



Empowering cities

**Innovative strategies
for Smart buildings and citizens**

**IMPACT OF SERIOUS
GAMES ON THE ENERGY
EFFICIENCY OF SOCIAL
HOUSING COMMUNITIES**

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Introduction

- **Housing sector priority in EU**
 - 40% energy used is in the building sector
 - Greatest energy saving potential (estimated of 1509 Mtoe)
- **Energy efficient initiatives must be focused on the existing buildings**
 - Buildings have long lifespans
 - Currently low turnover in the sector
- **Energy users' behavioural change + Current gamification**

Introduction



EnerGAware

Energy Game for **Awareness** of energy
efficiency in social housing communities

- **Aim**
 - Reduce the energy consumption and emissions
- **Through**
 - Increasing the social tenants' understanding in Energy Efficiency
- **Using**
 - Serious Game



Serious games

- **What is a serious game?**
 - Simulated environment
 - Based on social interaction
 - Using a scenario experimentation
 - Designed to highlight potential realistic outputs
- **What is the aim of a serious game?**
 - Cover the bridge between understanding and awareness
 - Change human behavior through
 - Education
 - Training



EnerGAware starting point

- **Used**
 - A city-wide survey (sample size 2,772)
 - Three game-play scenarios
 - A social housing building stock DB
- **Project requirements**
 - User requirements
 - Building requirements
 - Game requirements



Identification of requirements

- **User requirements**
 - Domestic environment
 - Visual interface adapted to aging and novice users
 - Easy and clear goals
 - Users should learn
 - Balance energy consumption, comfort and costs
 - Where energy is consumed
 - How to save energy
 - Interaction with social media platforms

EnerGAware requirements

- **Building requirements**
 - Design “typical” social dwelling
 - Own metering system and own communication infrastructure
- **Game requirements**
 - Serious game focused on a virtual house customization game
 - Pseudo realistic game
 - Suitable device → Tactile tablet

Home sweet home



Beyond Space



Do it like Lemmings



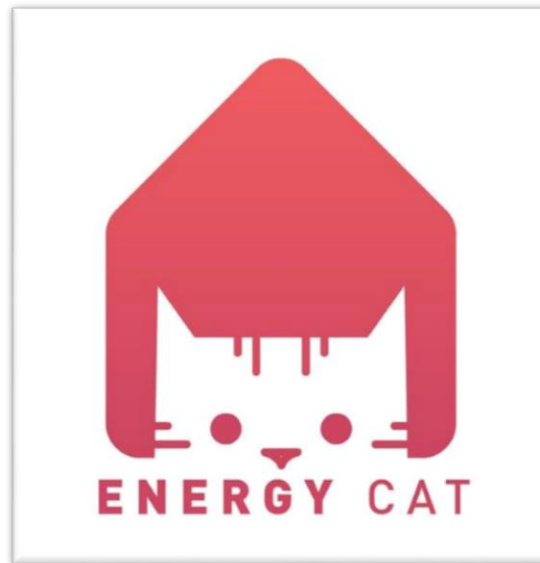
Game development

- **Development**
 - Living Lab methodology
 - Tenants active part of research, development and innovation
 - Deployment and testing integrated with the energy metering system

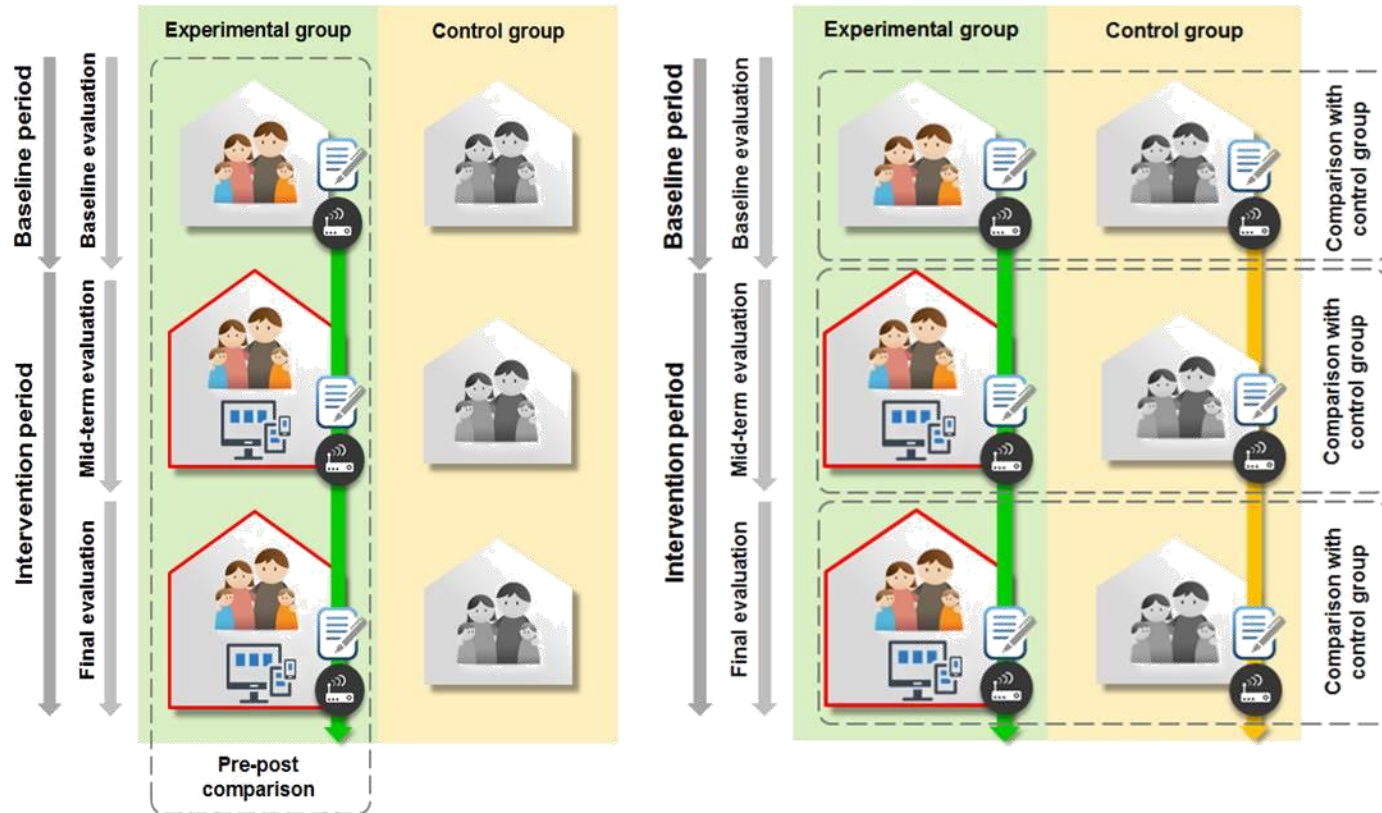


EnerGAware game

Energy Cat : The House of Tomorrow



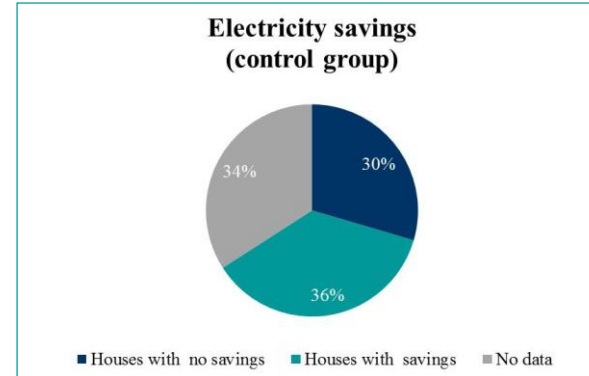
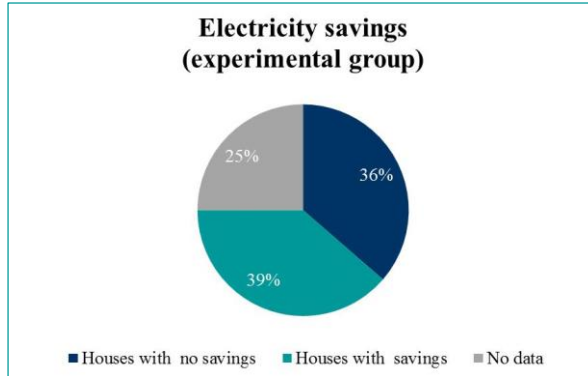
Evaluation methodology



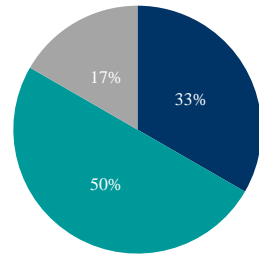
- International Performance Measurement and Verification Protocol (IPMVP)
- BECA project



EnerGAware results

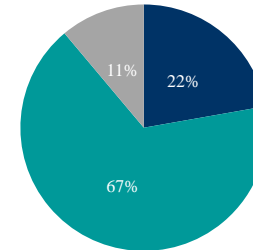


Electricity savings (experimental group, subgroup 1)



■ Houses with no savings ■ Houses with savings ■ No data

Electricity savings (experimental group, subgroup 2)



■ Houses with no savings ■ Houses with savings ■ No data

	Experimental group (N=44)	Experimental group Subgroup 1 (N=17)	Experimental group Subgroup 2 (N=9)	Control group (N=44)
Average electricity saving [%] ¹	1.39%	1.99%	8.66%	-2.50%



EnerGAware results

	KPI-1 Electricity consumption per day [kWh/day]	
	Experimental group	Control group
Baseline period	9.12	9.77
Mid-term reporting period	8.66	14.19

Issues learned:

- Tenants involvement
- How to motivate them?
- Technical problems

Preliminar conclusions:

- Hypotesis seems to be ok
- Energy Savings seems to be achieved

Final remarks

- **More info** and details at project website:



<http://energaware.eu/>

- **ENERGY CAT game** available in few weeks at **major app stores**



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