# 5.3 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 'Energiestrategie2050', for achieving the country's energy transition. Acknowledging that the widespread technical measures targeting the energy efficiency of buildings tends to neglect the impact of 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 behavioural and engagement initiatives were implemented[2,3,4,5,6,7].

Thanks to recent progress in information and communication technologies (ICTs), with smart meter rollouts by utility companies, ease of installation of sensors and the widespread diffusion of smartphones among consumers, energy-saving interventions are increasingly being performed by means of applications (apps) for mobile technologies. This allows customized, (nearly) real-time energy feedback and interaction with and between the users. One particular growing tendency is to approach consumers no longer as individual agents for change, but rather as socially situated individuals who 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 save a

given amount of energy collectively 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 approximately 8% in electricity savings in two Swiss cities, the savings were not being maintained one year after the intervention ended[11].

We hypothesize that such relapses into previous behaviour are due to a failure to explicitly incorporate user knowledge, practices and preferences into the design of the Social Power challenge. To explore this hypothesis, we have 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, using 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 make possible 'participatory mindsets', in which users become active partners in 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, surveys, focus groups, pilot testing). This results in the product being designed for its intended use, the argument being that this is ultimately more effective and efficient[18].

Designs involving users have been previously applied to energy transition research in order to improve smart meter-based behaviour change interventions: in this case, 'users' are household energy consumers receiving feedback on usage from their smart meters. For example, consumption data have been used as feedback to provide support for energy-efficient purchasing 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 being 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 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 challenge, connecting this to individual energy practices at home. This workshop aims to identify the material and immaterial factors that influence and drive practices, as well as 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, in these two workshops we will explore 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 mixture 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. Discussion and Conclusions

While results of the entire co-creation process are not yet available, preliminary results concerning the first design workshops, as well as lessons on how to engage customers, will become available in spring 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 intended to optimize the app's retention rate and to encourage the embedding of 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, its aim being to understand the surrounding contexts, limitations and opportunities. Furthermore, the living lab allows the app's and community energy-savings challenge's features to be tested, and ideally inter-locking practices that are relevant to household energy savings to be identified[24], thus supporting long-term impacts.

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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