


ClairCity: Citizen-led air pollution reduction in cities

# D4.8 Fully functional (ClairCity Skylines) Game – First City

April 2018

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# Document Details

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| **Description** | A brief introduction of the ClairCity Skylines Game and underlying systems. The main deliverable is the launch of the game in City 1 (i.e. Bristol) which took place on April 11th – 13th 2018, and its wide-spread availability to members of the public ahead of the remaining five playable ClairCity partner cities. |

# Version History

| Version | Updated By | Date | Changes / Comments |
|---|---|---|---|
| V1.0 | Andrew King | 11/04/2018 | First version |
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| V1.2 | Enda Hayes | 24/04/2018 | Final edit |

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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 by citizens which is then packaged anonymously with game feedback for use in upcoming stages of the project such as scenario development (WP7), quantification (WP5) and policy making (WP7).

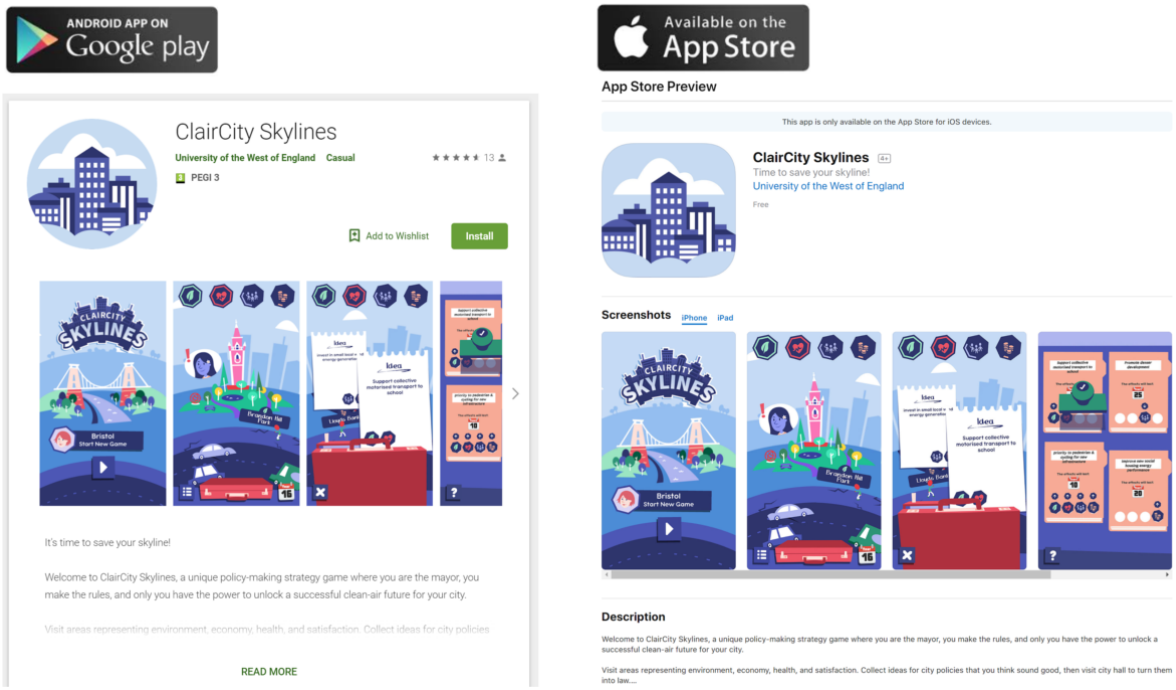
This is a first iternation of the Game launched in City 1 – Bristol City Council (13th April 2018). By the end of the ClairCIty Project six iterations of the ClairCity partner cities will be playable in the game to make it locally relevant to all players of the game.

## *Game Availability*

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 and App Store listings**



# 1 ClairCity Skylines: A Serious Game for Air Quality

## 1.1 How it works, player view

### *Game Overview*

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 hopes to understand the varying strategies and policy combinations enacted as citizens attempt to achieve a clean air future for their city. We hope to 'crowd source' public acceptability of different policy options allowing for a citizen-led and citizen-inclusive bottom-up policy making approach driven from the perspective of the city citizen and from their understanding of how difference policies would affect their day to day lives.

### *Design & Accessibility*

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.

The game has been designed to be as simple and attractive as possible, with each member city having its own distinct colour scheme, in-keeping with the visual style established by the early communications of the project, a rotating world was used to make navigation simple and accessible for gamers and non-gamers alike. The game only requires typical smartphone gestures such as 'drag', 'tap' or 'swipe' to play.

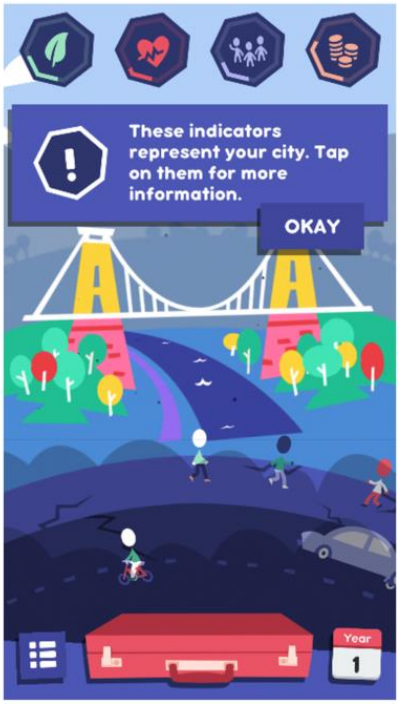
**Fig. 1.1-1: ClairCity Skylines, Bristol flyer**


**Fig. 1.1-2: Early city design variations**


**Fig. 1.1-3: Player sign-up**


**Fig. 1.1-4: Logo screen**


**Fig. 1.1-4: Indicators**




## *A typical play session*

Players, signed up as a ClairCity Mayor, run their home city, and can 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: Citizen health** **Fig. 1.1-4: Use of landmark** **Fig. 1.1-4: The city hall**


Behind the game is a comprehensive database of potential policies, ClairCity Policy Library (CPL) in which the policies have been ‘scored’ agains the four indicators. Players see measures from the CPL displayed 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. At this stage, ideas (measures from the CPL) displayed contain only simple icons that ‘hint’ at potential impacts for the city. The look and sound of the city and its citizens will change slightly (as immediate impacts) every time an idea is collected.

**Fig. 1.1-5: Policy elevation**

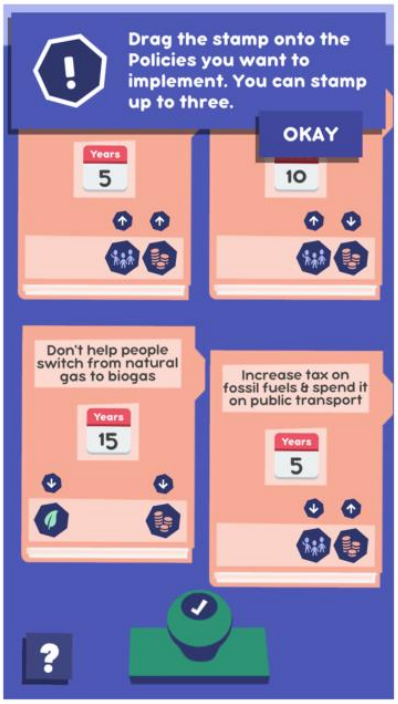



**Fig. 1.1-6: Policy end report**


**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**

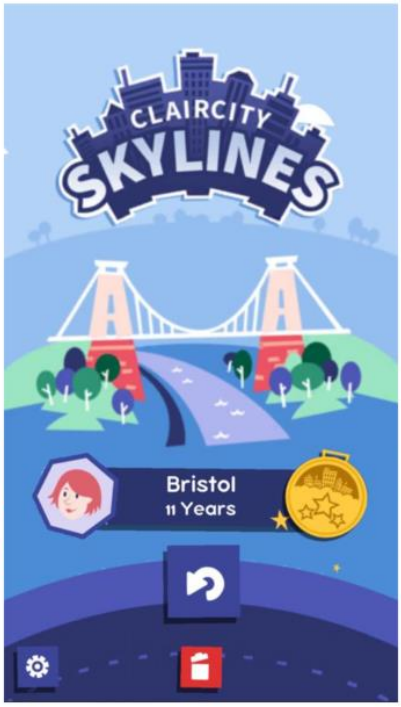



**Fig. 1.1-10: Silver medal**

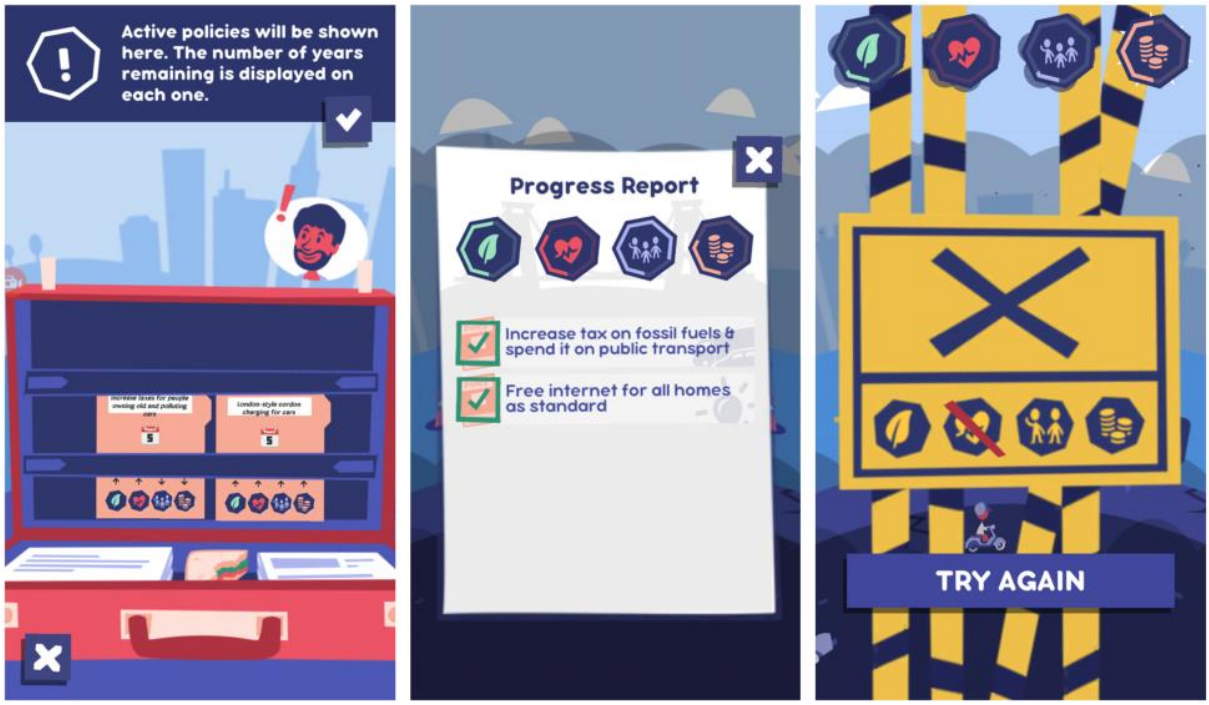
Idea collection and policy making continues until the player achieves a win or fail state. Active policies are visible in the player's briefcase and are displayed during progress reports to ensure

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.

### *Playable Data*

By creating a profile and giving informed consent, the game can record player activity and write it to a behavioural database. Actions recorded include areas visited, ideas collected and policies created during a session.

**Fig. 1.1-11: Policy elevation** **Fig. 1.1-12: Policies complete** **Fig. 1.1-13: Failure reason**




The game design also carefully considered 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.

It will be possible to extract 'plays' of the game that achieved a given medal win, (e.g. gold medals where players achieved the best possible outcomes in fastest time), but it is also possible to view player behaviour across any or all of three levels of activity which includes the city areas most visited (exploration, surface level), the ideas most collected (consideration, moderate level) and also the policies enacted (strategic, deeper level).

### *Player Retention & Further Development*

Players will be challenged to 'try again' to achieve a better medal for their city, until they achieve a gold medal, at which point they will unlock the other 5 cities to play. Whilst citizens from one city playing other cities is not core to the project, it provides real value for those that

have downloaded the game, 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.

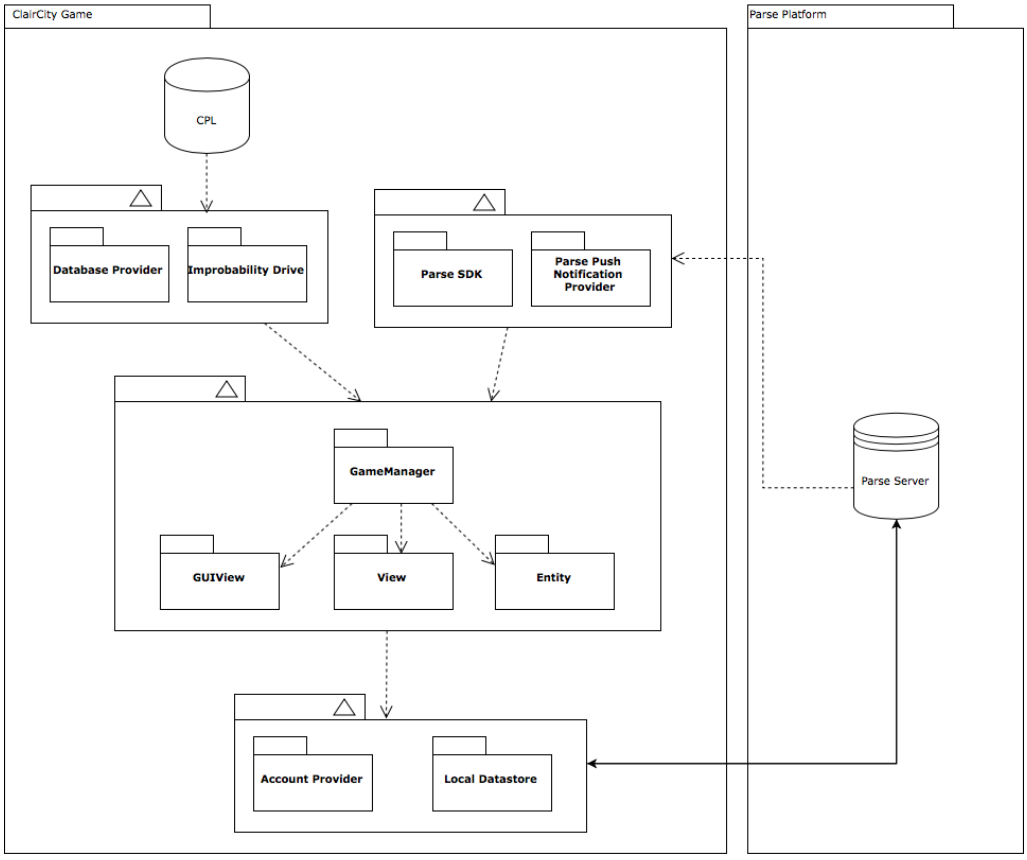
The first city available to play is Bristol, and the team will continue to develop a further 5 EU partner cities in the coming months as part of this on-going project. It is planned that the core game engine can be made available for other cities and related research projects worldwide.

## 1.2 How it works - developer view

A full technical design document (TDD) is available for ClairCity Skylines. The following serves only as on 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.

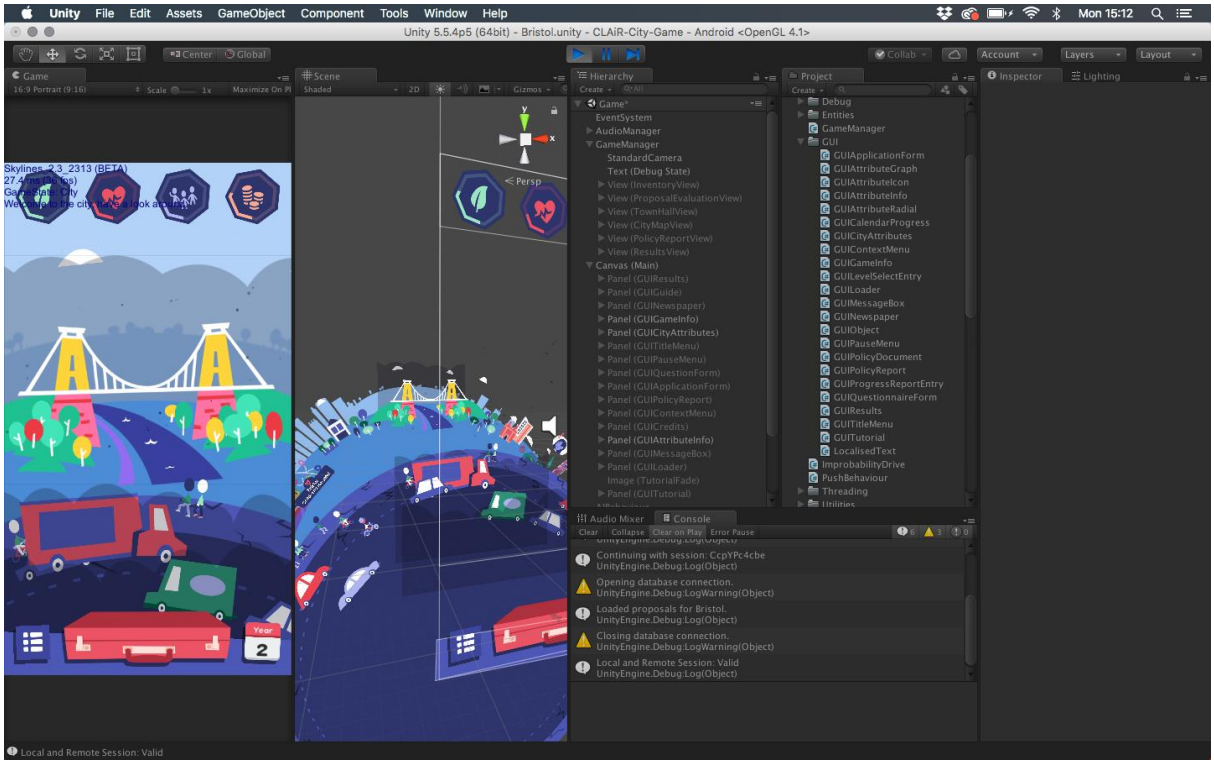
**Fig. 1.2-2: Overview of ClairCity Skylines**




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).

**Fig. 1.2-2: ClairCity Skylines Unity project**




Unity assets were also utilised to complete aspects of the game. iTween and Spine were used for in-game animations and adding interpolated transitions of movement, colour, and scale. Graph Maker was used to display information in charts, while Input Event was used to detect and handle simple touch interactions such as touch, tap, and drag. Lunar Console was used at runtime to allow users to do bug testing and submit error reports.

Development of the game also required SQLite, a database management solution for internal data on the target platform device and Parse, a NoSQL database solution for remote database access.

**Fig. 1.2-3: The Parse database for behavioural data**

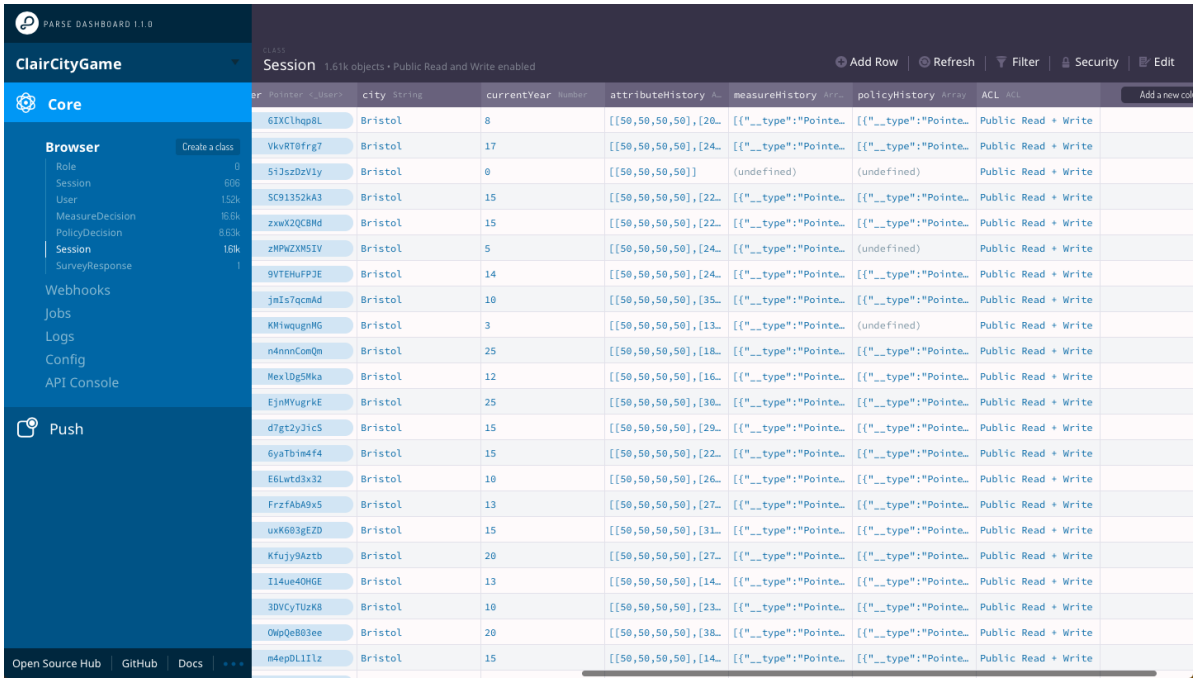
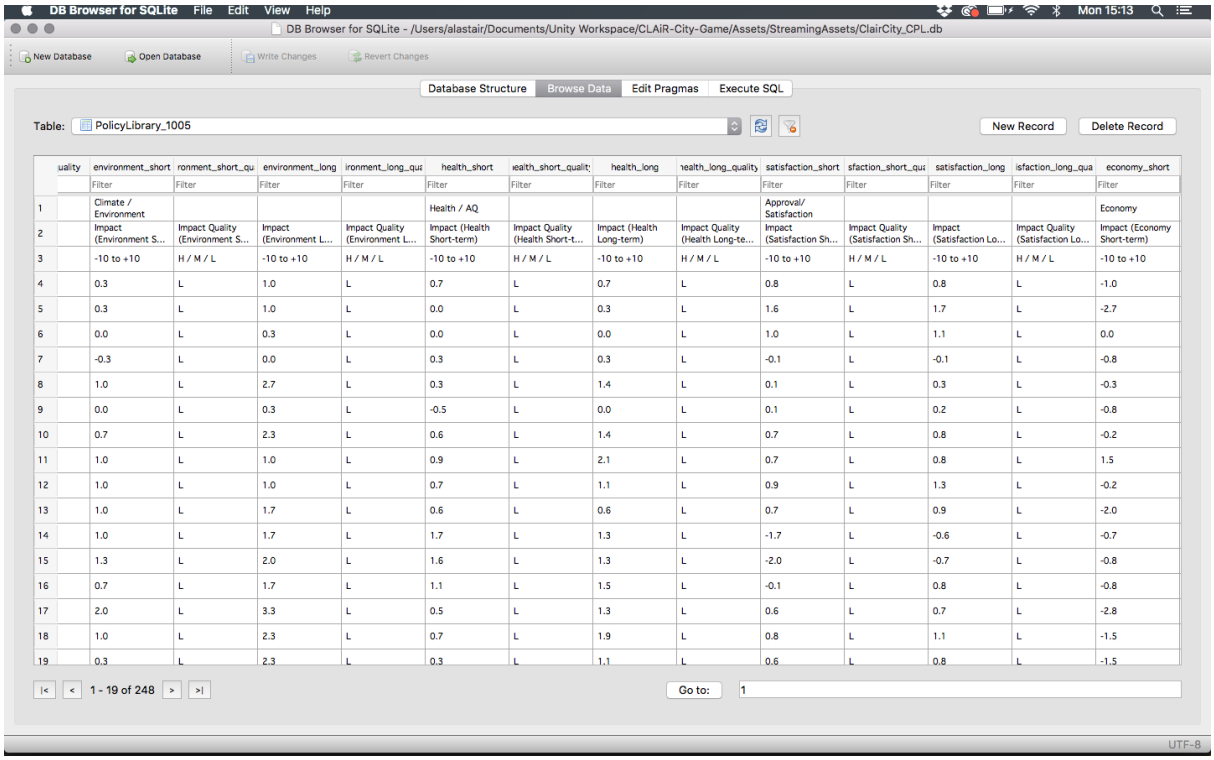



**Fig. 1.2-4: ClairCity Policy Library (CPL)**

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