

Social gaming for better energy efficiency in public buildings

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Credit: TRIBE

Tackling the energy inefficiency of public buildings, TRIBE developed a mobile game to educate and change behaviour. Its simulation draws on real data to demonstrate the human aspects of building use, such as ingrained attitudes and the pursuit of comfort.

According to European Commission figures, approximately 40 percent of energy consumption comes from buildings, which are also responsible for 36 percent of the EU's CO₂ emissions. Currently, around 35 percent of buildings in the EU are more than 50 years old, with almost 75 percent of the stock deemed energy inefficient.

One method for tackling this inefficiency is through renovation. However, the EC has calculated that only 0.4-1.2 percent of building stock across the EU is renovated each year.

Another approach, taken by the EU-funded TRIBE project, is to encourage building users to change their behaviour. TRIBE created a management pack, which included an energy audit, a virtual pilot's design (energy model of the real building), an ICT deployment plan, user engagement campaigns and funding schemes. Perhaps the most innovative aspect was the creation of a social

game, available for iOS and Android devices, linked to data collected from five European pilot buildings, including a university, public offices and social housing.

The multiple strands of effective engagement

Players of the TRIBE game adopt the role of an energy consultant responsible for changing the behaviour of people working in, visiting and using, public buildings. They decide how electric devices and equipment are used, as well as budget to select and implement energy measures. Throughout, players must balance increased [energy efficiency](#), against the need for occupant comfort.

The team faced two significant challenges; one technical, the other human. Firstly, it had to define the framework for game conditions, which involved collating and filtering data from a range of sources and expertise. The project brought together raw scientific data on energy use, with calculations necessary to design the simulations, alongside information on user behaviour from social science.

Secondly, TRIBE faced the challenge of engaging a very wide target group – the general public. However, as project manager Mr. Eduardo Cembrano Burgos explains, "In a sense this challenge was also our greatest asset. In the end, we all use public buildings and therefore nearly everyone could relate to TRIBE."

The vigorous engagement campaign included printed materials and training sessions but was especially active through social media, achieving nearly 20,000 game downloads and more than 24,000 substantive views on YouTube.

Recalling the project aims Burgos summarises, "One of the most important features of the game is its replicability. The tools and methodology used can be adopted, using open software principles, for

other games, projects and initiatives. The content itself can also be expanded, for example by introducing new buildings."

The project had to be underpinned by data, which fed an assessment of the best energy management principles. TRIBE's ICT monitoring plan collected data from the buildings, transferring it to the game through a simulation engine developed for the project incorporating a client-server solution, a library of mathematical and logical tools, alongside user behaviour and electricity simulation.

By including real data alongside historic data, the simulation engine could create the energy baseline for the buildings. It also enabled real-time feedback to players of the actual impact of their energy efficiency measures, selected out of the 250 available from the online library.

The social aspects of innovation

Improved energy efficiency of buildings generates a range of economic, social and environmental benefits. It contributes to increased health and wellbeing for occupants, which also benefits the economy through reducing sick days induced by building conditions. More efficient buildings are also clearly less polluting to the environment and improve housing affordability.

Reflecting on the project, Burgos concludes, "TRIBE successfully demonstrated that applying technology solutions is not the only way to enhance energy efficiency in buildings. There is a significant gap in influencing user behaviour, which also needs to be addressed." By using plausible scenarios with real data, TRIBE took energy efficiency out of a purely virtual sphere and made it real, prompting discussion and engagement for users within their daily lives.

Taking the work forwards, the team will continue promoting the TRIBE game and TRIBE Pack and are actively involving public authorities in these solutions.

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