

GUIDELINE: GAMIFICATION - MAKING ENERGY FUN

Abstract

Gamification is the usage of game mechanics and game thinking in serious contexts. In the energy sector it can be used to inform participants about (smart) energy topics or to motivate customers to reach energy efficiency or demand response objectives in a playful manner. This guideline gives project manager of R&D projects or utility energy project manager theoretical and practical insights into the topic of gamification. A literature selection and best practice examples for the use of the gamification approach in (smart) energy projects and a step-by-step instruction show you how to implement gamification approaches and the do's and don'ts will help you to avoid common mistakes.

What is it?

In this guideline you can learn about the basic concepts on which gamification is based, which objectives could be achieved and how to set up a gamification approach in your smart energy environment. Energy is not a very interesting topic for most people as it is consumed rather invisibly, but gamification can help to engage people with energy related topics. Gamification can even help to foster habitual changes in a playful manner. For the utility, gamification could be a very cost effective alternative for fulfilling the legal home energy efficiency obligations (instead of e.g. sending energy consultants from door-to-door, see our guideline [Energy audits for households](#)).

Bringing game elements like points, high scores, rankings, achievements, etc. into an everyday environment and connecting it to a serious topic is what the concept gamification is all about. Using prepared and predefined rules and goals, gamification approaches produce results within a game (e.g. points, achievements) which are connected to a real world outcome (e.g. changed behaviour) (Herger, 2014). The basic concept behind gamification in the energy sector is to use game mechanics and game thinking to motivate customers. Although gamification could also be used for other goals, such as participation in the planning process, in this guideline the focus will lie on gamification practices used to change energy consumption behaviour in the consumer.

Gamification triggers natural desires for competition, achievement, status, self-expression, and learning, with as potential result participants changing their less sustainable behaviour on a voluntary basis. Furthermore, the consumers or players are motivated due to the rewards and achievements they gain for different energy related tasks. Participants receive points depending on desirable behaviour, correct answers in quizzes, frequent use of electric usage monitors and other activities.

and further educational programmes. For children, there was an extra section in which they were able to play further energy learning games, which on the one hand emphasized the importance of energy savings (e.g. climate change, sustainability, environmental conservation, etc.) and on the other hand offered options and recommendations on how children can take part in saving energy. Further, there was an event at one of the middle schools with presentations about energy efficiency and electric vehicles.

More information: <http://www.sdge.com/newsroom/press-releases/2012-06-06/sdge-launches-reduce-your-use-day-rewards>

When to use?

Gamification can be used within different phases of smart grid projects but due to complex, yet necessary preparations, it is recommended to initiate the gamification approach in an early stage of the project. Gamification approaches can generate a big amount of data about your customers that can be helpful to learn more about them, which can also be useful in case you plan on dividing the target group in different segments. For more information on this, see also our guidelines [Learning about target groups](#) and [Using segmentation to better target user groups](#).

Furthermore gamification can motivate customers to do designated tasks which renders it a good instrument to change energy behaviour, learn about energy related topics, improve customer loyalty or motivate your customers for the participation in demand response programmes. These characteristics make gamification an ideal instrument to reduce fatigue effects of the participants in smart energy projects. Within this context, gamification can also be considered a non-monetary incentive (for a general overview on incentives please have a look at the S3C guideline [Choosing and combining monetary and non-monetary incentives](#)).

Learning about energy (InovGrid Initiative, PT)

EDP Distribuição developed a gamification initiative based on this guideline. Due to a tight relationship with the community in Alcochete the project team was able to involve the main institutions and local communities. A living lab to process mutual learning and to promote more energy efficiency consumption habits through an educational platform was established. In close cooperation with this living lab, a gamification approach was initiated. Within the region, special events to support the launch of the game were organised to ensure a high level of participation. Dissemination materials such as flyers and posters were developed in order to engage the local students and families to participate in the contest and specific events to launch the communication for the game were promoted in Alcochete Schools, with the sponsoring of the School Community and Alcochete Municipality involvement.

The gamers were motivated with rewards for correct answers in three quizzes related to energy savings and sustainable behavior and could share their points and general ranking on Facebook to compete with other players. Launched under the S3C activities, the game started in April and was live until 30th July with more than 100 gamers from the municipality

of Alcochete. The participants needed to have an electricity supply contract with EDP and a computer or mobile device to use the online game and interface (see Figure 2). Younger children could also participate if supervised by their parents. This quiz, funded under the S3C project, had more than 100 participants, mostly young students and parents. The contest aimed on the one hand to promote the knowledge about smart grids and responsible electricity consumption. On the other hand the game aimed to foster energy savings by receiving points for energy savings.

The game used a combined point system consisting of the answers to the questions of the quiz and the reduction of the energy consumption. For the tracking of the energy savings per household the energy consumption was compared to the consumption of the same week one year ago. The players received a feedback about their energy savings on the web portal. An additional incentive for saving energy was given by the prizes for the winners: The 1st prize is electrical bicycle, the 2nd prize a laptop and the 3rd prize an iPad.



Figure 2: Screenshots of the game. Every week the consumption was compared to the same week of 2014. For those who reduced consumption, points were gained

Video about the project: <https://www.youtube.com/watch?v=f-avZ4XNCyY>

More information: <http://www.quiz-s3c.com/>

What do you need to do?

In the following steps you will get an introduction on what to do when you want to start your own gamification approach. The most important steps are listed here and additional hints can be found in the do's and don'ts section.

1. Define the objective of the game

The first step would be to find out how the game will fit in the overall smart grid project aims and based upon this you need to decide what the objective of the game is going to be. The objective of the game should be stated in the form of the desired energy behaviour in real life in the consumers. For example the game objective could be to raise the load shifting potential or to gain overall efficiency in energy usage. In the game, actions that indicate this desirable energy behaviour is acted out should be rewarded.

2. Get an idea of your main target group for your game

It should be decided for what target group the game is being created at a very early stage of the development of the game. Depending on the context of the smart grid project and its participants, several elements of the game may vary. For example, a game for adult participants needs another style and design and composition than one targeting children as its audience. This has to be considered while planning the game. However, the game should be open for as many users as possible. Although specific game approaches can be designed for specific target groups, there is no special target group for gamification in general. The guideline [Learning about target groups](#) gives more information about how to get to know your target group.

3. Define the point system

Every game needs a reward system, which is necessary among other things to define and evaluate the progress of every player. Depending on your project, you should give the participants points for different tasks and achievements. For example, if the objective of the project is to increase energy efficiency, points can be offered for every saved kWh, in case of load shifting points can be offered for every shifted kWh. If you like to add quizzes or educational elements, points can be offered for solving a quiz, reading an article about energy saving measures, lending an electricity usage monitor, etc. The specific name for these points is not very important. You can simply name them points or credits or tokens, but are free to find a name with a regional or electricity-related meaning. Be creative! The guideline [Bonus & malus – changing behaviour with rewards and penalties](#) elaborates further on this topic.

4. Create goals and levels to reach

In many projects, the fascination for the new technical appliances and the usage of energy saving portals decreases over time. To avoid these fatigue effects, it is necessary to define goals and different milestones within the project time. This requires the participants to constantly confront themselves with goals and levels that can be reached. For example, quizzes have to be solved within a defined amount of time, or a winner for every month can be rewarded. This also means that the content of the website has to be updated from time to time to render the participants the opportunity to discover new elements on a regular basis. These goals can also be

announced in newsletters etc. For more information see our guideline [How personal goals can motivate behavioural change](#).

5. Define prizes

A prize for the best participants in your game can further motivate participants to change their behaviour. The specific form of the prize can vary from gift coupons, technical gadgets to tickets for regional sports or cultural events. Putting the prize into a regional context can make it more appealing for your customers. Have a look at the guideline [Choosing and combining monetary and non-monetary incentives](#) for more information on this.

6. Offer further education possibilities

Further educational elements can be introduced to the game, such as tips and tricks on how to reduce energy consumption. The reading of these tips can be rewarded with points. Additionally, these newly learned information can be combined with a quiz. It is very important to fit the information of these educational offers to the knowledge level and needs of the participants.

7. Promote your game

Serious games and gamification approaches have high network effects. In fact, the promotion of your game is very important, given that it is only fun to play the game if many others do the same and the value of the game for your consumer increases with every new player. Ideally, the promotion is organized by the utility itself (or the company responsible for the metering). At this phase, it is very important to include your marketing department or an external PR company. For more information on recruitment strategies see the S3C guideline [Recruiting participants](#).

8. Design the website or the smartphone app

The playground for your game is the website or smartphone/tablet app. Hence, it is very important to fit the needs of your primary target group that will play the game. The website is the place, where points, badges, levels etc. are calculated and displayed. It is the place where quizzes and mini games are taking place. Depending on your primary target group, it can be very useful to work with a mascot, which can guide and help the participants.

To see what a good portal should look like, just take a look at our best practice examples in this guideline. Furthermore, it is very important that the website has no technological problems to avoid discouragement of the end-users. Some providers of gamification solutions regarding smart grid projects have already entered the market with white label products, who can help you to build the website and to consult you by designing your game.

Do's and don'ts

- **Combine it with a smart meter rollout and other programmes.** Gamification can be a strong instrument to change energy behaviour. It can be combined with a smart meter rollout as part of an energy education programme and more generally to increase energy efficiency and decrease energy consumption.
- **But maximise the number of participants.** Even if the project is designed only for households with smart meters, it should (depending on the objective of your game) be possible to participate for other households as well. Projects like OSCAR (see below) did not require smart meter data, but relied on manual data entry on the website. If people don't have a smart meter, they will probably learn and understand about the added value of smart meters and their intelligent use for energy efficiency while taking part.
- **Integrate a ranking.** It is very important to structure the game in a way that allows for attaining milestones or intermediate goals on a regular basis. A system of points or tokens indicates the progress of the different players and their ranking. The gamification approach offers the participants a sense of achievement on a regular basis to maintain the motivation.
- **Choose communication channels.** You have to choose different communication channels depending on the specific purpose and your target group. To communicate the results and winners of the game, you can use additional communication channels like local newspapers, publications of the utilities, newsletter etc. To remind the participants of future game events, new levels or goals to reach a newsletter can be used.
- **Look for partners.** If you have set the objectives of the game and defined your target group, you should look for potential partners. These partners may help you to advertise the game, to find new participants, they can help you to find desirable rewards for the winners or they can give an extra input in design and content into your game. To find partners, you may emphasize the need for sustainable development and that your partners can be part of this (e.g. to enhance their Corporate Social Responsibility (CSR)) (Finding allies on the regional level).

You should definitely ask your local utilities for support, in case they are not already a partner in your project. Furthermore, you can contact education institutions like universities and schools. In case big companies with many employees are settled within your smart grid project site, you can invite them to become a partner as well. Furthermore, the local or regional administration should be informed, and the local or regional media should be told and made enthusiastic to reach a broader public. There is no right or wrong in choosing your partners. Consider that you have covered big local or regional players and the organizations with many employees to ensure a good dissemination campaign for your gamification approach. The partners are mostly needed to

ensure that your game has as many players as possible, but can additionally be a source of financing or can help you to find rewards for the winners.

- **Combine it with a challenge between different groups.** Additionally, the approach can be enhanced by a competition or challenge between different groups (see the guideline [Motivating consumers with social comparison and competition](#)). Competitions can be an extra incentive to motivate people. Groups can be predefined or they can be defined by the participants itself. The competition can e.g. be organized between the employees of organizations (see best practice example “ECOFFICES”) between different organizations or between different neighbourhoods (see best practice example “San Diego Energy Challenge”).

Energy challenge within offices (ECOFFICES, FR)

The objective of the project is to achieve an energy challenge within offices by inciting employees to an intelligent use of energy in a fun and interactive way. The project aims to change the mentality underlying energy consumption in the office and to induce an overall learning process through this “serious game”. Office buildings are equipped with metering devices and feedback channels for the employees enabling a competition based on real-time energy usage data of the employees within the offices.

In a pilot, 400 metering devices have been installed in a building of the company CSTB. The employees then received access to their consumption histograms, but also received tips on how they could improve. The employees were grouped into three teams and together aimed to reduce their consumption to receive so-called bonus points (for e.g. always switching of the light before leaving a room) while avoiding malus points (for e.g. leaving on the air conditioning while being away). The winning team received a prize for its efforts. The average saving for the three teams was a reduction of energy consumption by one fifth.

More information:

<http://ses.jrc.ec.europa.eu/ecoffices>;

<http://2011-cibw078-w102.cstb.fr/papers/Paper-38.pdf>

Motivating customers (OSCAR, CH)

OSCAR’s energy saving world is an energy portal that motivated the private customers of a utility (BKW Energie AG) to enter their meter readings into the online portal on a weekly basis to educate end-users about conservation possibilities and increase consumption awareness. Though strong initial and ongoing advertisement via poster campaigns, mailings, presence at trade fairs and festivals, OSCAR has achieved a user count of 24.000 customers. OSCAR aims to engage the participant emotionally. It is based on extensive research on consumer behaviour (motivation, social norms, incentives) by the company BEN Energy AG.

OSCAR combined gamification in the form of quizzes and little tasks that are continuously updated (find your meter) with a bonus system and a lottery. After registration, participants received bonus points for each action (take part in a quiz, enter a user profile, enter a meter reading, etc.) that could be used as currency in the utility's online store. The participants were only eligible to participate in the lottery if they entered their meter reading at least once a month.

More information: <https://oscar.bkw-fmb.ch/de/>

- **Use easy to understand language or icons.** Avoid the use of the abstract measurement unit kWh and replace it with an understandable substitute. For example: Instead of setting the goal to reduce the energy consumption by 100kWh, the goal can be to reduce it by one ton of CO₂ or the CO₂ a car uses to drive from x to y. There are many equivalent measures. Let your creativity flow! See also our feedback guideline [How to make energy visible through feedback](#) about how to present feedback and information to consumers.
- **Choose the prizes wisely.** The prizes for the winners do not have to be too valuable, the character of the game and the social challenge itself motivates people to change their behaviour or to learn. Prizes can include tickets for regional sports or cultural events. These events can furthermore become partner of the game.
- **Define goals and levels as intermediate targets.** To avoid fatigue effects, it is necessary to define intermediate goals (and prizes). This helps the participants to stay motivated.
- **Don't make it too complicated.** The best games are easy to understand and intuitive. Don't make the game too complicated.
- **Make use of emotions:** Human motivation is strongly driven by emotions. Within gamification approaches you can make use of different emotions. One easy option is to introduce a mascot into the game (see the example of the OSCAR project). Further motivation by emotions can be triggered by the visualization of the results of one's own behaviour. The visualization does not have to be shocking or depressing. It is enough to paraphrase the results (see best practice example of the Carnegie Mellon University).

Motivating behaviour with virtual pets (Carnegie Mellon University, US)

In an experiment by the Carnegie Mellon University in Pittsburgh (US), test persons received a virtual pet (polar bear) to take care of. The objective was to test the influence of simple and reduced information to the environmental behaviour of the participants. For this purpose, every participants adopted a virtual polar bear, which was sitting on an ice floe. Depending on the energy behaviour, the ice floe was shrinking which could result in a dying polar bear. This simple visualization had an enormous impact on the environmental behaviour of the participants.

More information: http://www.cs.cmu.edu/~tdillahu/index_files/Dillahunt08-Pervasive.pdf

- **Don't overburden participants.** Participants have to be engaged in the game, but it should not impose too much upon their everyday life. Taking part in the game should be fun instead of causing stress. The key here is to find the balance between keeping them committed and overburdening them. This task is not as easy as it sounds because the right balance strongly depends on the concrete gamification concept and its context. Therefore, it can be helpful to discuss this topic with experienced experts in this field.
- **Don't neglect data security and privacy.** Participation in the game is connected with the use of private data like the smart meter data. The participants should be made aware of this so transparency is required. Data usage and data security principles should be made perfectly clear right in the beginning of the project. For more information about this, see our guideline [Privacy and data security](#).

Further reading

- An [overview](#) of books dealing with gamification.
- [Videos](#) of the speakers of the gamification summit 2012.
- [Online course](#) about gamification.
- Press releases ([1](#), [2](#), [3](#)) on the San Diego Energy Challenge.
- Three sites ([1](#), [2](#), [3](#)) on gamification for children.
- A Collection of over 100 gamification examples can be found here: [http://enterprise-gamification.com/mediawiki/index.php?title=Facts - %26 Figures](http://enterprise-gamification.com/mediawiki/index.php?title=Facts_%26_Figures)
- And another 25 more can be found here: <http://blogs.clicksoftware.com/index/top-25-best-examples-of-gamification-in-business/>
- A wiki dedicated to the topic of Gamification can be found here: [http://enterprise-gamification.com/mediawiki/index.php?title=Main Page](http://enterprise-gamification.com/mediawiki/index.php?title=Main_Page)^{Mario}
- Herger (2014). *Enterprise Gamification - Engaging people by letting them have fun*. EGC Media. p. 32. ISBN 978-14-70000-64-6.

This guideline was developed in the S3C project, and is freely available from www.smartgrid-engagement-toolkit.eu.

S3C paves the way for successful long-term end user engagement, by acknowledging that the "one" smart consumer does not exist and uniform solutions are not applicable when human nature is involved. Beyond acting as a passive consumer of energy, end users can take on different positions with respective responsibilities and opportunities. In order to promote cooperation between end users and the energy utility of the future, S3C addresses the end user on three roles. The *smart consumer* is mostly interested in lowering his/her energy bill, having stable or predictable energy bills over time and keeping comfort levels of energy services on an equal level. The *smart customer* takes up a more active role in future smart grid functioning, e.g. by becoming a producer of energy or a provider of energy services. The *smart citizen* values the development of smart grids as an opportunity to realise "we-centred" needs or motivations, e.g. affiliation, self-acceptance or community.

S3C performed an extensive literature review and in-depth case study research in smart grid trials, resulting in the identification of best practices, success factors and pitfalls for end user engagement in smart energy ventures. The analysis of collected data and experiences led to the development of a new, optimised set of tools and guidelines to be used for the successful engagement of either smart consumers, smart customers or smart citizens. The S3C guidelines and tools aim to provide support to utilities in the design of an engagement strategy for both household consumers and SMEs. The collection of guidelines and tools describe the various aspects that should be taken into account when engaging with consumers, customers and citizens. More information about S3C, as well as all project deliverables, can be found at www.s3c-project.eu.