



Is this the Real World?
Perfect Smart Cities
vs.
Real Emotional Cities

A SMART HOME NETWORK FOR PROACTIVE USERS

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SUMMARY



Introduction



Design of System Architecture



Centocelle neighbourhood



Users' engagement



Conclusion

Introduction



General framework



European SET Plan Challenge 1st: “Active consumer is at the centre of the energy system”.

I-MiSE ESRP: research and development of National Electricity System research programme guidelines as part of the “*Development of an integrated model of a replicable Urban Smart District network*” .



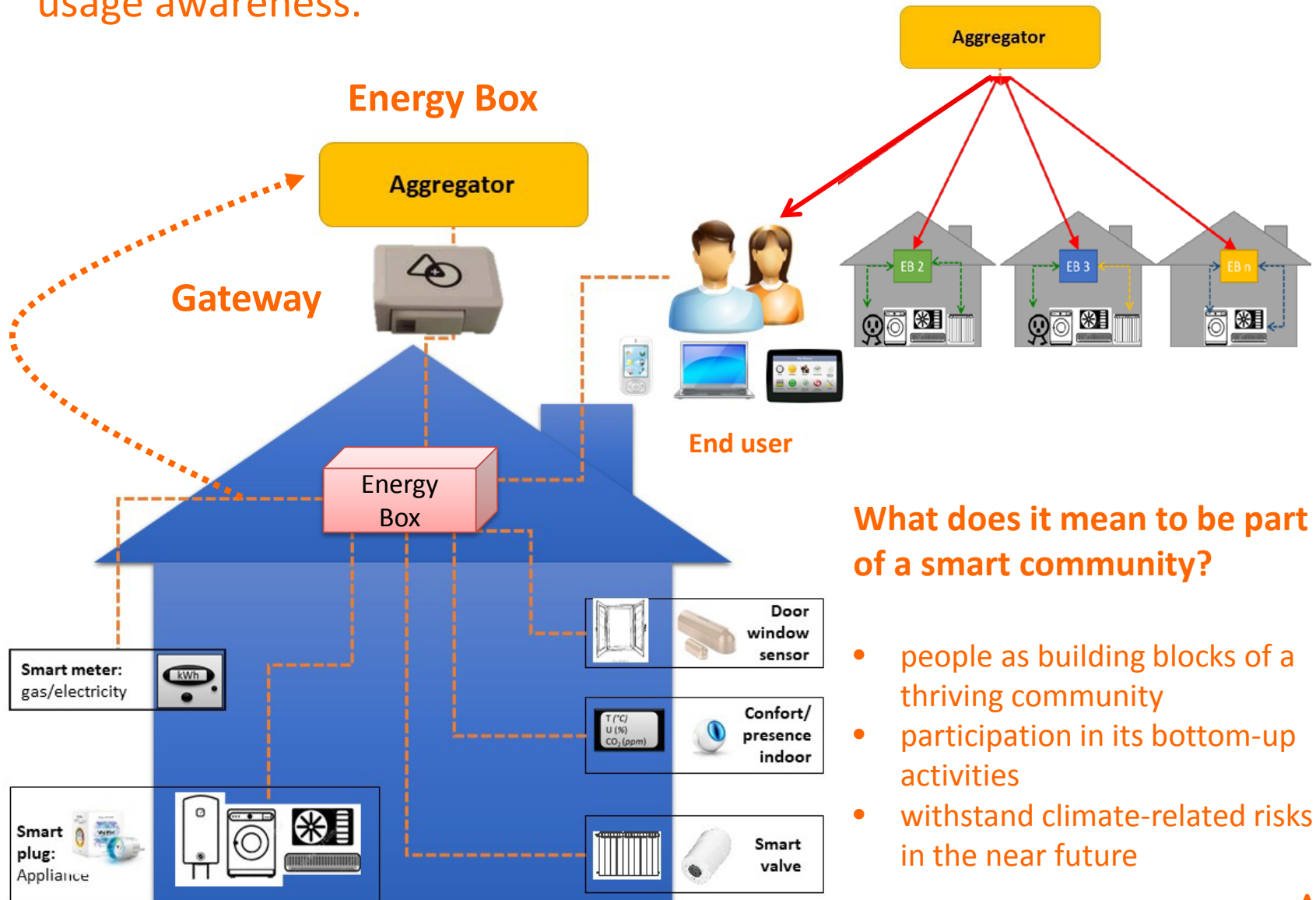
Project



SHN Centocelle: an experimental demonstration of a Smart Home network is being carried out in the Centocelle district of Rome, called “Smart Home Centocelle”.

The project: a replicable Smart home Network

Aim: to reduce energy consumption by increasing users' energy usage awareness.

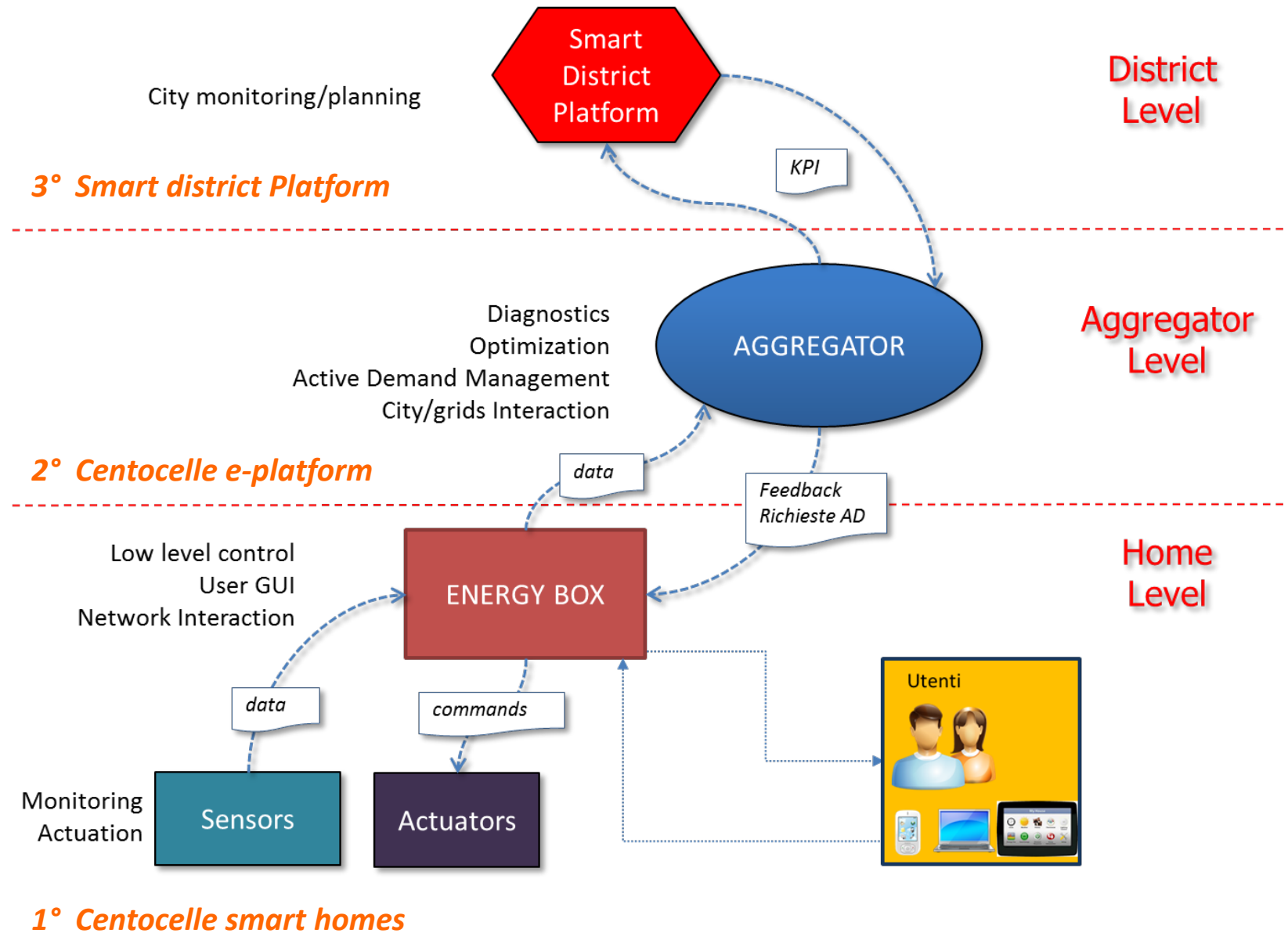


What does it mean to be part of a smart community?

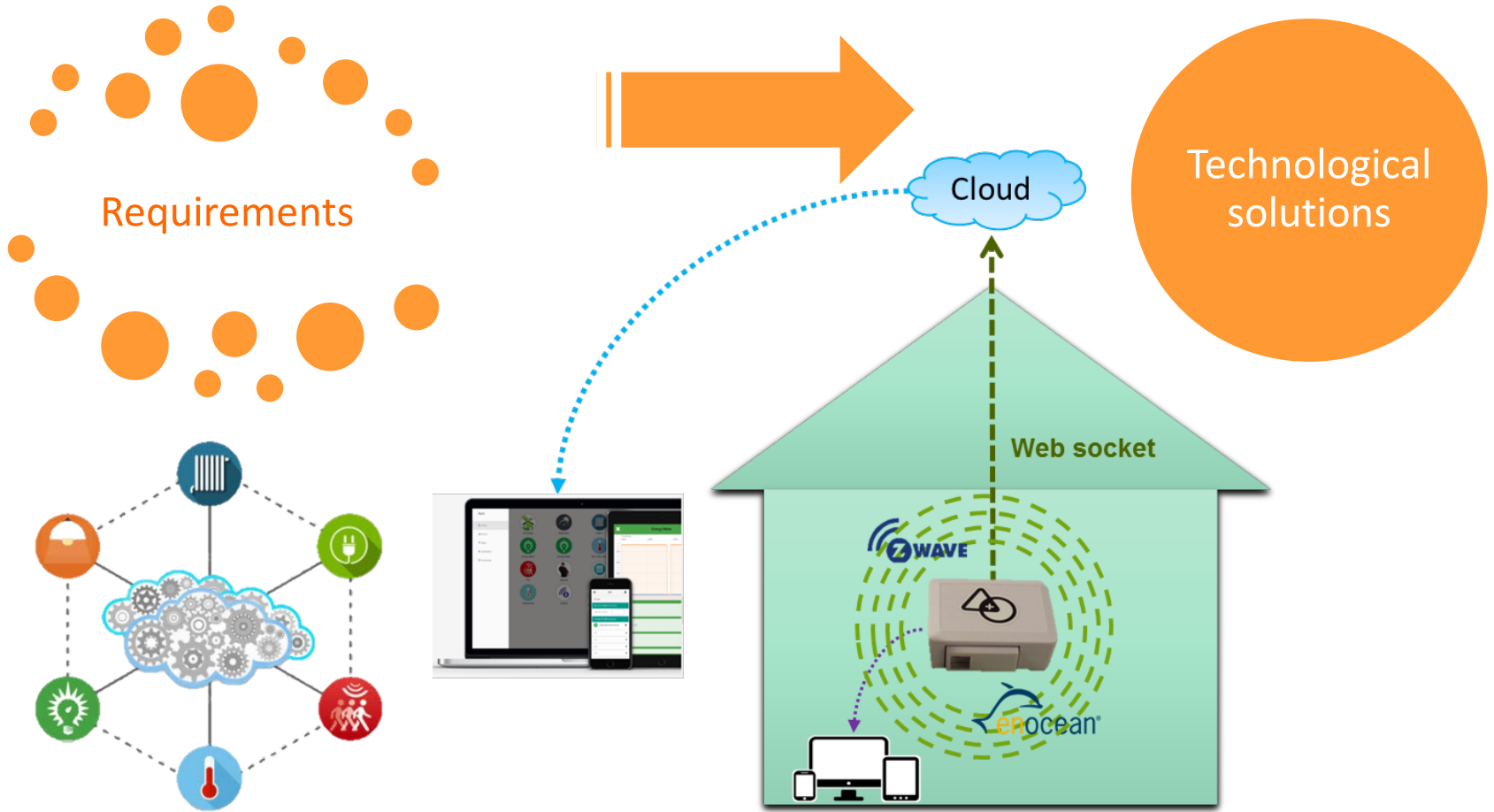
- people as building blocks of a thriving community
- participation in its bottom-up activities
- withstand climate-related risks in the near future



System architecture: 3 levels



Technological solutions



- Interoperability
- Reliability
- Robustness
- Ease of use and interaction with the user

- Wireless sensors integration with standard and **open protocols** (Z-Wave, enOcean, ...)
- Implementation of customised rules for home management
- Services usable through Apps on both local and cloud platforms

Smart home toolkit



ENE A



ENE A 1



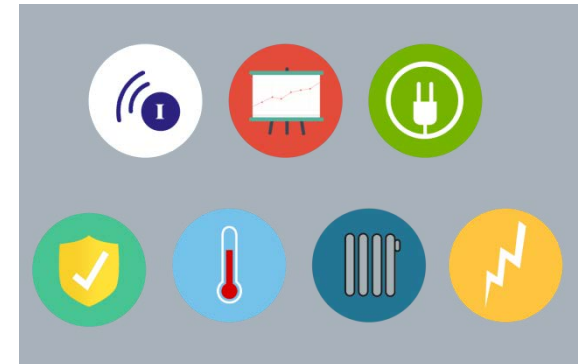
ENE A 2

EBs' interface

Router with internet access



Cloud Aggregator



Devices' interface control icons



Users

Energy Box

Smart Meter:

- Elettricità



Sensor open/close



Motion sensor



- Tmp
- Luminosity
- Presence
- Accelerometer

Remote control Apps



Smart valve



Heating on/off

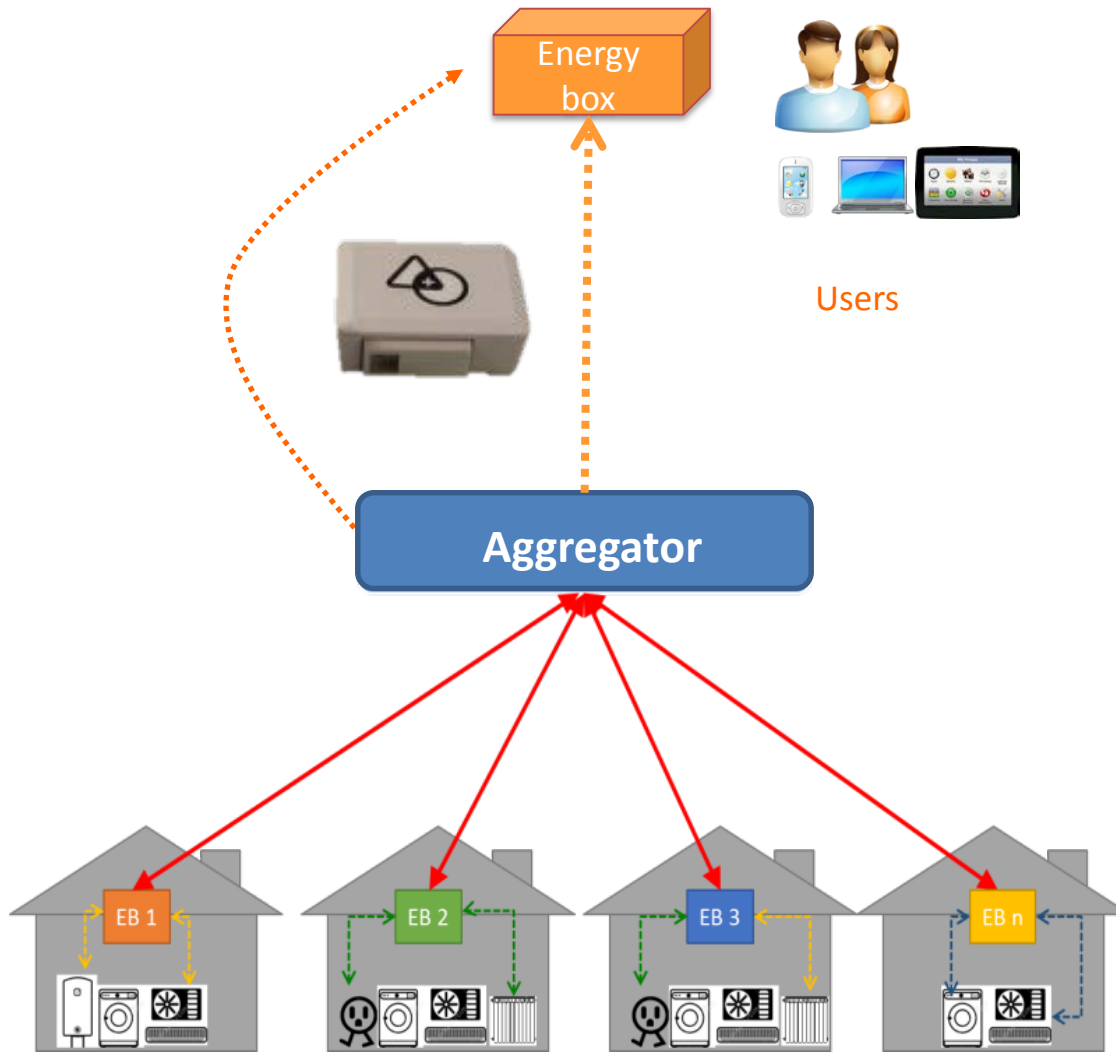
Smart Plug



Household appliances



Centocelle e-platform- Aggregator



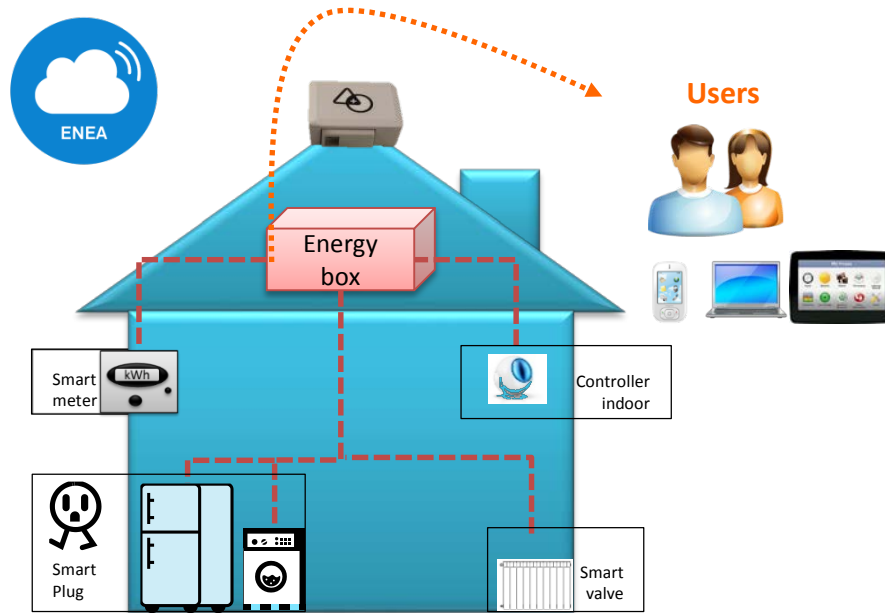
Raw data

- data set anonymously acquired
- data mining used to define KPIs and only for statistical research purposes

Additional services

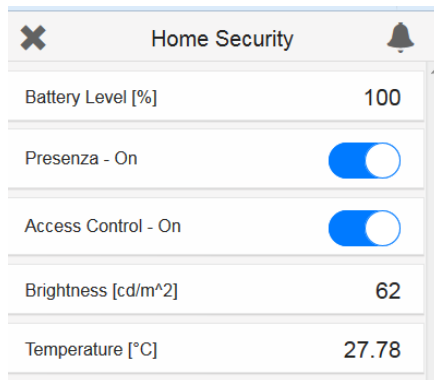
- processing KPIs
- district benchmarking
- competitive comparison
- interaction for demand response
- reports on consumption, potential pitfalls, anomalies, statistics

Energy box level

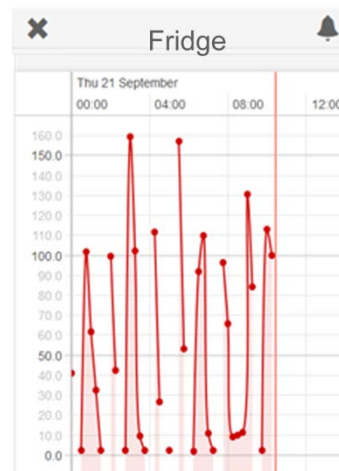


What the user can do:

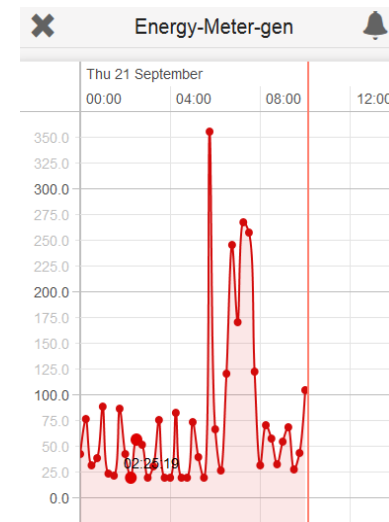
- devices configuration and remote control
- real time monitoring
- check on consumption trends over time
- door opening / closing status check
- view alert (battery status, sensor failure)
- scheduling allows the creation of customised static configurations and user preferences (on-off / set point)



Home Security

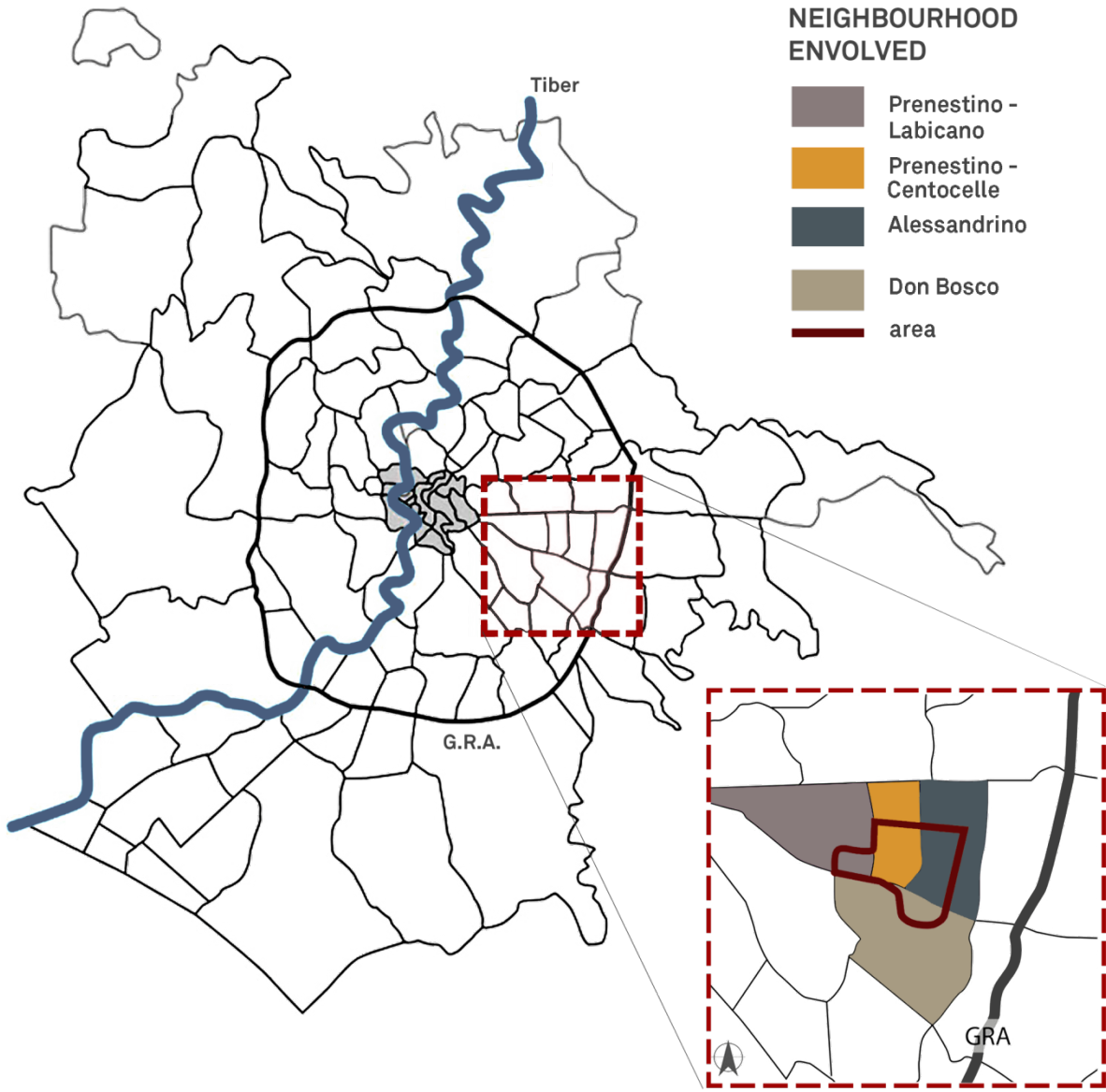


Smart Plug



Energy Meter

Centocelle neighbourhood



Location

- South-east outskirts of Rome within the outer MW belt
- located between via Casilina on the South and via Prenestina on the North, not far from Rome's city centre






Features and qualities

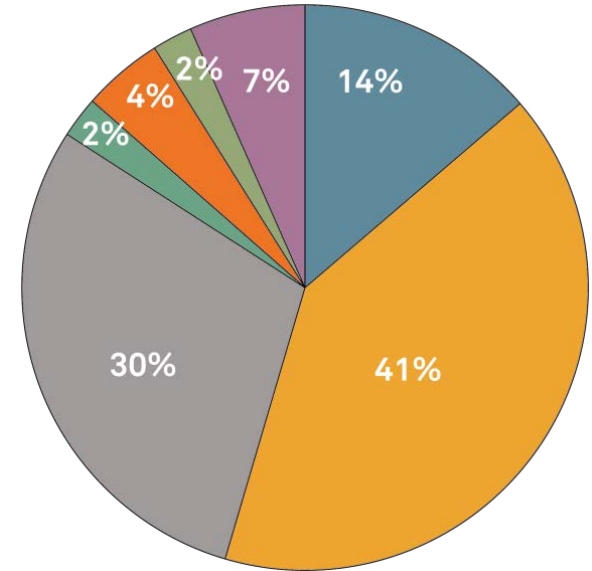
- its core was designed and built during the 20s-30s
- today it is the result of the inclusion of a previous urban sprawl during the 60s -70s

Issues

- same background with likewise urban settings:
- lack of public transportation convenience
- enjoyable public spaces
- low standard quality housing

Building typology and user profile

PICTURE	ID	BUILDING TYPE	m ²	YEAR OF CONSTRUCTION	N. OF FAMILY COMPONENTS
	C1	Flat in multi-family apartment block	49	1919-45	
	C2	Flat in a two-family house	101	1919-45	
	C3	Flat in multi-family apartment block	100	1962-71	
	C4	Flat in a two-family house	50	1946-61	
	C5	Flat in multi-family apartment block	100	1946-61	
	C6	Detached house	65	2010-15	
	C7	Flat in multi-family apartment block	65	1991-05	
	C8	Flat in multi-family apartment block	60	1962-71	
	C9	Flat in multi-family apartment block	95	1946-61	
	C10	Flat in multi-family apartment block	102	1962-71	



User typology

- Commuters 41%
- School students 30%
- Part-time workers 14%
- Housewives 7%
- Job hunting 4%
- Retired workers 2%
- University students 2%

Phases of experimentation



1° Meet up

2° Audit

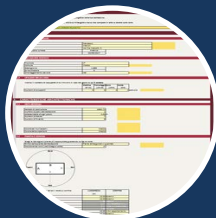
3° ToolKits

4° Experiment start

5° Experiment end



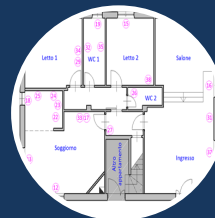
Being part of the project - fill in the application form



Housing audit - sharing installation configuration



Sensor kits delivery and installation



Implementation - Experimentation phase



Check



Sett-Ott
2017

Nov-2017
Feb 2018

Mar-Apr
2017

Mag-Giu
2018

Survey

Dic
2018



The People and their engagement

- Meet Up & Lectures
- Energy survey
- Events



Obiettivi

Il progetto si propone di sviluppare un modello replicabile di Smart Home in grado di monitorare i consumi energetici, il grado di comfort e sicurezza presso gli edifici residenziali e di trasmetterli ad una piattaforma ICT di livello superiore dove vengono analizzati ed aggregati così da fornire un serie di feedback all'utente e alla comunità.

L'obiettivo è la riduzione dei consumi finali di energia (elettrica e termica) dei consumatori domestici attraverso un percorso di consapevolezza energetica.

Descrizione delle attività

L'attività prevede l'installazione su un numero limitato di abitazioni di un kit di sensori e attuatori wireless per il monitoraggio dei consumi e del comfort indoor ed il controllo di alcune utenze termiche ed elettriche.

La gestione di tutti questi dispositivi wireless, che portano non raramente cablaggi, è demandata all'Energy Box, un dispositivo hardware, connesso alla rete Internet per la trasmissione dei dati raccolti ad una piattaforma ICT, il cosiddetto Aggregatore.

Il sistema di Smart Home Network, a parte dalle informazioni che vengono raccolte dall'Energy Box e dai sensori installati, consente di offrire numerosi servizi agli utenti finali: informazioni sui consumi o analisi di benchmarking, feedback relativi al comportamento dell'utente, diagnosi e allarmi in caso di malfunzionamenti o anomali consumi, suggerimenti per l'ottimizzazione dei consumi (cambiare un set point, spegnere un dispositivo), confronto tra la residenza grazie all'installazione di appositi KPI. Il Kit di sensori da installare verrà fornito in accordo con gli utenti partecipi alla sperimentazione.

Requisiti per partecipare

- Computare e consegnare l'apposito format di partecipazione;
- Connessione Internet ADSL, Fibra;
- Disponibilità di pc, tablet o smartphone come interfaccia per l'Energy Box per la visualizzazione dei dati e l'attuazione dei comandi;
- Impianto autonomo di riscaldamento.

ENEA SMART HOME event flyer

CASA ~~DOLCE~~ INTELLIGENTE CASA

DALLE SMART HOME ALLE SMART COMMUNITIES: PERCORSI DI CONSAPEVOLEZZA ENERGETICA

SMART #100CELLE

PRESENTAZIONE PROGETTO

QUESTION TIME

ADESIONI ALLA SPERIMENTAZIONE

VENERDI 22 SETTEMBRE H.18.00

FUSOLAB 2.0 - VIALE DELLA BELLA VILLA 94



SONO INVITATI TUTTI I CITTADINI DI CENTOCELLE E ALESSANDRINO



Self made Energy Audit

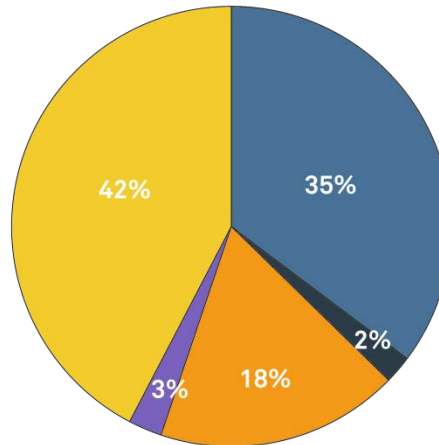
Aim: to verify how much the user was aware of his own energy consumption

Data collection module for the domestic consumption simulation, in dynamic calculation.

- 1) General information and usage profile
- 2) Building construction features
- 3) House plant and orientation
- 4) Appliances and other electrical equipment
- 5) Energy bills

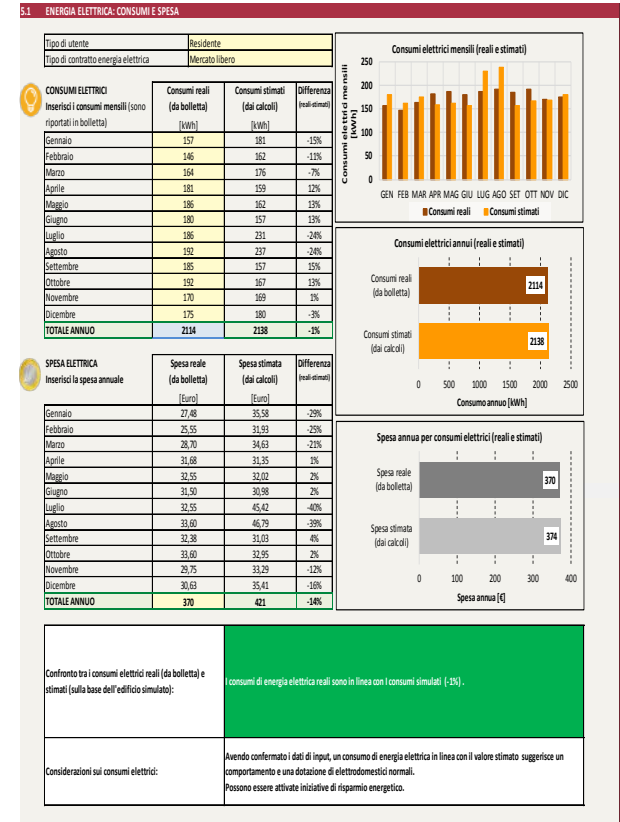
Energy consumption

Heating 35%
 Domestic hot water 18%
 Lighting 3%
 Cooling 2%
 Other uses 42%



FEEDBACK

- Comparison between real / estimated energy consumption
- Indications on savings as per variation of electricity and gas supply contract
- Simulation of energy and economic savings after automation systems installed



Feedback:

REAL CORP 2019



Bentornato casaccia@enea.it

MY CONSUMPTION

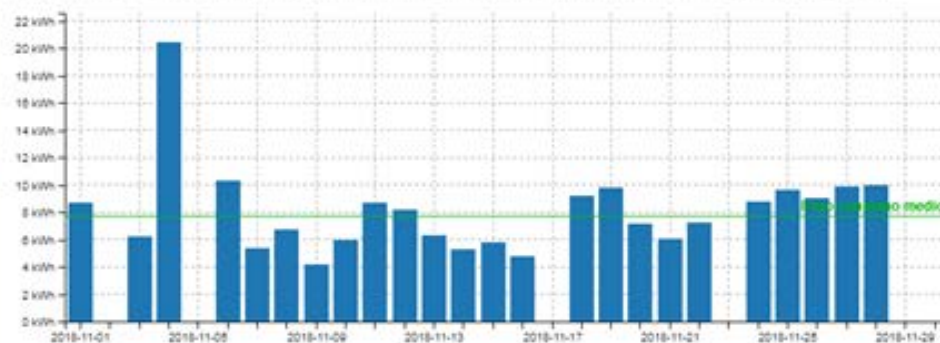
COMPARISON WITH OTHERS

Questo mese

AGGIORNA

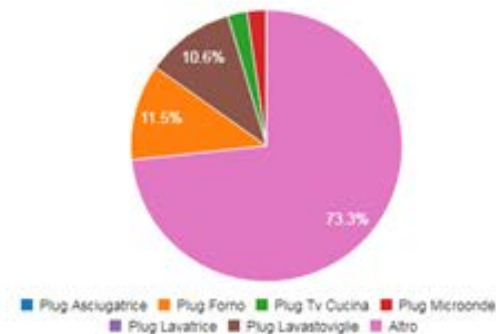
Daily energy consumption

Il grafico mostra il TUO consumo di energia confrontato con il tuo consumo medio (1.6€, 7.8kWh) nel periodo selezionato.



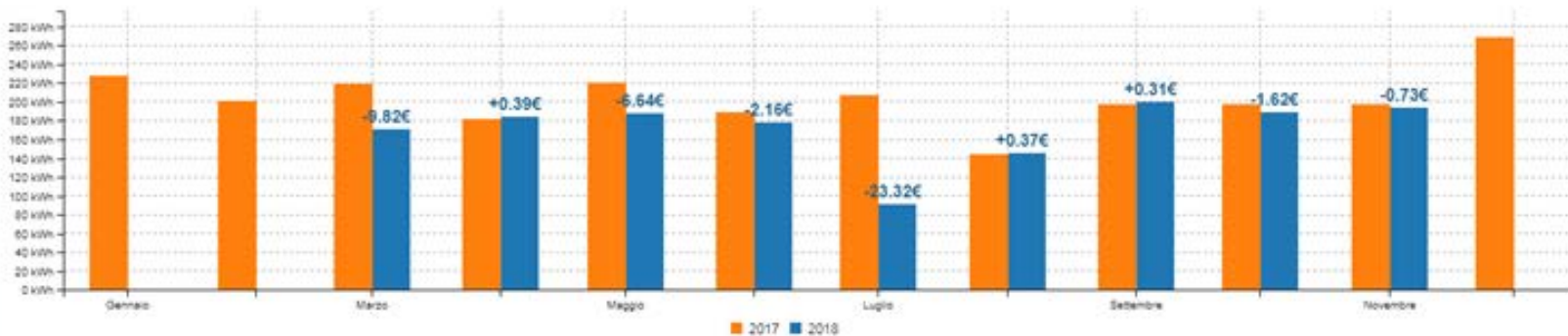
Consumption breakdown

Il grafico mostra la ripartizione dei TUOI consumi nel periodo selezionato.



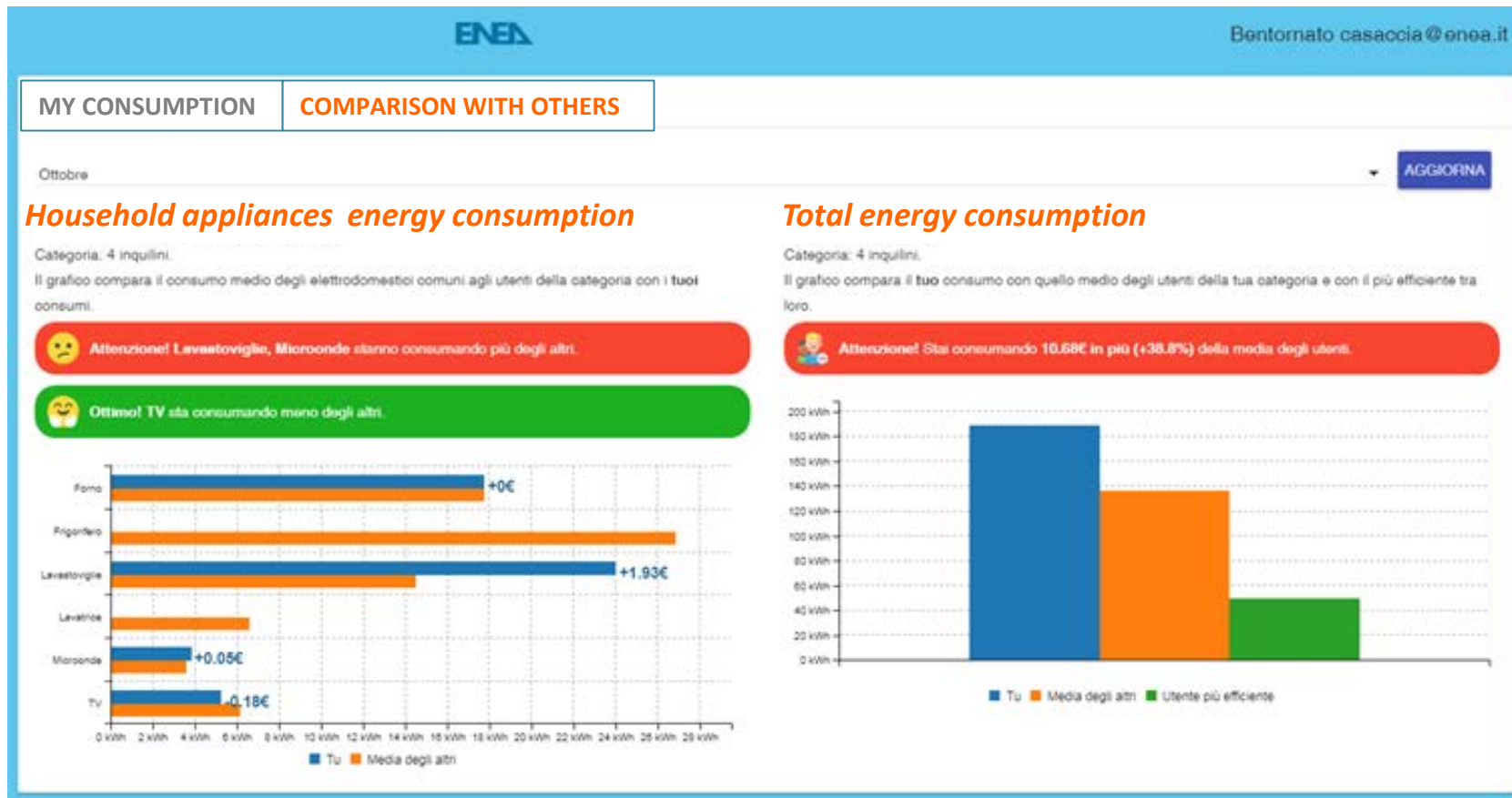
Monthly energy consumption comparison

Il grafico compara il tuo consumo mensile di quest'anno con quello dello scorso anno.



Feedback

REAL CORP 2019



Additional services

SECURITY



The service provides, in the absence of users, the detection of the intrusion of strangers in the home or the break-in of the locking systems.

SAFETY



Thanks to the sensors for monitoring particular environmental parameters the system is able to prevent injuries and potential pitfalls.

ASSISTED
LIVING



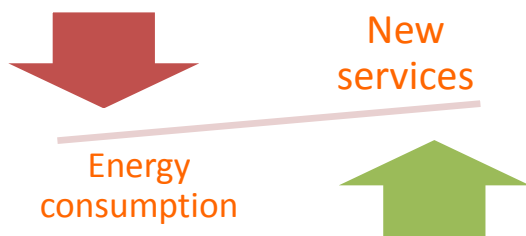
A series of services aimed at helping vulnerable and fragile people to live better and longer in their own homes for as long as possible.

Conclusion



THE SMART HOME MODEL STRENGTH :

To help users live better and longer at home



FOR ALL:



Integration between solutions to sort out both social and energy control issues

THE NEXT STEP

LOCAL ENERGY COMMUNITY

IL PROGETTO CHI SIAMO **centocè** SOCIAL COMMUNITY CONTATTACI

Centocè, verso la sostenibilità.

Abbiamo immaginato un nuovo modo di vivere, consapevole ed ecologico. Centocè ha risposto all'appello e da oggi inizia un percorso per diventare una realtà sostenibile, evitando gli sprechi e migliorando la vita dei suoi abitanti.

Tutto questo insieme, dai cittadini per i cittadini.

scroll

<http://centoce.it/>

THANK YOU FOR YOUR ATTENTION!



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