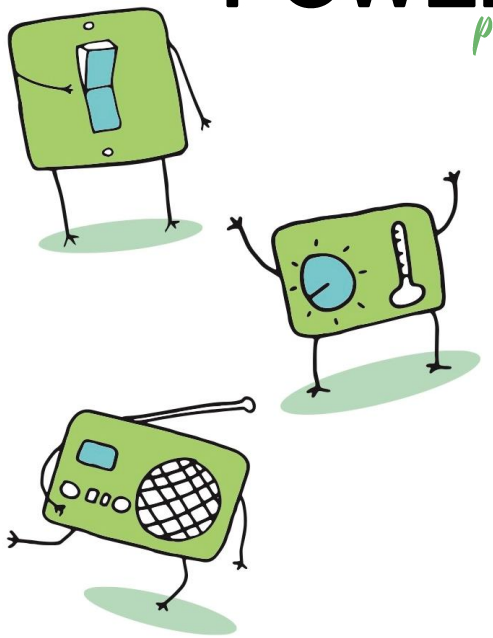
SOCIAL POWER plus

Empowering households to energy sufficiency through co-designed, app-based community energy challenges



Francesca Cellina, Vicente Carabias-Hütter, Roberta Castri, Vanessa De Luca, Pasquale Granato, Pascal Kienast, Evelyn Lobsiger-Kägi, Devon Wemyss

University of Applied Sciences and Arts of Southern Switzerland (SUPSI)
Zurich University of Applied Sciences (ZHAW)

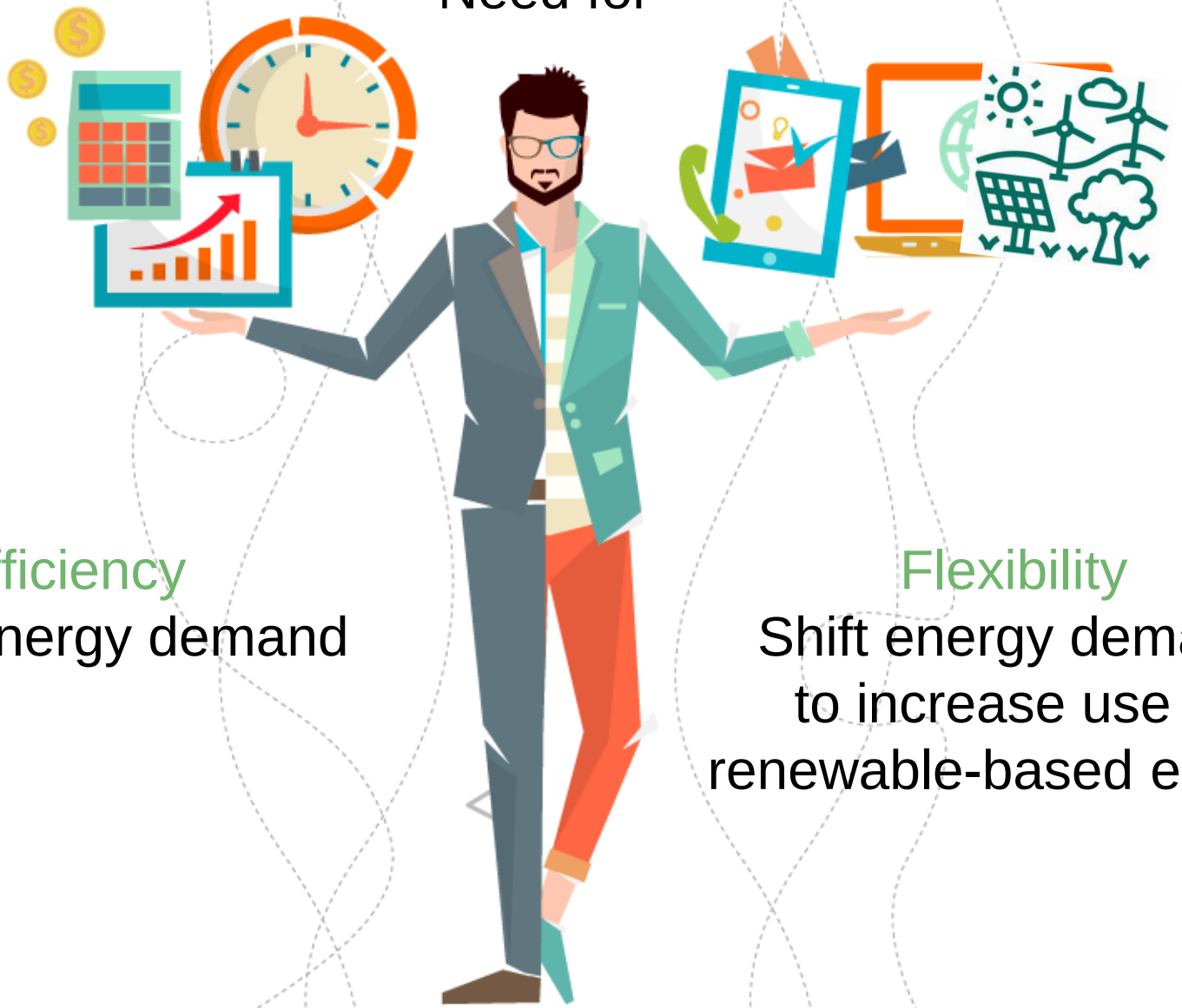
Supported by:

Scuola universitaria professionale della Svizzera italiana SUPSI
Zurich University of Applied Sciences zhaw
CLEMAP CLEVER ENERGY MAPPING
EKS
STADTWERK WINTERTHUR
Energiestadt Wil für Klima und Umwelt
TBW
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Bundesamt für Energie BFE
Office fédéral de l'énergie OFEN

Technology improvements in the building sector (efficiency) are essential components of the energy transition

However, human activity has a tangible impact on energy consumption in buildings

Need for



Sufficiency

Reduce energy demand

Flexibility

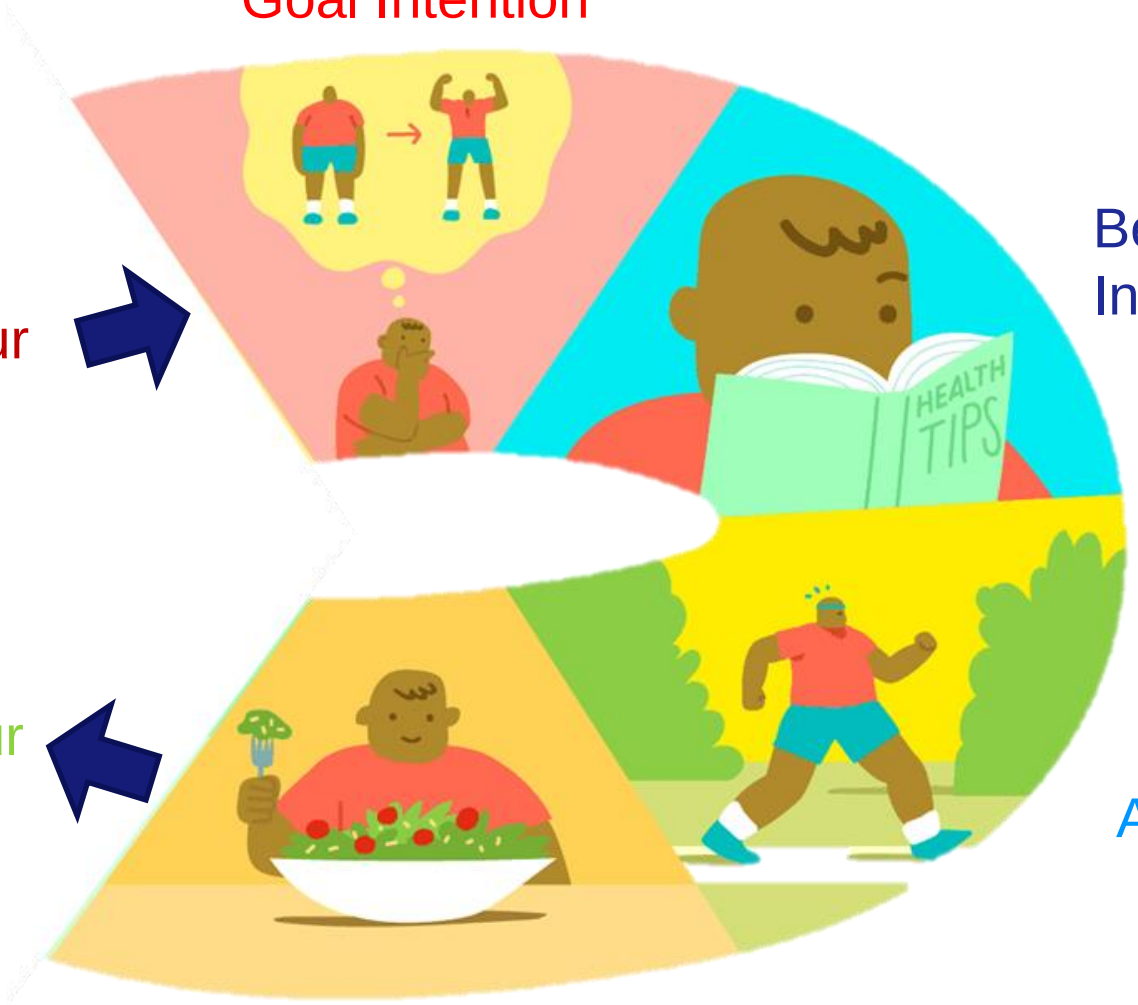
Shift energy demand to increase use of renewable-based energy

Behaviour change

Behaviour change as a process through stages

Goal Intention

Present behaviour



Behavioural Intention

Target behaviour

Action

Habit formation

based on Ohmacht et al, 2017; Artho et al, 2012; TPB-model

Community-based engagement strategies

- They build a sense of community, shared values and goals
- They favour cohesion where otherwise individual action feels insignificant
- They allow the sharing of good practices
- They reinforce positive change in social norms

Social Power

An app-based electricity-saving game between teams of households, exploiting smart meters

Collaborative or competitive game-setting

Average 8% electricity savings in the short-term

www.socialpower.ch

Social Power Plus

Four challenges

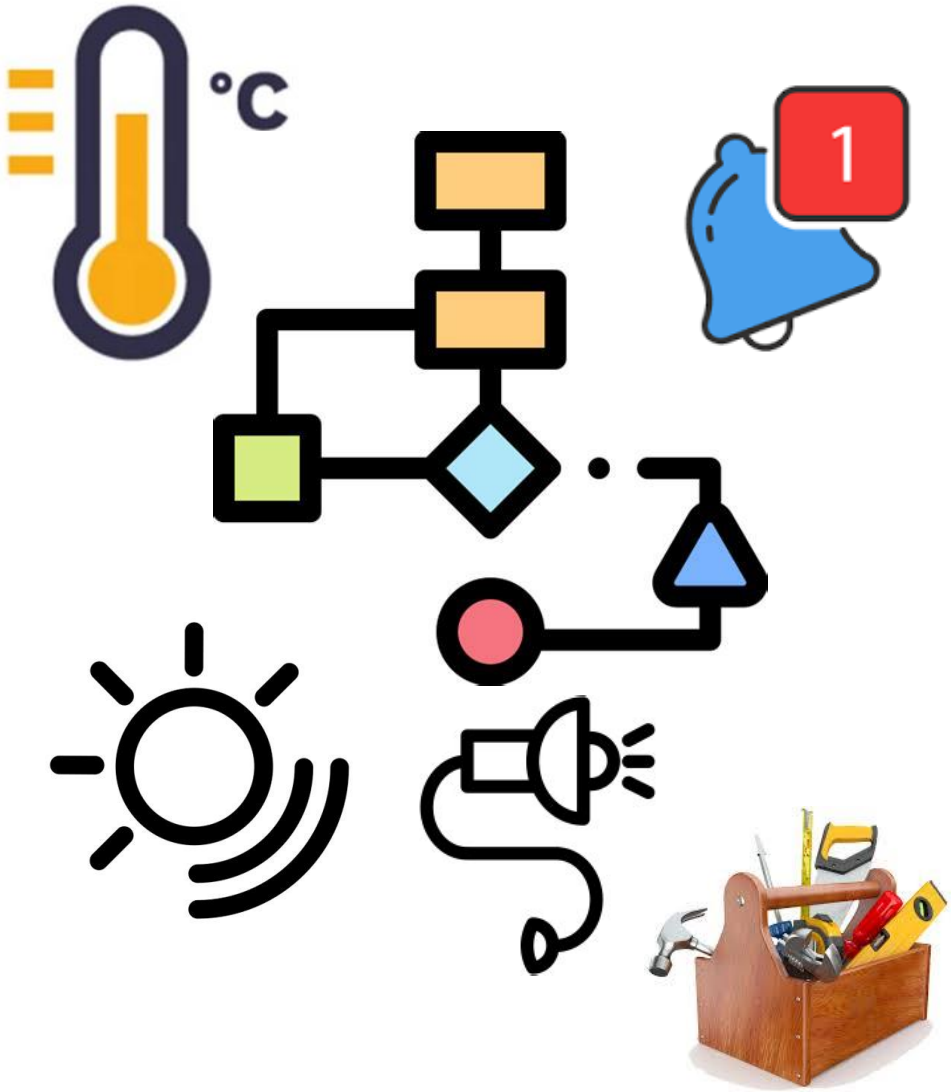
1. Maintain energy savings in the long term
2. Reduce drop-outs and early abandon
3. Include energy consumption for heating purposes
4. Include flexibility of consumption

www.socialpower.ch

The Social Power Plus «Community energy challenge»

- Engage potential users in the co-design of the app's features (Living lab approach)
- Exploit already existing real-life relations
- Favour sharing of experiences
- Combine virtual, app-mediated activities with in-person activities
- Address energy saving potentials, as well as concrete daily practices, both inside and outside the house

The Social Power Plus «Digital toolbox»



Provide feedback on energy consumption (heating/large electricity appliances):

- load disaggregation algorithms
- electricity and gas smart meters and IoT sensors

Provide reminders to avoid relapse to previous energy consumption behaviour

Three pilot regions across Switzerland

- 100 households involved in each region
- Schaffausen - Elektrizitätswerk des Kantons Schaffhausen AG (EKS)
- Winterthur - Stadtwerk Winterthur
- Wil - Technische Betriebe Wil (TBW)
- Different metering systems and technology equipments

- Test the effectiveness of the «SPP Community energy challenge»
  - creation of commitment and engagement over time
  - energy saving
  - flexibility in energy consumption
- A before-after, quasi experimental design (questionnaires and energy consumption data collected by utilities)

Treatment group

(self-selection)

Control group

(matched to treatment, random selection between utilities' customers)

- Develop guidelines and make the digital toolbox openly accessible

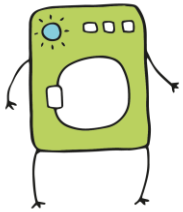
Co-design in the living labs

Recruitment of interested households in the three regions

	Schaffhausen	Wil	Winterthur
Participants	15/18	9/12	20/24
Number of families	4	7	7
Average age	58	45	65
% Female (number)	16% (3)	15% (2)	26% (6)
% Owner (vs. renter)	100%	62%	95%
% PV owners (number)	42% (8)	31% (4)	18% (4)

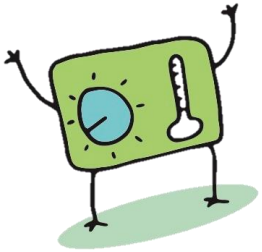
- Motivation to join:
  - Climate and environmental concerns: more needs to be done and hopefully this project helps
  - Technology orientation: many photovoltaic (PV) and electric vehicle owners, aiming at improving their competences

Which behaviours do we want to improve?

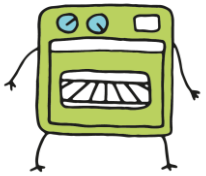


Washing
- Use dryer less
- Use washing machine when the sun is shining
- Only run washing machine when full

Heating
- Reduce temperature by 1°C
- Reduce heating in certain rooms
- Only short airing of house



Kitchen/ appliances
- Use dishwasher when the sun is shining
- Only run dishwasher when full
- Turn off standby appliances
- Use oven less and more efficiently



Co-design in the living labs

- So far, two online meetings in each region (very low drop-out rates)
  - Discover the previous Social Power app
  - Develop user stories and get specific feedback on design elements
  - Provide inputs on how to favour engagement and commitment for change (sufficiency, flexibility and efficiency)

Set individual goals for change

An internal chat to share progress and difficulties

Get practical (and customised) recommendations

Comparisons with similar households and previous own behaviour

Interaction with family, friends, and within household members

Account for the weather forecast

Next steps

- Identification of the features of the Social Power Plus Community energy challenge and of the related game mechanics
- Development of a mock-up and further advice by living lab participants
- Development of the Toolboxes in parallel with recruitment of participating households
- The Community energy challenge will start on early 2022 and last for three months, followed by nine months of reminders and feedback at the individual level
- Assessment of its effects will be assessed after one full year

Thank you for your attention!

francesca.cellina@supsi.ch