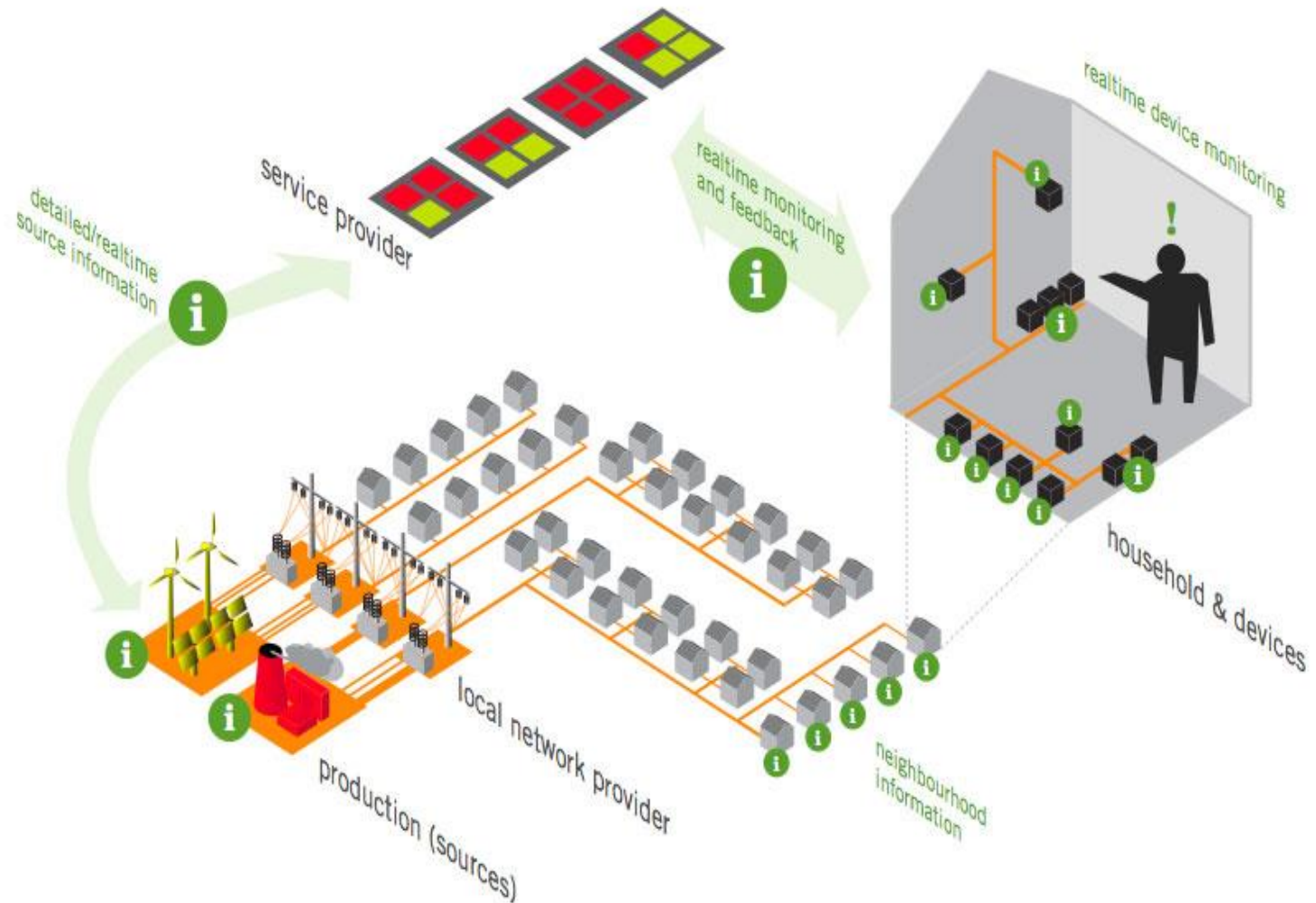


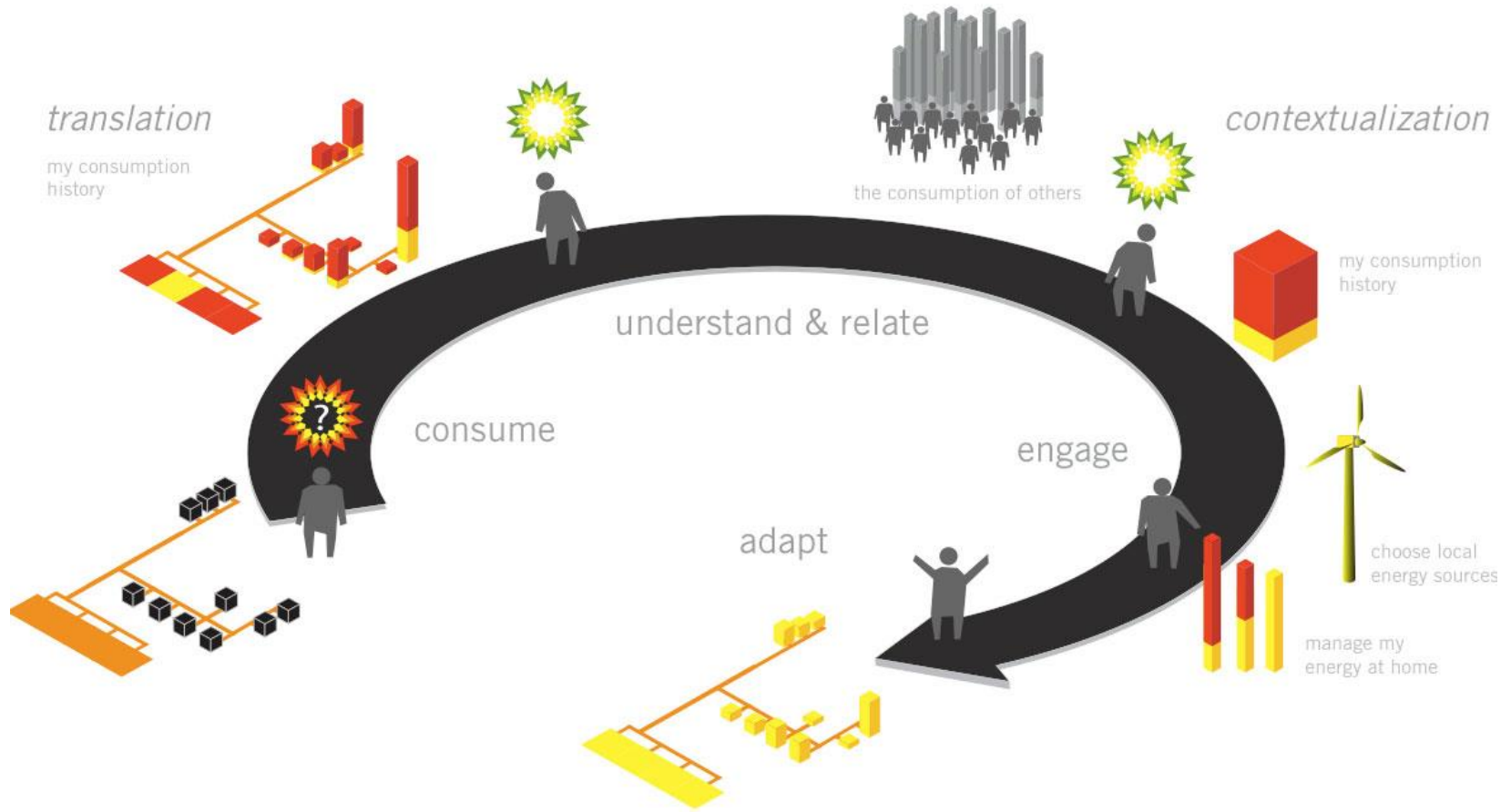
Engaging People in Energy Choices

Marko Turpeinen

Problem 1: Complexity of infrastructure and information



Problem 2: Complexity of influencing social choice and practices



Behavior Change approaches in Energy

- Research in energy consumption has highlighted the importance of social norms and social media in formation of choice.
 - Established approaches are not able to exploit the opportunities of technology in turning consumers into active players.
 - Feedback, social norms and values campaigns, and discussion forums on conventional social media.
- These efforts are only partially effective in changing habits and energy choices affecting equipment and infrastructure for their limit in addressing engagement and participation.

Choice Models

- Behavior change models have been dominated by:
 - **rational choice** models, are often employed by psychologists who view environmental behavior primarily as driven by self-interest;
 - the second, **norm-activation** models, tend to be used by researchers who view pro-social motives as most important (Froehlich et al 2010).
- Recently **social constructivist theories** provide alternatives to previous models that tend to reduce agency to the choice of individuals.

Ecoland

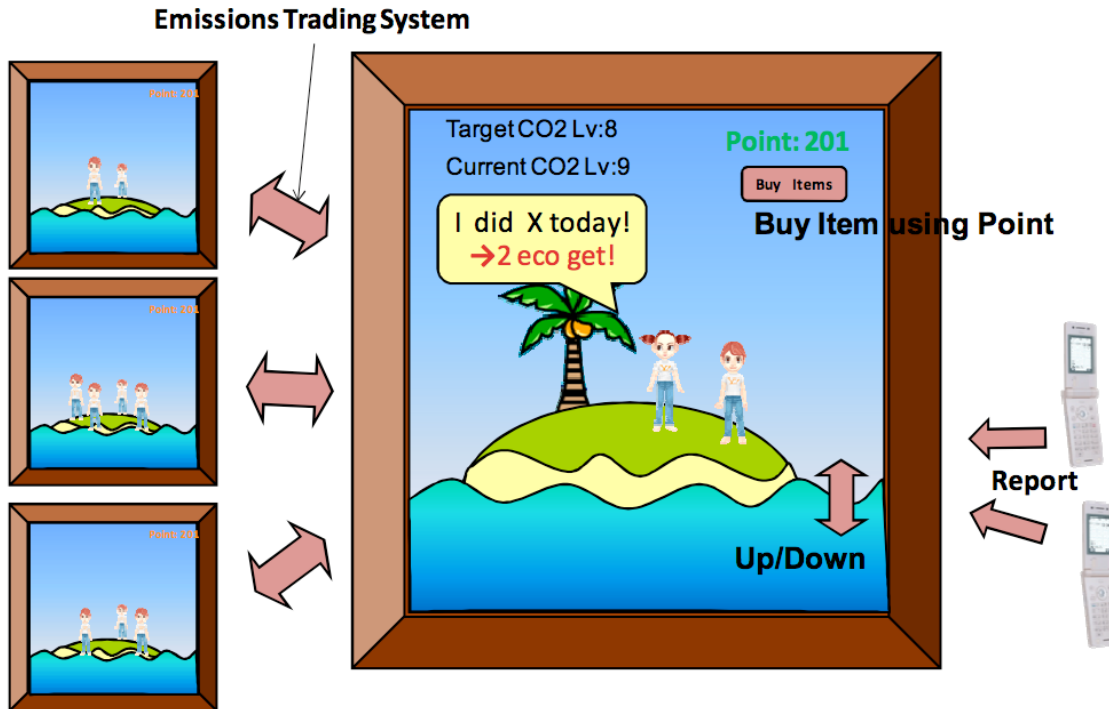
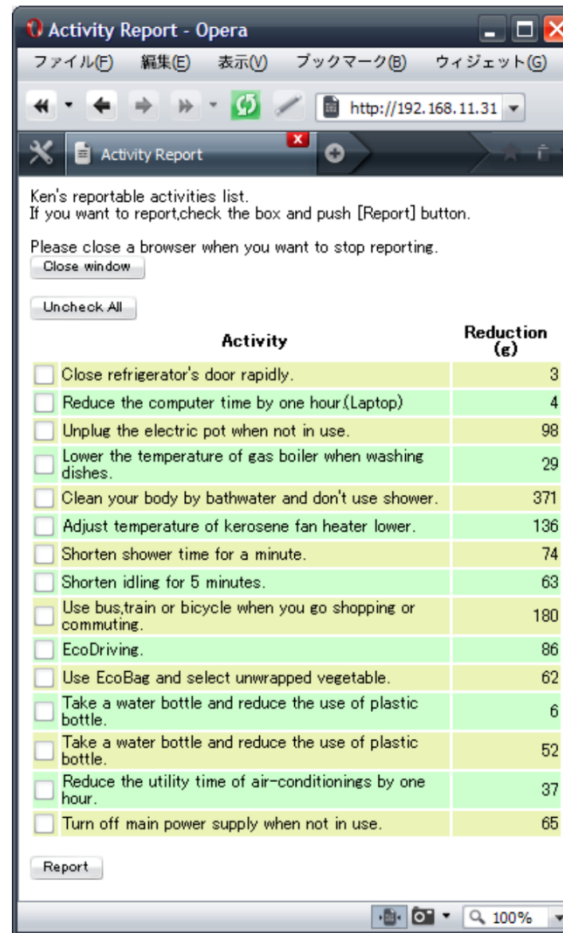


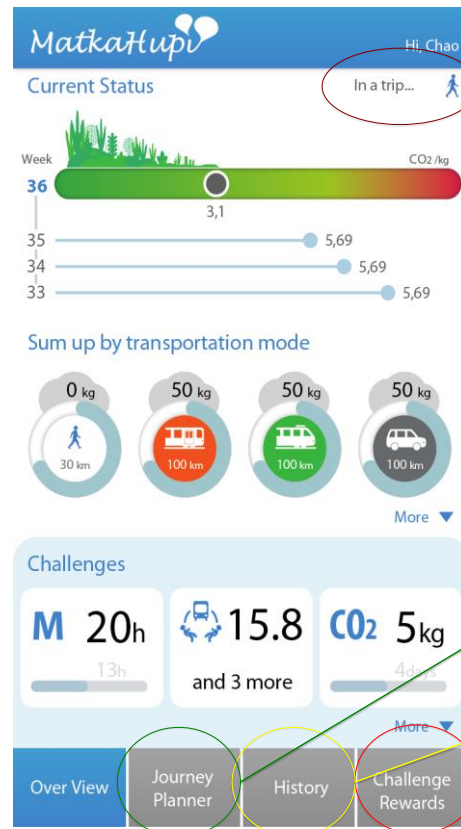
図 1. アプリケーション

- Environmental CO2 exchange.
- Family quotas.
- Uses sensors and mobile phones for reporting on a home server.
- Visualised as a family island where every family member has an avatar.
- If the CO2 targets are not met, water rises.
- CO2 rights can be traded with other users.
- Saved quotas can be used for purchasing virtual items.
- Collaboration between Waseda University and HIIT.

Ecoland



Sustainable mobility eco feedback based on automatic tracking



An indicator shows the current detected status of the user.

The user can see how the emissions of the current week compare to the past three weeks.

Middle of the screen shows a breakdown of emissions per transport mode.

Bottom of the screen shows a summary of the active challenges.

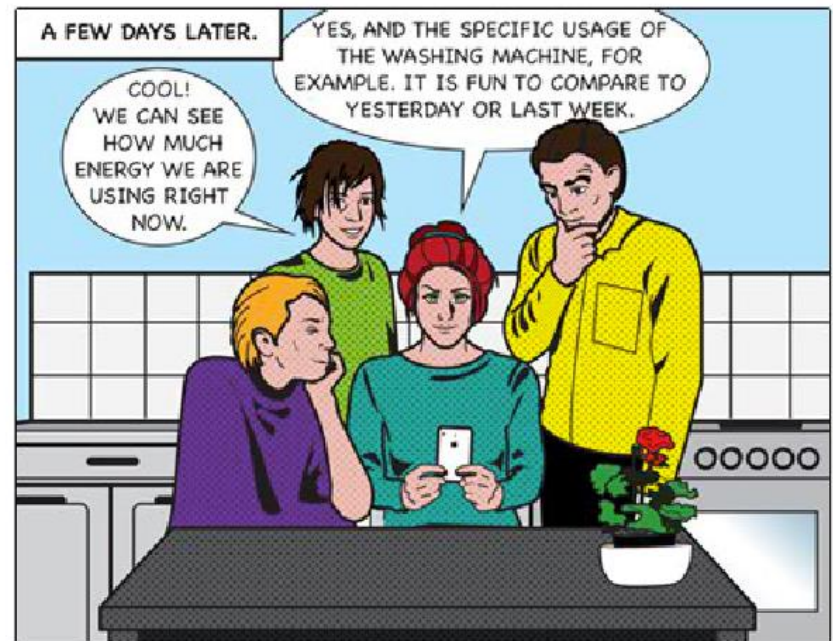
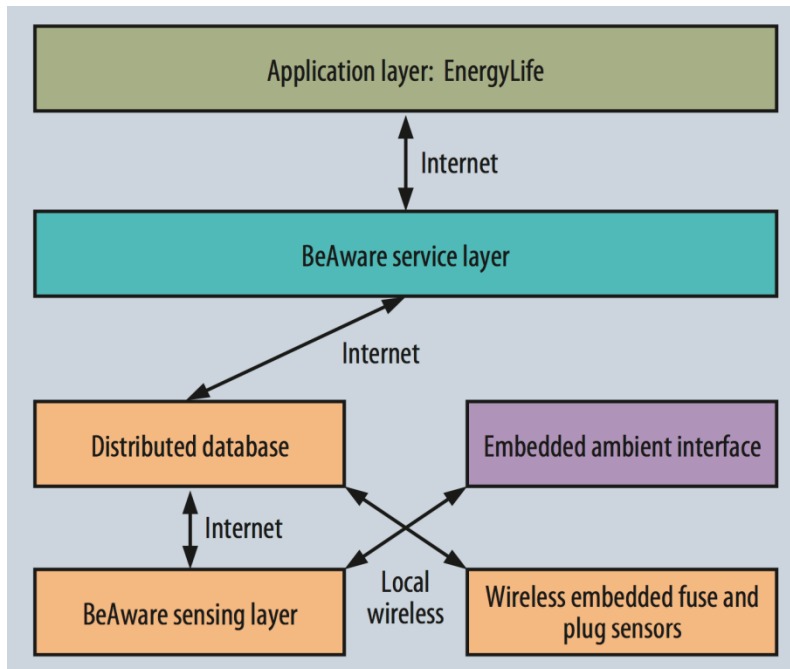
A journey planner, making use of the open API provided by HSL, is available for planning new trips.

The user can view a list of past trips.

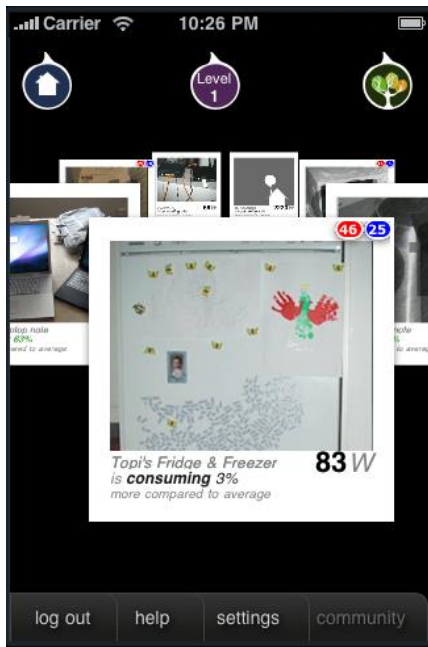
A more detailed view of ongoing and completed challenges.

Project BeAware

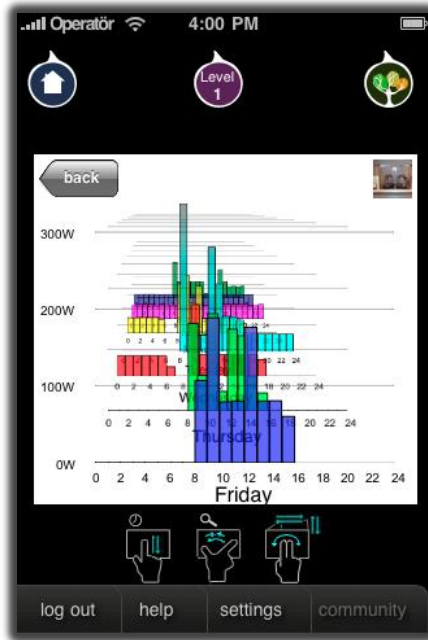
- Support users in adopting virtuous “saving” behaviors can be done using engaging game oriented applications



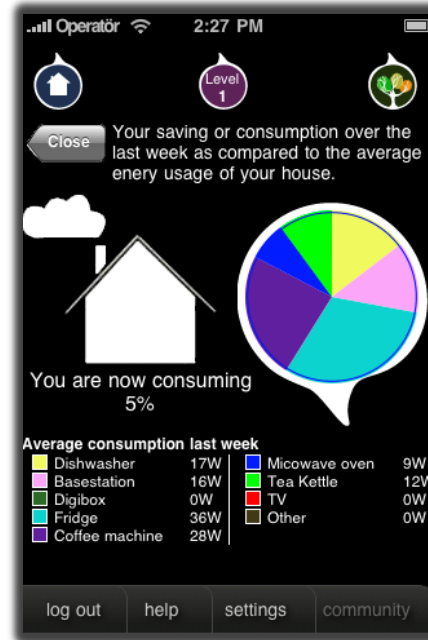
BeAware: EnergyLife



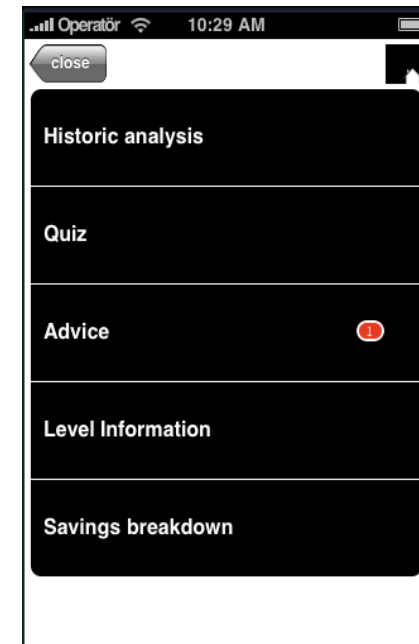
Intuitive cards



Historic comparison



Overview of saving

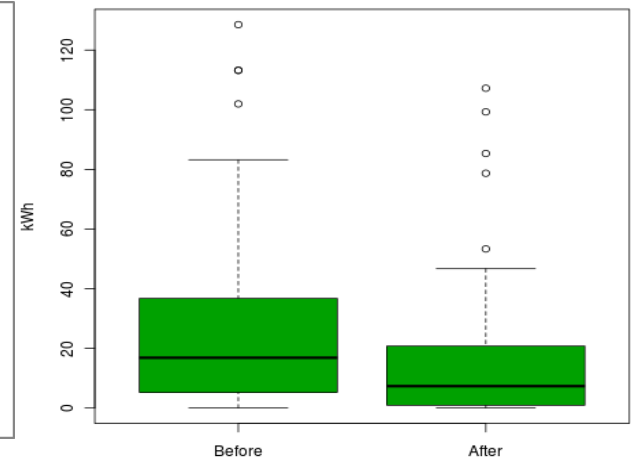
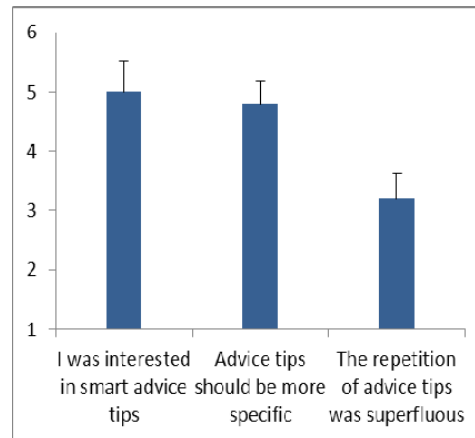


Smart Advice and Quiz

BeAware: EnergyLife Saving

Smart advices triggered contextually and tailored to users save more energy

The computer that you have left on on [day] for [n] hours made you consume [n] g CO2. Switch off the monitor if you plan not to use it for longer than 15 minutes
The computer that you left in stand-by for [n] hours, made you consume [n] kWh this week. Please remember to turn it off completely, to avoid wasting electricity
The computer that you left in stand-by mode for [n] hours this week, made you consume [n] g CO2 more than the previous week. Switch the computer off completely instead of leaving it in stand-by
This week [n] trees had to absorb the CO2 produced by your PC . Help the environment by changing the energy saving setting of your PC
This week [n] trees had to absorb the CO2 produced to provide energy for your fridge : you can help the environment by reducing the length at which the door is left open and do not insert food when it is still warm
This week your fridge spent [n] kWh more than last week. To save electricity reduce the duration of door openings and do not insert food when it is still warm
This week the micro wave oven spent [n] kWh more than last week. Please try to use it as little as possible to save electricity
This week [n] trees had to absorb the CO2 produced by your micro wave oven. Save electricity by defrosting your food naturally
This week you left the microwave on stand-by for [n] hours consuming [n] kWh. To save electricity, try to turn it off completely
The stereo that this week you have left in stand-by for [n] hours, made you consume [n] kWh more than the previous week. Remember to switch it off completely when you don't use it, to conserve electricity
On day [n] the TV left on for [n] hours made you consume [n] kWh. To save electricity switch it on only when you really watch it
On day [n] you used the washing machine [n] times. Was it always fully loaded? In this way you can save electricity and time
The day [n] you used the washing machine [n] hours longer than usual. Please try to use it only at full load

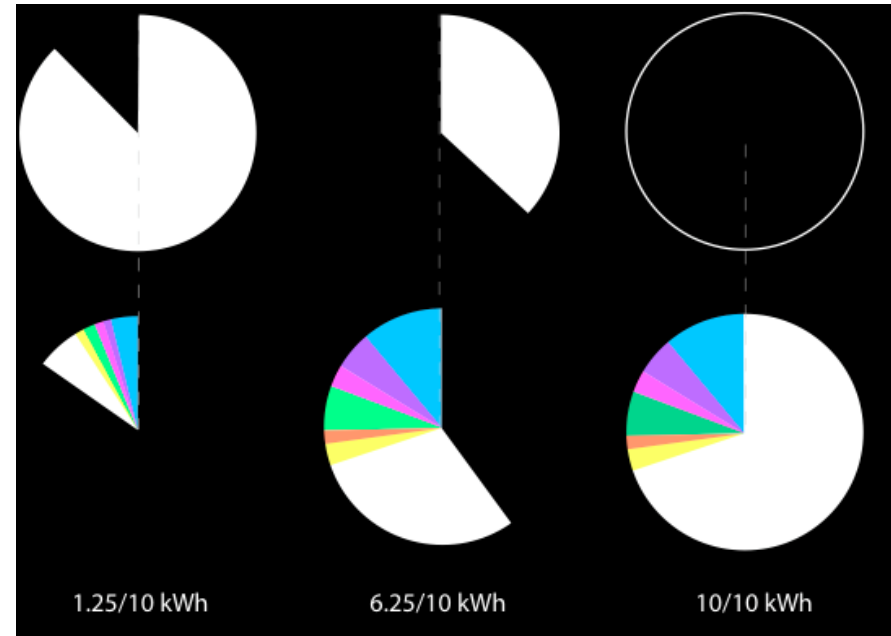


Box plots of electricity consumptions the day before (left) and after (right) reading a smart advice tip. Isolated dots represent outlier observations.

BeAware: Ambient and ubiquitous interfaces



Intuitive tangible interface to quantify watt



Integrating web resources in the domestic environment



Tokens of Search

RFID reader

Token (RFID chip)

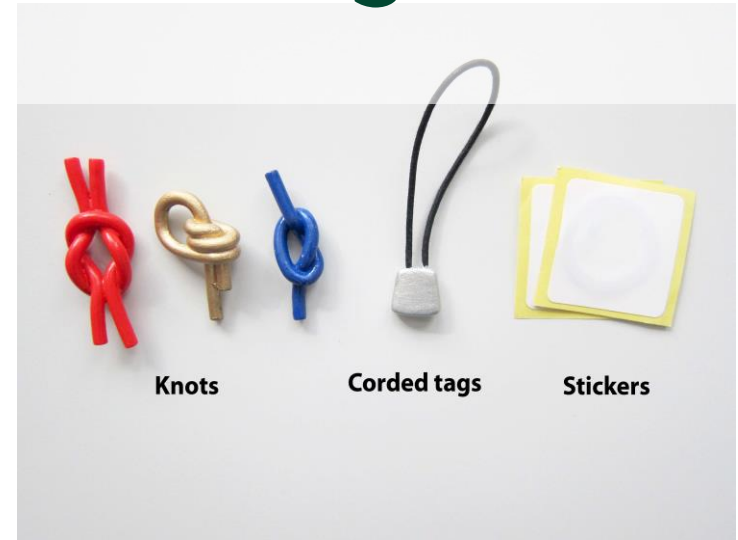
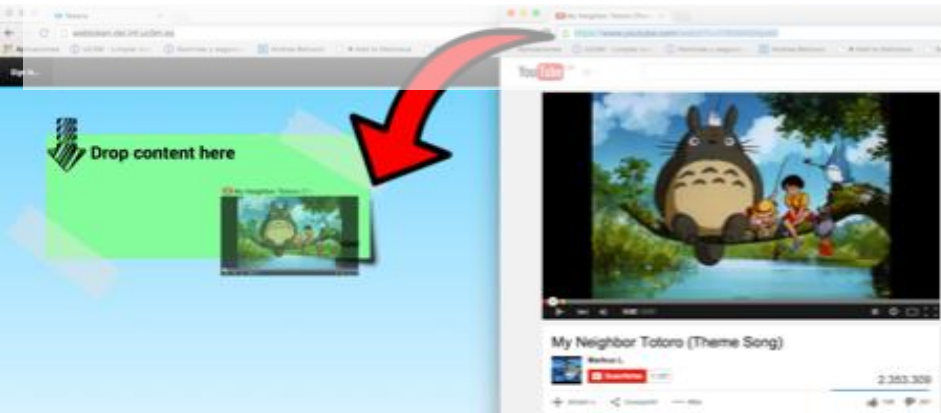
Tokens tray

Screen for viewing



Exploring use cases through co-design

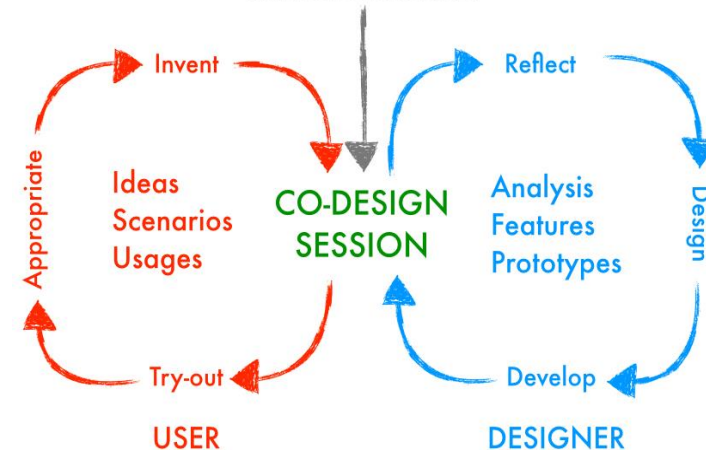
End User Programming



3 families (the UK, Finland, South Korea)

4 weeks in each household

Open-ended technology (repurposing):
undefined purposes
different affordances

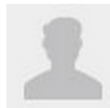


Suvilahti Solar Panel Farm



VAPAA AURINKOPANEELI (0)
OSTETTU AURINKOPANEELI (1188)

PANEELI nro. SUVI505



Omistaja
Stefano De Pascale

Ostettu 06.10.2014



AURINKOVOIMALAAN ASENNETTAVIEN AURINKOPANEELIEN SIJAINTI JA SAATAVUUS. KAIKKI PANEELIT TUOTTAVAT SAMAN VERRAN.

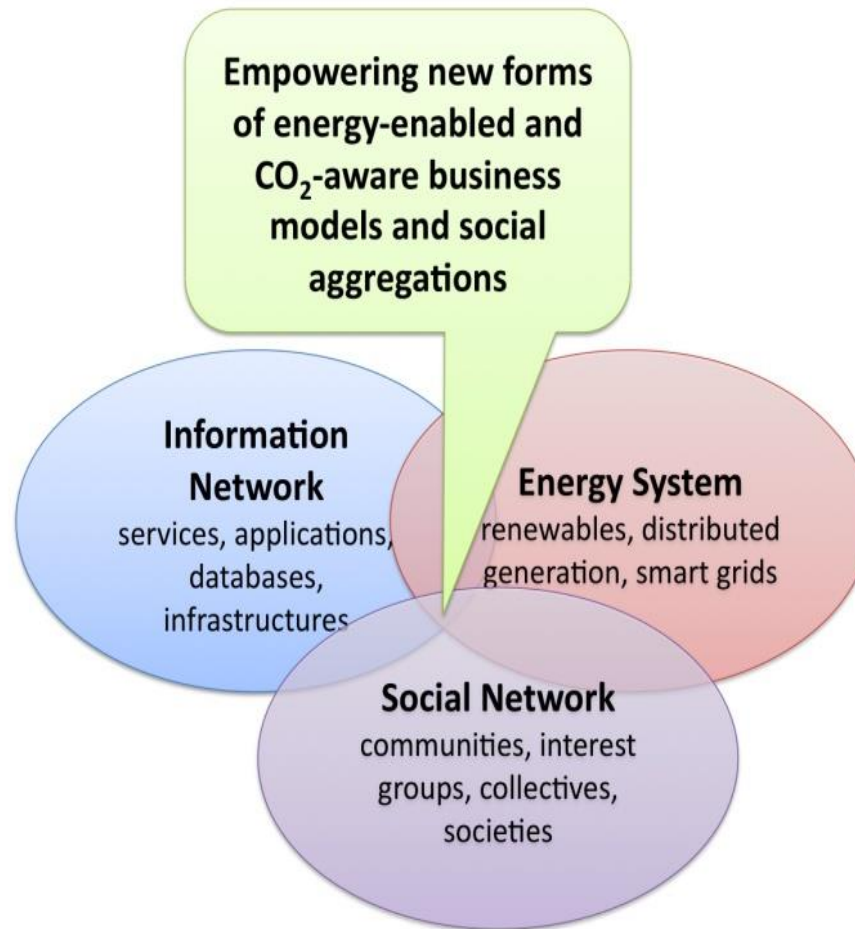


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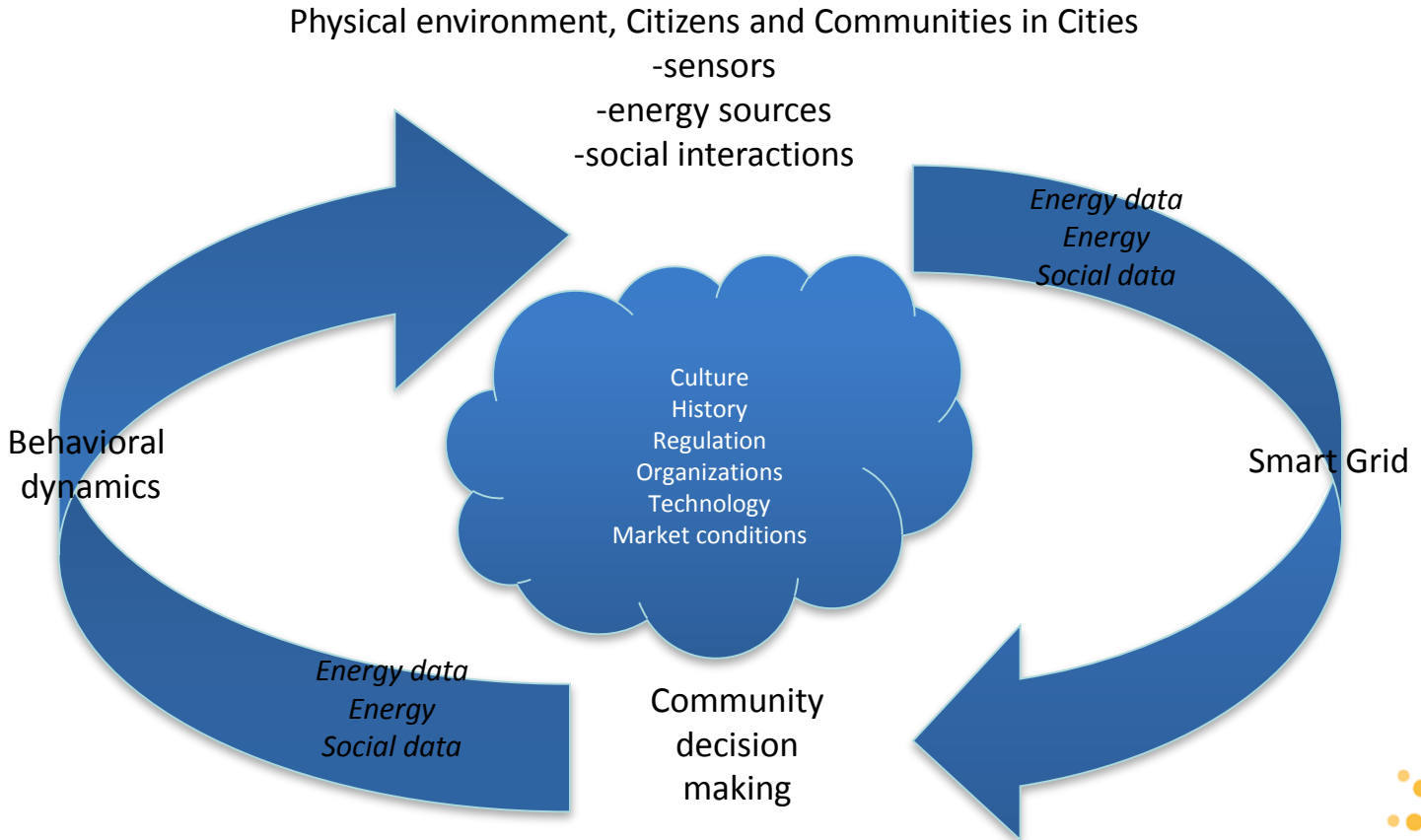
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Social Dimension in Energy



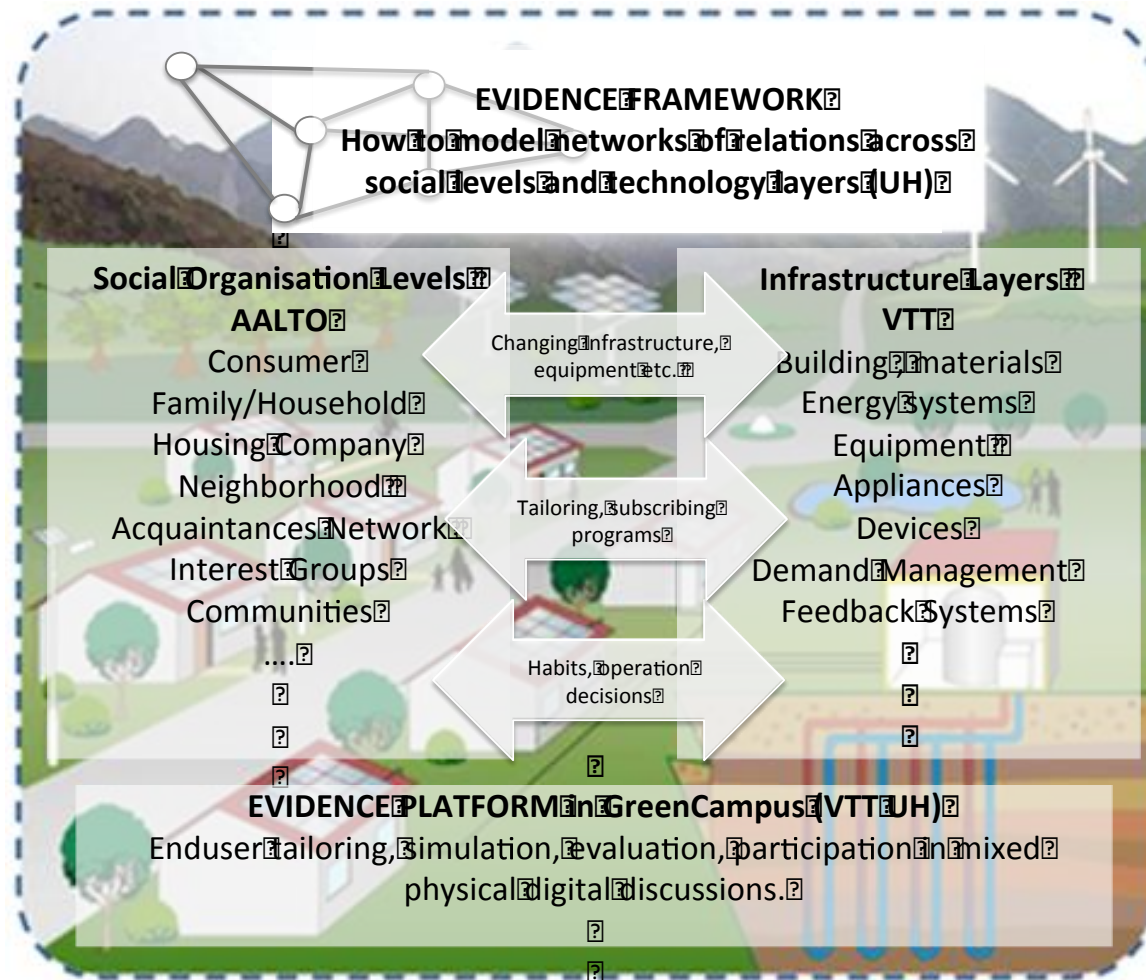
Socially Smart Grid



Our EVIDENCE Approach

- Measures, incentives and other approaches need to take into account the complex layering of the technological environment and tailoring to engage consumers in choice formation.
- The collective emergence and active shaping of choice can be addressed by ubiquitous social media that better support choice across levels of social organization.
- Evaluation platform can be created where measures and incentives can be tested in simulation of the wider network where users are actively shaping technology through end user tailoring.

EVIDENCE Consortium

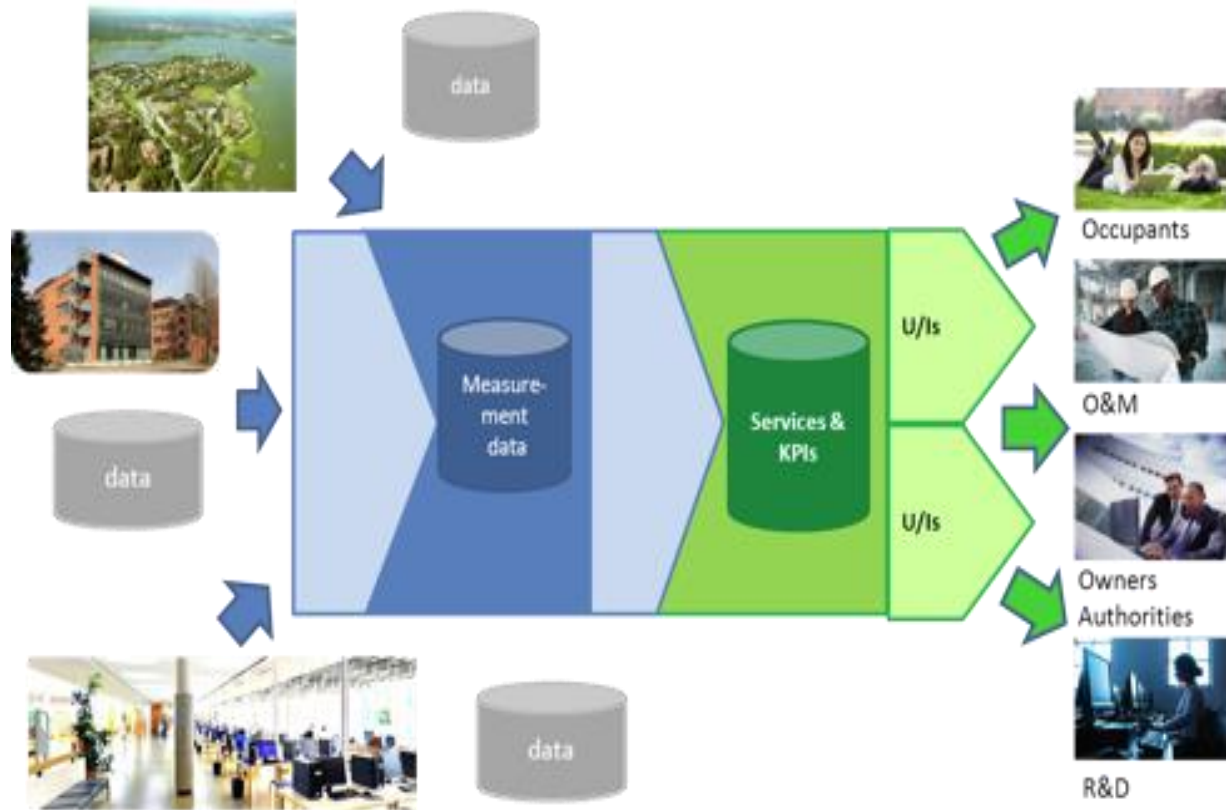


Otaniemi EcoCampus



- Field research in EVIDENCE is in the Otaniemi EcoCampus.
- A secondary mirror site in China is the Tongji GreenCampus

GreenCampus



EVIDENCE Work Organisation

- **Task 1:** Field and web survey studies from GreenCampus households (N=12 around 40 participants) and web survey data (N=1000) at international level.
- **Task 2:** Analytical framework for understanding energy choice using as methods recent constructivist approaches such as Actor-Network Theory (Latour 2005).
- **Task 3:** Workshops for identification of incentives and measures.
- **Task 4:** Prototyping and interventions with end user tailoring.
- **Task 5:** Simulation of wider energy and social network.
- **Task 6:** Test Bed Platform for evaluating incentives and measures. The GreenCampus is extended to become an evaluation platform.
- **Task 7:** Evaluation in GreenCampus households in Otaniemi and Shanghai.
- **Task 8:** Dissemination and Workshops with stakeholders.

EVIDENCE team

VTT Energy



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HY Social Psychology



Veera Kotkavuori

HY End User Development



Andrea Bellucci

PhD Students and Postdocs

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VTT Energy



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HY Design, HCI



Prof. Giulio Jacucci

PIs and Professors





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INSTITUTE FOR
INFORMATION
TECHNOLOGY

Thank you!

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