

# **MOTIVES & TOOLS TO ENABLE CITIZENS TO BECOME “SMART CONSUMERS”: A “SOCIALLY-ORIENTED” APPROACH TOWARDS SMART ENERGY CONSUMPTION IN BUILDINGS**

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# Introduction

- Nowadays, over half of the world's population is living in urban conurbations / buildings.
- The anthropogenic pressures on the environment have reached nowadays critical levels in areas worldwide.
- Urbanization, which is a continuous process, has led not only to economic and social **transformation** but also to high resource consumption and considerable environmental damage that can be attributed to many economic sectors.

❑ Among others → Building Sector


- Buildings exert significant environmental load attributed to energy consumption (heating, cooling, lighting, cooking).



# Introduction

- Efficient use of Resources: key challenge for the building sector in the continuous effort to encounter environmental deterioration, face climate change risks and eventually promote sustainability.



- Promotes a “socially-oriented” hybrid approach towards **Smart Energy Consumption** in buildings.
- Discusses motives and tools to enable citizens to become “smart consumers”.
- Need  As the world population urbanizes - Smarter and more Energy-efficient Buildings.

# Options put forward by our Chamber:

- Retrofitting of houses to save energy and costs with payback periods of a few years – Relevant EU (structural and investment funds) and Hellenic funding instruments.
- Energy inspectors for buildings, TOTEE/KENAK 2017 Standards/Procedures.
- Smart finance for smart buildings: investing in Energy Efficiency&RES in Buildings (EIB) – “energy efficiency first”.
- Key areas include:
  - Increase the refurbishment rate.
  - Better building design to reduce Heating & Cooling, by insulation.
  - Putting forward initiatives for sustainable energy.

# Options put forward by our Chamber:

- RES (Greek Tourism Expo 2017 Prototype Bioclimatic Room).
- Energy-efficient lighting technical innovations.
- Reducing Energy Poverty.
- Minimizing carbon footprint.
- Emphasis on energy cost (not just construction cost).





# Thessaloniki





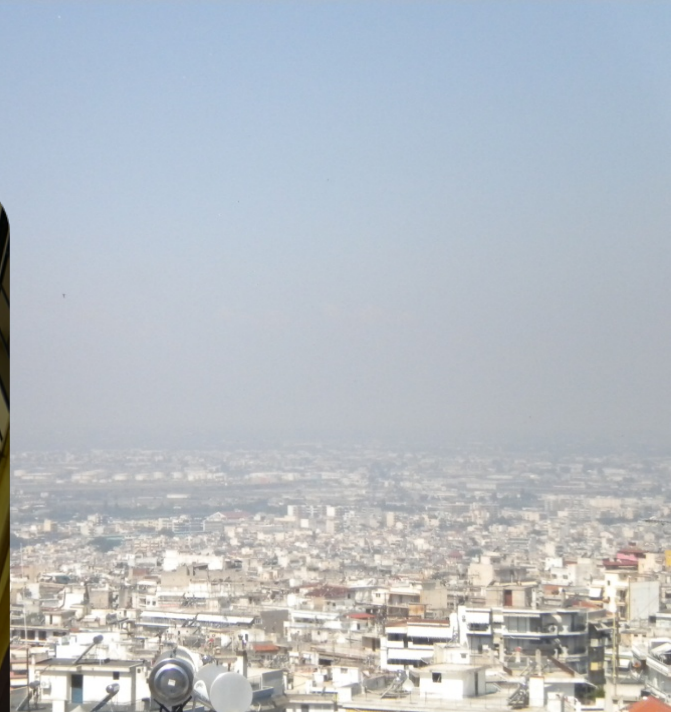
# Snapshots












# The Problem is still there...



- Although key areas for improvement are well known & promoted in the building sector, energy efficiency and rationalization of energy use are still the core of the problem.
  - Mitigation options are faced with many barriers, such as consumer behavioral patterns and preferences.
  - Slow progress of existing policy frameworks and their capability of absorbing digital evolution (digitalization and sharing data).
  - Lack of interaction/cooperation between responsible (public) authorities and departments.
  - Lack of interaction between citizens/consumers.
- 

# The Problem is still there...

- Result of unsustainable practices, e.g. the fossil fuel use.
- Both “Smart Buildings” and “Smart Consumers” is all about “Smart Citizens”.
- Concerned about: increasing the quality of life of their fellow-citizens, (ii) protecting their environment, (iii) sustainability.
- Research into the determinants of consumers behavior has shown that an improvement of the Individual and **Collective** behavior can be obtained if citizens are more exposed to information, engaged as part of a community.
- The participation of **citizens as consumers** is not sufficient enough.



# Options in the building sector

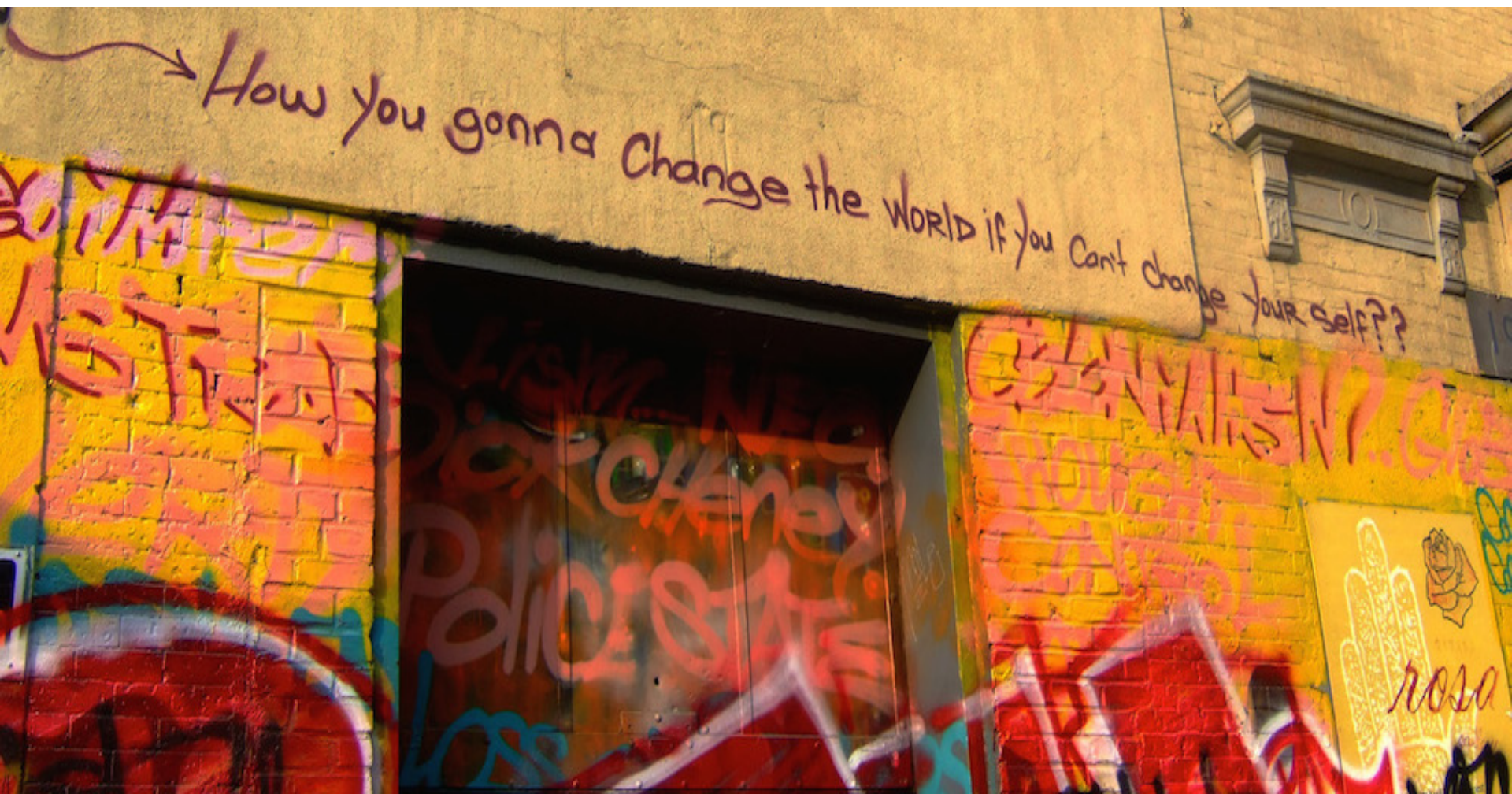
- Simple&Acceptable lifestyle changes or habits can save both Energy&Money.
-  e.g. estimation: in a typical office building, cooling the interior to 25°C rather than 18°C, when the outside temperature is 32°C, would make energy Savings 25-50%, depending on the amount of waste heat generated inside the building.
- Developing&Choosing more energy efficient individual appliances is another major potential saving.
- Setting heating in winter to lower temperatures (along with putting on a sweater). 
- Cooling in summer to higher temperature settings (and dispensing with jackets and ties).

# Combine:

## Networks – Knowledge - Sensors

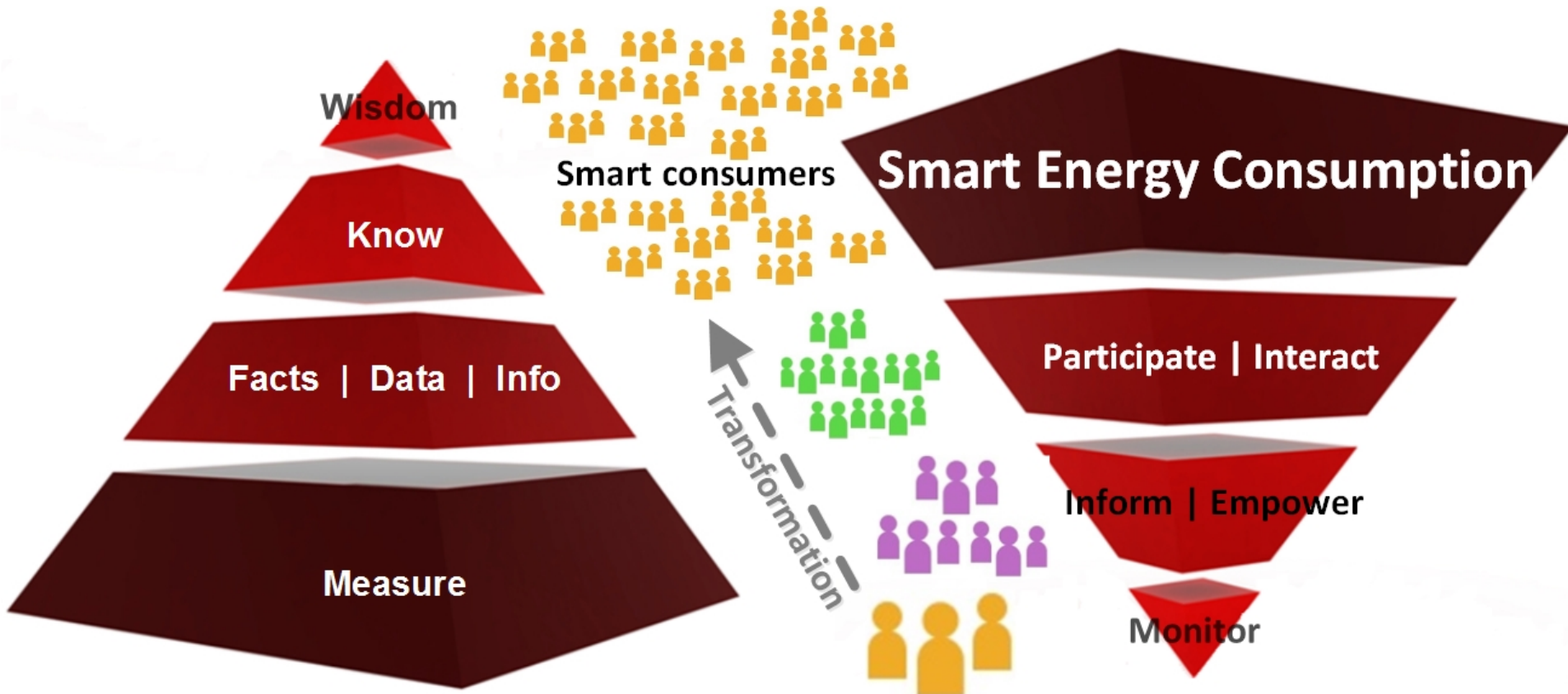
- In order to efficiently encounter sustainability threats, promote energy efficiency and rational use of energy the combination of networks of people, knowledge and sensors is necessary.
- These threats are usually addressed separately, with a top-down approach (from policy-makers & authorities to citizens) and not in a holistic “hybrid” way.
- Hybrid in terms of combining a top-down (from authorities to consumers) and a bottom-up approach (from consumers to authorities).
- Empowerment is missing...

# A bottom-up perspective with “smart citizens” is needed...





# ICT is crucial towards a “Socially-oriented” bottom-up

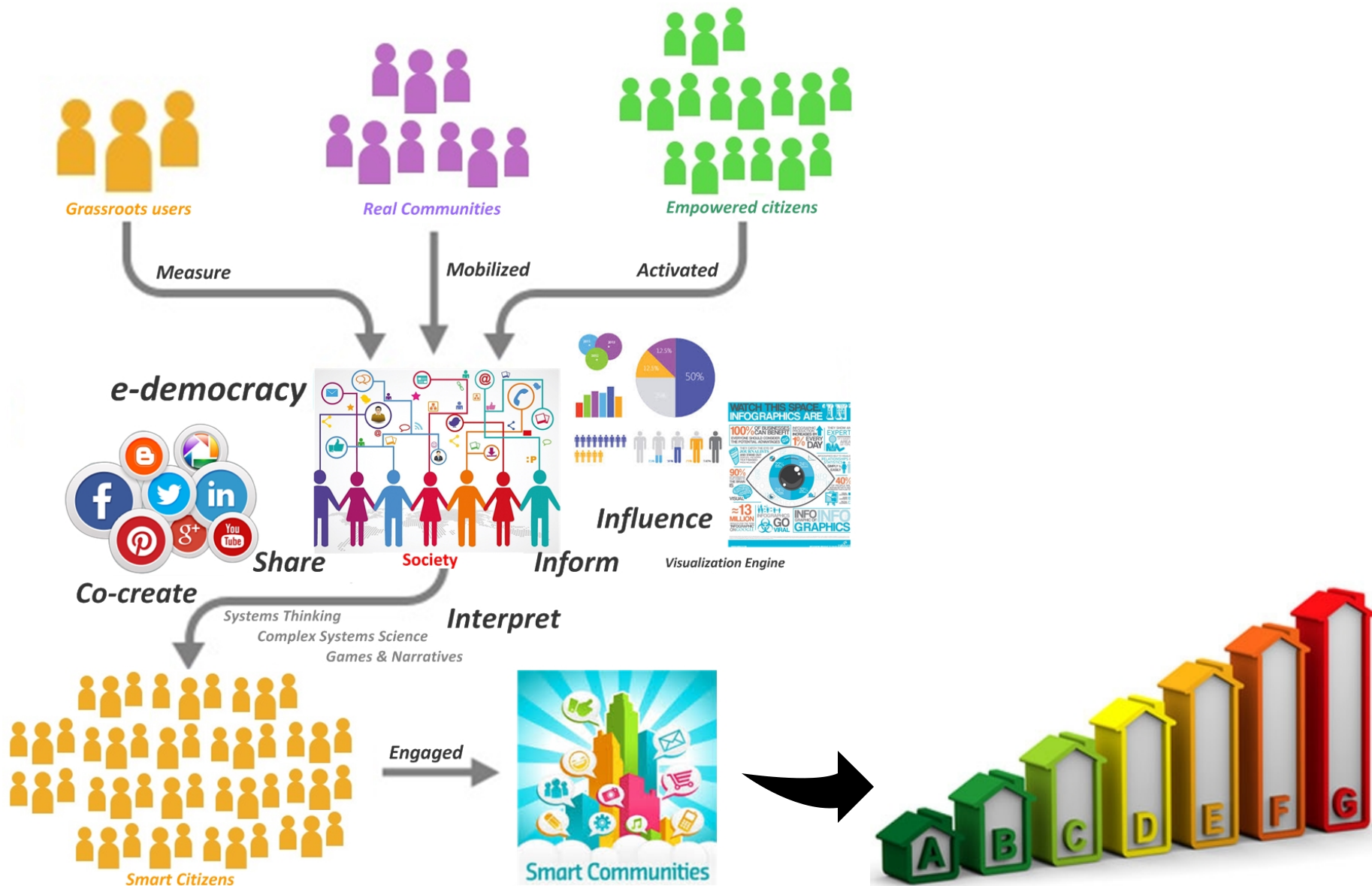


Pyramid of the levels of citizens' interaction  
to enable citizens to become “Smart Consumers”

# Consumers' challenge...



# Collective Intelligence concept





# Creating tools and motives

- Collective awareness for a hybrid participatory effort is the basis to effectively improve energy efficiency and promote rational use of energy in the building sector.
- Collective Awareness Platforms for Sustainability & Social Innovation(CAPs) raise awareness collectively and transform it into behavior change.
- CAPs provide opportunities for citizens' empowerment to fully collaborate&promote better informed decision-making processes.
- Approaches that will empower citizens, through participation and interaction to adopt more sustainable individual and collective behaviors and lifestyles.
- Bottom-up participatory paradigms via ICT-based collective awareness and collaborative activities of citizens'.

# CAP paradigms

- **DeCarbonNet**

## **RAISE INDIVIDUAL&COLLECTIVE AWARENESS**

Collectively building knowledge on the impact of everyday behavior& effective ways to change it.

## **TRIGGER BEHAVIOURAL CHANGE& FOSTER SOCIAL INNOVATION**

Understanding the behavior change dynamics and providing appropriate tools that contribute to every stage of this process.

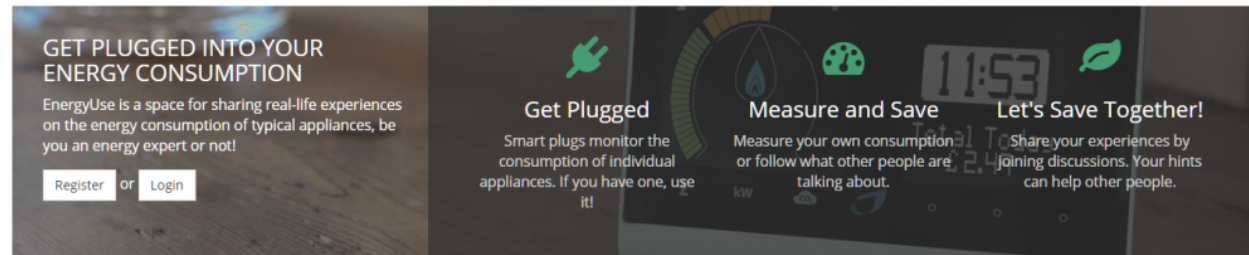
## **ANALYSE BEHAVIOURAL PATTERNS &INFORMATION DIFFUSION**

By developing methods and tools to analyze how information can effectively reach society and stakeholders through the social media.



[Interested in learning about your appliances' energy consumption?](#)

# On-line community



Top Conversations

Sort by: update Limit to: all time

6 votes 1 reply 108 views

**When to run appliances**

Saving energy in general is a positive step. For example, we've just bought a new freezer and dis...

time energy

written 7 weeks ago by js • 190 • updated 18 days ago by Laser • 120

9 votes 3 replies 106 views

**Eco mode - is it really eco?**

I recently bought a washing machine with an "eco mode". Do I really save money/energy using this ...

washing machine eco mode

written 11 weeks ago by sandra • 50 • updated 7 weeks ago by dain • 180

7 votes 1 reply 268 views

**Zombies can make as much as 50% of your bill. Do you know if you have many on them in your house?**

Discover where your zombies are and win a £25 Amazon Voucher ! They are devices that are usual...

baseload vampires electricity-consumption zombies

written 10 weeks ago by decarbonet ++ 140 • updated 7 weeks ago by js • 190

3 votes 0 replies 59 views

**Zombie appliances and family issues**

My electric oven, washing machine, dishwasher and electric water heater are enemies of the planet...

energy

written 8 weeks ago by GaryB59 • 30

20 votes 17 replies 337 views

**EnergyNote meter's readings 70% higher than utility meter, why?**

Just wondering if anyone else had this happening, it seems that the EnergyNote's clip-on meter gi...

meter analysis

written 8 months ago by dain • 180 • updated 4 months ago by Imccann • 120

4 votes 5 replies 176 views

**Reducing the brightness**

If you reduce the monitor brightness from 100% to 70%, you can save up to 20% of the energy the m...

screen office energy

written 15 months ago by decarbonet ++ 140 • updated 5 months ago by js • 190

Top Contributors

js • 190

dain • 180

decarbonet ++ 140

Top Contributions

★ When to run appliances

Saving energy in general is a positive step. For example, we've just bought a new freezer and dis...

time energy

— by js • 190

★ A: Eco mode - is it really eco?

A lot of these eco modes use passive ways to clean (clothes, dishes, etc) by lengthening the soak...

— by dain • 180

★ Base Load

Does anyone have a base load that they can't track down? In a previous house I could get the ele...

baseload vampires time alarm boiler ventilation electricity-consumption

— by js • 190

Energy Consumption

Average Energy Consumption

15.1532 kWh / day

Are you part of Decarbonet Energy Trial? Log in and visit your profile to learn more about your own consumption.

Discussed Topics

**Energy**  
In physics, energy is a property of objects whi...

**In the office**  
Many people spend most of their time in the off...

**Kilowatt-hour (kWh)**  
Kilowatt-hour (kWh) is the way we usually quant...

**Time**  
Time is a measure in which events can be ordere...

EnergyUse is Decarbonet online community for sharing real-life experiences on the energy consumption of typical appliances (<https://energyuse.eu/>)



# Creating tools and motives

- enCOMPASS (Collaborative Recommendations and Adaptive Control for Personalised Energy Saving)
- MOBISTYLE (MOTivating end-users Behavioral change by combined ICT based tools and modular Information services on energy use, indoor environment, health and lifestyle)
- OrbEEt (ORganizational Behaviour improvement for Energy Efficient administrative public offices)
- ENTROPY (Design of an innovative energy-aware IT ecosystem for motivating behavioural changes towards the adoption of energy efficient lifestyles)



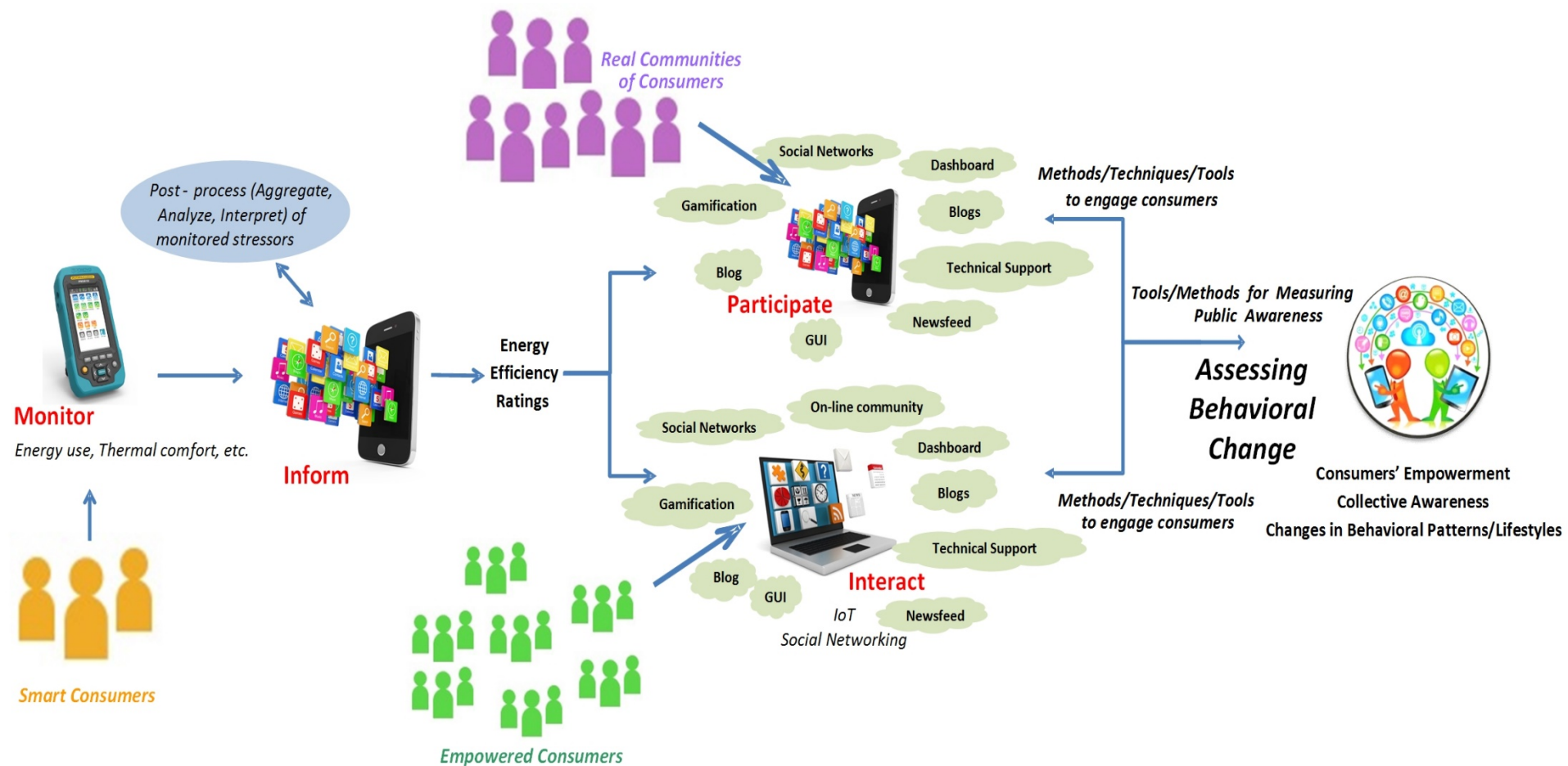
**EnerGAware**

Energy Game for Awareness of energy efficiency in social housing communities

# Creating tools and motives

- E-techniques to engage citizens in sharing knowledge and expertise and improve their quality of life.
- Tackle citizens' opinions, willingness and knowledge regarding alternative behaviors/possible solutions.
- Assure improved transparency of information related to the impact of energy/environmental policies.
- Assessment of societal behavioral change.
- Inform, Empower, Participate, Interact towards collective intelligence...

# ICT towards collective intelligence...





# Holistic characterization



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

**ScienceDirect**

Procedia Environmental Sciences 38 (2017) 571 – 577



International Conference on Sustainable Synergies from Buildings to the Urban Scale, SBE16

## A Holistic Methodological Approach in the Urban Context Towards Characterizing the Environmental Performance of Buildings and Promoting Strategic Governance and Sustainability

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**Thank you for your attention!!**

