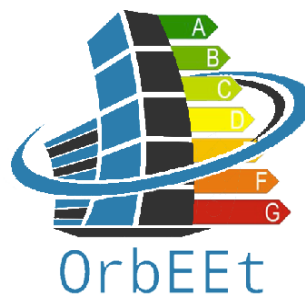




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Project Title:

# **ORganizational Behaviour improvement for Energy Efficient administrative public offices**



## **OrbEET**

**Grant Agreement No: 649753**

**Collaborative Project**

### **Public Summary**

Deliverable No.	<b>D3.2 Gamified users interfaces</b>
Workpackage	<b>WP3 Pilot Setup &amp; Configuration</b>
Task	<b>T3.2 Ambient End-user interface Gamification Service Development</b>
Lead beneficiary	<b>COVUNI</b>



# 1. PUBLISHABLE PUBLIC SUMMARY

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This deliverable presents the key outputs of Task 3.2 – Ambient End-User Interfaces & Gamification Services Development. The purpose of the document is to provide the description of the user interfaces; the gamification processes for the in-office displays, the intranet portal and the game design of the smartphone game application. The end-design is underpinned on the Behavioural and Organizational theories that are outlined in the T1.3. Additionally, this report includes the gamification implementation details of the in-office display, intranet portal and smartphone game, which raise awareness on various levels across offices and business processes by presenting all the energy consumption and business process information. Finally, the development of eDECs includes feedback on energy consumption and business efficiency, thus motivating building occupants to change their attitude towards specific task performance to improve the procedures.

As described in Task 1.4, the Gamification and Behavioural Change Engine is responsible for receiving the sensor data on energy consumption and transferring it to the three ambient user interfaces in the form of gamification approaches. Energy and business process efficiency are presented on the three user interfaces, in subtly different ways:

- **Smartphone Game:** To promote self-efficacy and add value to the behavioural change by unlocking rewards and engaging end users with various game mechanics that will motivate business productivity and energy conservation.
- **In-Office Displays:** Information of performance and awareness tips.
- **Intranet Portal:** To encourage social activities, such as engagement to the OrbEEt wiki and OrbEEt forum or collaboration with the team office in order to compete with other offices.

The smartphone game represents the abstract intervention, which aims to engage users that are not particularly interested in energy and business process efficiency. It also aims to offer an entertaining method of addressing objectives to all users. It was built in the Unity 3D platform for Android based devices, using JavaScript and C#. The game is designed to be played using touch interfaces, so therefore the interface and game interactions are all based around taps and drags. The game, named *OrbEEt Planet Escape*, takes place on an unspecified planet and the player is in charge of a team of astronauts who have crash-landed. The main goal is to survive and collect resources in order to repair the damaged spaceship and escape the planet. Initially, players have to ensure there are enough resources for the astronauts to survive, but then also have to manage the repairing of the ship. It's the player's responsibility to assign astronauts to the specific jobs that best match their abilities. The jobs will range from building scientific structures, to farming potatoes for food. Through the use of good strategy and time management, the players should not only be able to keep the astronauts alive, but also help them fly back to earth in the fastest time possible.

The in-office displays have limited responsibility for gamification within OrbEEt's OBCF context. However, even though there is no interaction between the users and the interface, a feedback cycle does exist between occupant's behaviour in the office and the feedback presented through the interface. This is achieved through targeted messages utilised as general feedback on business processes and energy consumption that prime users and inform them about energy consumption and the impact of it. The system consists of a number of webpages, developed using HTML5 and JavaScript that automatically transition between one another for non-interactive purposes. The system is meant to be shown long term on an in-office display, as a focal point for the OrbEEt system and to garner interest in energy saving practises. Contents include energy saving tips, energy data visualisation, leaderboards, energy goals, benefits of saving energy and critical reflections of OrbEEt.

The intranet portal is responsible for the personal environmental awareness information and the learning of the end users. There is a synergy with the in-office displays, in order to present the energy

visualisation and leaderboards, as well as information on OrbEEt. The content of the portal includes, energy consumption statistics, leaderboard, forum, wiki, quiz, settings, notifications and forum activities. Leaderboards are used, as outlined in the OBCF, to provide information about player's success in the mobile game, as well as the pilot sites' success regarding the energy savings goals. The purpose of the energy statistics page is to interact with the SEOR framework and represent the energy KPIs in a format understandable by the average OrbEEt end-users. By providing this consumption information through an understandable medium, users can track progress, see if they are being successful in saving energy and identify areas for improvement. The portal consists of two systems; the backend system and the frontend system. The backend system runs entirely on the server and its main responsibility is to handle system logical, access the database, manipulate data and handle user access. The frontend is mainly running client-side and shows the page views and forms. The server is responsible for sending the required view based on the client's request. The system was developed using the Haxe programming language and exported to PHP, incorporating elements of Bootstrap and Shield UI.

The main goal of the enhanced Display Energy Certificates is the visualisation of dynamic display energy certificates for the pilot sites participating in the OrbEEt project, replacing the static and monolithic representation of current DECs. Therefore, this interface addresses mainly the role of the Facility Manager, although specific views are also available for pilot sites' building occupants. The perspective of this GUI should not be confused with the behavioural triggering engine for the three gamified interfaces. eDECs is a Dynamic Web application that runs on an Apache Tomcat Server v8.0, adopting the Spring MVC (Model View Controller) framework. The programming language used was Java 1.7 for the back-end implementation and HTML5, CSS and JavaScript for the front-end implementation, dependent also on free java libraries available by Maven repository. Furthermore, any required application data that were stored and accessed through a MySQL database. Finally, the application is accessible by a web Browser or a smart device.