The game seeks to understand what citizens would do if they were in charge of achieving a green future for their city whilst also exposing them to some complexities of running a city. The game makes it impossible to pass pre-preferred policies for a 'quick win', as the game mechanics encourage players to consider policy making and air quality measures in an accessible, and engaging manner.

Through the game, ClairCity can understand the varying strategies and policy combinations enacted, as citizens attempt to achieve a clean air future for their city. The game works by 'crowd sourcing' public acceptability of different policy options, supporting the basis of a citizen-led and citizen-inclusive, bottom-up policy making approach where citizens also gain further understanding of how policies could affect their daily lives.

Game Design

Citizens play the game by visiting key areas of their city, investigating ideas that will affect four key attributes (Environment, Health, Satisfaction, Economy). As players choose ideas they feel will help their city or are considered acceptable the weightings applied to each idea will be applied to the four attributes. These weightings are positive and negative, meaning players must make conscious decisions about who a policy may affect various attributes of their city.

By exposing players to competing demands displayed as attributes at the top of the screen in a simple way, and by representing policy impacts by changing the city and citizen graphics accordingly, the game makes real-world air quality policies accessible that could have short/medium/long term consequences for their city.

Every 5 years, players will then be offered the chance to elevate these ideas to 'policy' level. In doing so, this will begin a series of prolonged impacts to the city over the duration of the policy. For example, some policies will last 5 years, others will last 20.

As the player continues to choose ideas and implement policies the city will ebb and flow as the attributes change. Players will see visual effects of their choices in the city, such as air pollution and particulates, road deterioration and changes in citizen health.

If any of the four attributes reaches zero, the game is over, and the player must try again. The game is won when they player raises the environment plus one other attribute to full.

The game has been designed to be as accessible and simple as possible, with each member city having its own distinct colour scheme, whilst still in-keeping with the ClairCity brand. The game uses a simple 'rotating world' mechanics to make interactions simple for gamers and non-gamers alike, using typical smartphone gestures such as 'drag', 'tap' or 'swipe' to play.

Fig. 1.1-1: ClairCity Skylines, Bristol flyer



Fig. 1.1-2: Simple 'tap' for economy 'idea'



Playing the game

By creating a profile and giving informed consent, the game records player choices to the behavioural database. Actions recorded include areas visited, ideas collected and policies elevated. There is also a game survey unlocked once the game is completed win or lose.

Fig. 1.1-3: Player sign-up

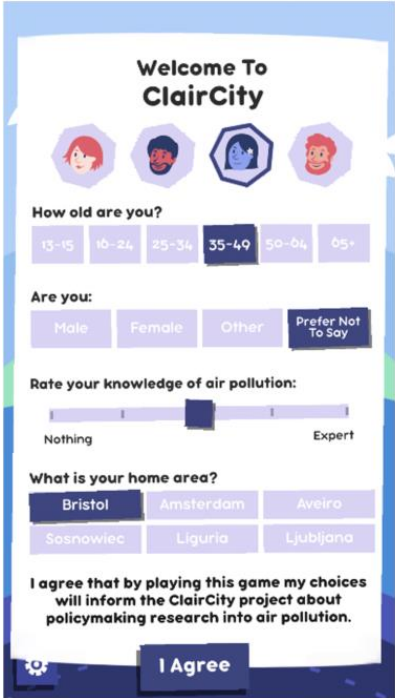


Fig. 1.1-4: Language Select

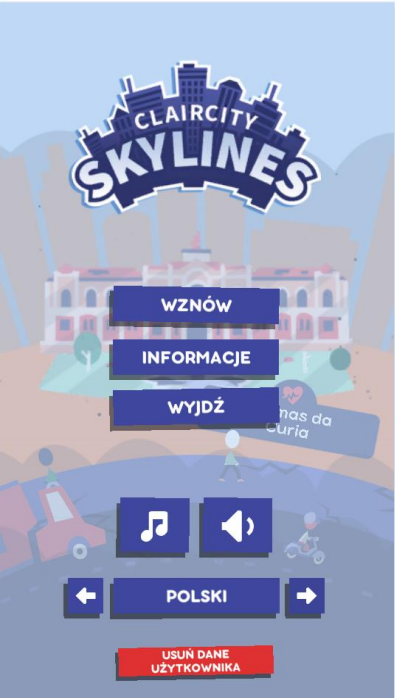
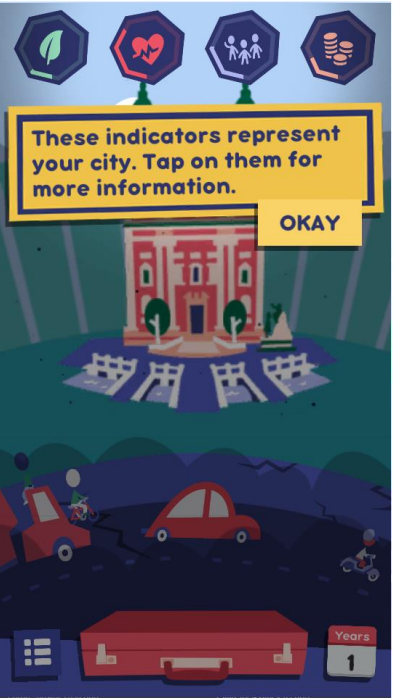


Fig. 1.1-4: Attributes



Citizens play as the Mayor, and visit areas that represent city environment (green leaf), economy (gold coins), health (red heart), and satisfaction (blue people). Ideas suggested at each location are more likely to influence the indicator linked with the area (e.g. visiting the bank displays ideas with impact on the economy, visiting hospital affects citizen health etc).

Fig. 1.1-3: Amsterdam health Fig. 1.1-4: Liguria landmark Fig. 1.1- 4: Bristol city hall



While the game style looks simple by design, significant effort was put into trying to recreate the look, feel and problems each city/region citizens were facing. To achieve cohesive yet distinct environments and ‘game feel’ the team undertook a range of design approaches. In Amsterdam, we produced a photo-tour of the city and pitched the prototype mechanics to the consortium for feedback. In Sosnowiec we recorded a video tour with the help and feedback of city partners learned about the industrial history of Silesia and selected areas all citizens could identify with. In Ljubljana we presented the first alpha build to the consortium and ran a workshop on game features, where feedback from Aveiro and Liguria was essential in terms of the iconography and attributes system in the game.

The game contains 36 famous city “areas” (6 for each city/region), with custom animations, language, music and sound effects that all change when players make decisions. This was a complex and intricate process, ensuring players recognise the effects of their policy choices. E.g. a poorer economy will make the bank fall apart, and vehicles older, while good environment clears the air, and citizens can become healthy. The biggest challenge for the team was worked with partners to localise the game available in all local languages, even where the Apple App Store did not support them, in order to maximise potential engagement.

The scores applied when a player collects an ‘idea’ or elevates an ‘idea’ (instant) into a ‘policy’ (over time) come from the ClairCity Policy Library (CPL) in which the policies have been ‘scored’ against the four indicators. Players see CPL measures as ‘ideas’ for future policies whenever they visit an area of the city, and can choose those they think have potential by dragging one into their briefcase to later elevate into a policy at the city hall every 5 years. Ideas (measures from the CPL) contain only simple icons that ‘hint’ at potential impacts, but in the city hall more detail for each is visible. Each partner was able to work with the game team to customise which policies exist for their city/region.

Idea collection and policy making continues until the player achieves a win or fail state. Active policies are visible in the player's briefcase and are displayed during progress reports to ensure players know which policies impacts are attributed to. To win players must fill the green environment attribute and at least one other, achieving a successful, clean-air future. A win in less than 15 years receives a gold medal, a silver medal in less than 25, bronzes for 50 or less.

Fig. 1.1-5: Policy elevation



Fig. 1.1-6: Policy end report



Fig. 1.1-7: Briefcase of ideas



In year five players visit 'city hall' to upgrade at least one 'idea' into a lasting 'policy'. Their ideas, are now displayed as prospective policy binders that must be 'stamped' that include more information on impact and duration, causing players to consider policy outcomes thoroughly.

Fig. 1.1-8: Bronze medal



Fig. 1.1-9: Gold for Bristol

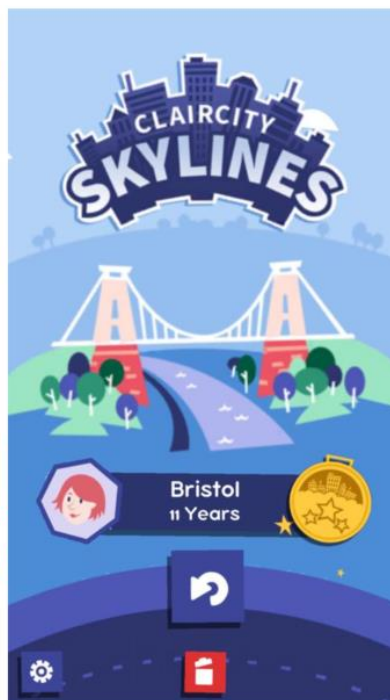


Fig. 1.1-10: Silver medal



Fig. 1.1-11: Policy elevation



Fig. 1.1-12: policy update



Fig. 1.1-13: Failure reason



The game design also considers the interactions of attacker, achiever, explorer and socialiser 'player types' as well as varied levels of gaming ability. For example, an 'attacker' may play subversively to crash the game to 'see what happens', but the game responds by clearly informing the player of the attribute that caused the failure. An 'achiever' might disregard personally held beliefs in pursuit of a 'win at all costs' but in this case (and especially for gold medals), shows they have implicitly understood the aim of the game, and have harnessed real world policies they believed would be successful.

While the data captured for work packages only considers ideas displayed, collected and potentially elevated into policies, in future it may also be possible to extract 'plays' of the game that achieved a given medal win, and areas most visited. Players will be challenged to 'try again' to achieve a better medal for their city, until they achieve a gold medal, they can then play the other 5 cities if they like.

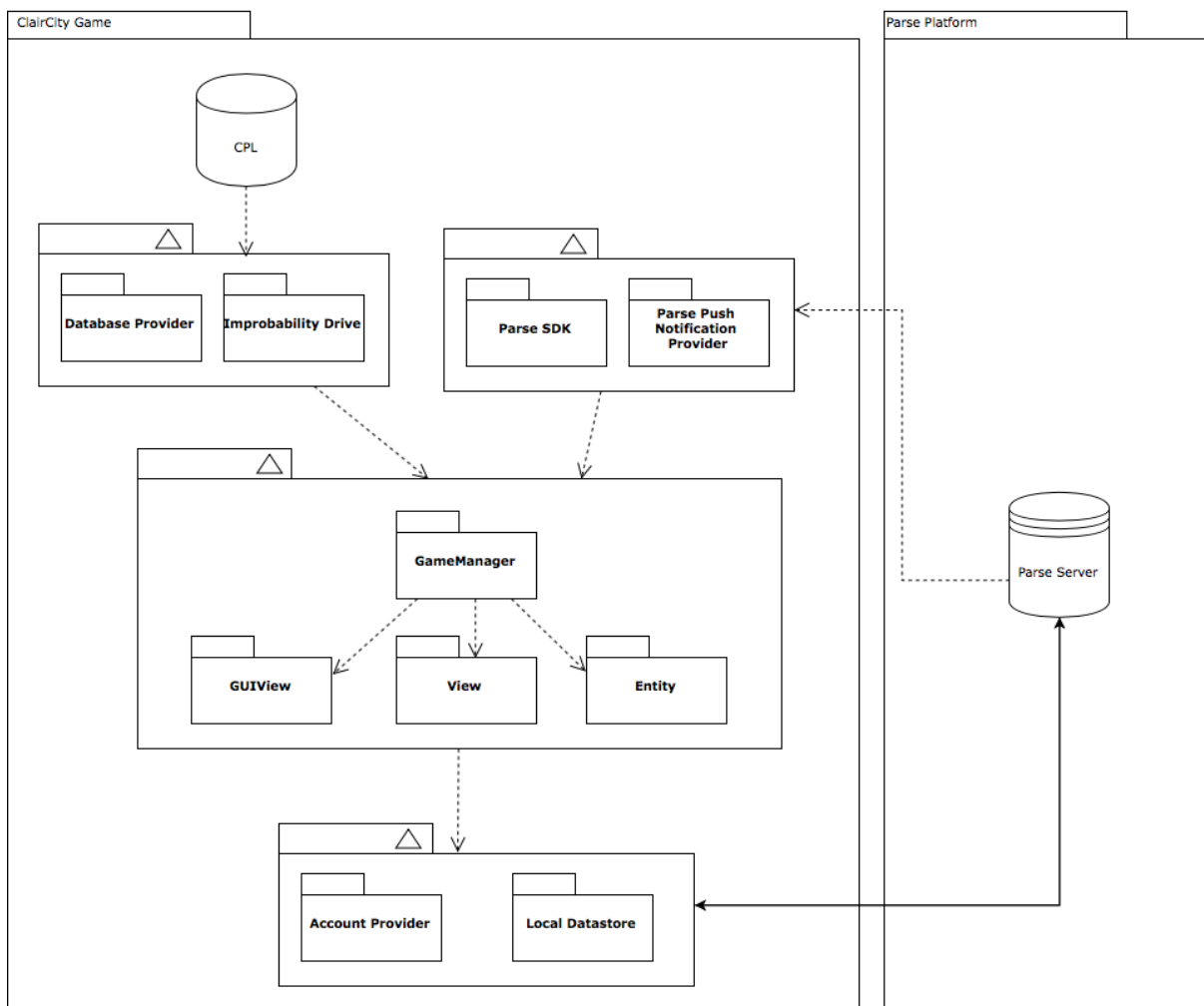
Citizens from one city playing other cities is not recorded, but it provides replayability value and may in time provide additional insight into how citizens from across the EU approach city problems from different perspectives with regards to air quality and policy making.

1.2 Technical Design

A full technical design document (TDD) is available for ClairCity Skylines. The following serves only as an overview / summary of the main game development methods and systems.

Policy measures are loaded to the game as 'ideas' or 'policies' that the players see from the CPL database (ClairCity Policy Library) and presented to the user via the Database Provider within the game, along with appropriate indicator weightings and temporal data supplied by the wider ClairCity team. Player actions such as ideas and policies chosen in game are then packaged with anonymised profile data and sent to the remote ParseServer.

Fig. 1.2-2: Overview of ClairCity Skylines



The game has been developed using Unity and Visual Studio. Unity is a multipurpose game engine that provides the core components for development (graphical rendering, audio support and asset management). Visual Studio is the Interactive Development Environment (IDE) that supports the compilation of the C# programming language used by Unity.

The game has been developed on Windows based PC's, however to deploy and test for iOS devices a Mac based laptop has also been used. The game has been tested on a wide range of mobile devices with varying specifications and operating systems (Android and iOS).

1.3 Future Work & Innovation Legacy

It is planned that the core game engine can be made available for other cities beyond the six within the ClairCity project, and that the serious game methodology used to triangulate player choices can be disseminated and applied to other research projects worldwide. A future possible step will be to create a 'universal city' level, that illustrates what the software is capable of, regardless of the policies and graphics loaded. The team also wishes to investigate the use of immersive visualisation VR/AR/MR as other outputs of the data collected by the game.

2 Contact information

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