

Social Power Plus: Empowering households to energy sufficiency through co-designed app-based community energy challenges

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1. Introduction

In Switzerland, as in many Western countries, households are responsible for 31.4% of total energy consumption [1] and are therefore an important intervention point for the “Energiestrategie2050”, the Swiss energy transition. Acknowledging that the widespread technical measures targeting energy efficiency of buildings tend to neglect the impact of the occupants’ behaviour in overall energy usage, a growing body of research has focused on behavioural measures targeting reducing energy consumption and exploitation of the potential for increased energy sufficiency. Social interventions targeting energy savings at home were in fact observed to reduce energy consumption by as much as 20%, when several behaviour and engagement initiatives were implemented [2; 3; 4; 5; 6; 7].

Thanks to recent progress in information and communication technologies (ICTs), with smart meter roll-outs by utility companies, ease of installation of sensors, and the wide diffusion of smartphones by the consumers, energy-saving interventions are increasingly performed by means of applications (apps) for mobile technologies. This allows for customized, (nearly) real-time energy feedback and possibilities of interaction with and between the users. A growing tendency aims in particular at approaching individuals no longer as individual agents for change, but rather as socially situated individuals that are part of a wider community [8].

In previous research, our team developed an app-based energy savings challenge, called Social Power [9], that allowed households to monitor their electricity consumption in real time through a gamified, lay-person visualisation, which connected actions to energy use, without the need for a more complex understanding of the energy system [10]. Households were placed in teams, within which they were invited to collaborate to collectively save a

given amount of energy or to save more energy than a rival team (compared to their historical average consumption). While the real-world test of the app-based energy savings challenge successfully resulted in approx. 8% electricity savings in two Swiss cities, the savings were not maintained one year after the intervention ended [11].

We hypothesize that such a relapse to previous behaviour is due to a lack of explicit incorporation of user knowledge, practices, and preferences, into the design of the Social Power challenge. To explore such hypothesis, we launched the Social Power Plus follow-up project, in which we overcome the expert-based approach and actively engage potential target users in the design of the behaviour change intervention itself, in a living lab approach.

2. Literature Review

Living labs are processes aimed at co-creating and validating innovation within collaborative, real-world environments [12; 13; 14; 15]. They open up to “participatory mindsets”, where users become active partners of the value creation process [16; 17]: beyond “designing for the users”, living labs support “designing with the users”. The approach involves users during the design process (e.g. through interviews, survey, focus groups, or pilot testing). In this way, the product is designed for its intended use and is argued to be ultimately more effective and efficient [18].

Design involving users has been previously applied to energy transition research to improve smart meter-based behaviour change interventions – in this case, “users” are household energy consumers receiving use feedback from their smart meters. For example, consumption data has been used as feedback to provide support for energy efficient purchase decisions based on household appliance use [19], improve energy efficient appliance use behaviour [20; 21], or capture multi-faceted benefits including increasing comfort, energy savings, transparency and overall consumer awareness [22].

3. Results and Findings

The Social Power Plus community energy savings challenge and the related app will be designed together with interested community members, within the Social Power Plus living labs run in three Swiss regions in early 2021. The living lab engages three Swiss utilities and a sample of their household customers, recruited through an open communication campaign targeting all the residential customers of such utilities. Three to four workshops will be held in between February and June 2021 to co-design a new version of the app and the community energy savings challenge.

The first workshop focuses on an introduction to the app and the energy savings challenges, and connecting this to individual energy practices at home. This workshop aims to identify material and immaterial factors that influence and drive practices, as well as about possible ways they might evolve to support the energy transition. The second workshop focuses on co-design and getting specific feedback for possible new or adapted features of the app and challenges from the household participants. In addition we want to explore in those two workshops, what incentives, features or interactions might support a longer lasting and continuous use of the app and hence probably a longer lasting engagement with their own energy consumption. In parallel, professional software developers will turn such proposals

into app prototypes, which will be tested in the final meetings, providing feedback for additional improvements. This iterative process is novel and potentially impactful in realising a user-centred design. We expect to adopt a mix of in-person and online formats, to enhance interaction possibilities, while also dealing with the social distancing norms imposed by the COVID-19 crisis.

4. Discussions and Conclusions

While no results of the entire co-creation process are available, preliminary results concerning the first design workshops, as well as learnings on how to engage customers, will be available in springtime 2021 for presentation at the conference.

Social Power Plus aims at improving personal engagement in the app-based energy challenge through co-creation workshops, which are in turn supposed to optimize the app's retention rate and to encourage embedding the energy savings in the long-term. Promoting co-creation and knowledge generation, the living lab is in fact expected to support the transformative potential of socially embedded behaviour change interventions [23]. This participatory approach supports an initial alignment of goals and interests with potential participants to save energy and aims to understand contexts, limitations, and opportunities around it. Furthermore, the living lab allows to test the app's and community energy savings challenge's features, and ideally to identify inter-locked practices which are relevant to household energy saving [24], thus supporting a long-term impact.

The app and community energy savings challenge resulting from co-creation in the living labs will finally be tested in 2022 in three real-life trials engaging a large number of customers in order to assess their long-term effectiveness in supporting the energy transition.

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