STEP-IN

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SYMPOSIUM

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Supporting households against energy poverty using the Living Lab approach: First evidence from the STEP-IN project

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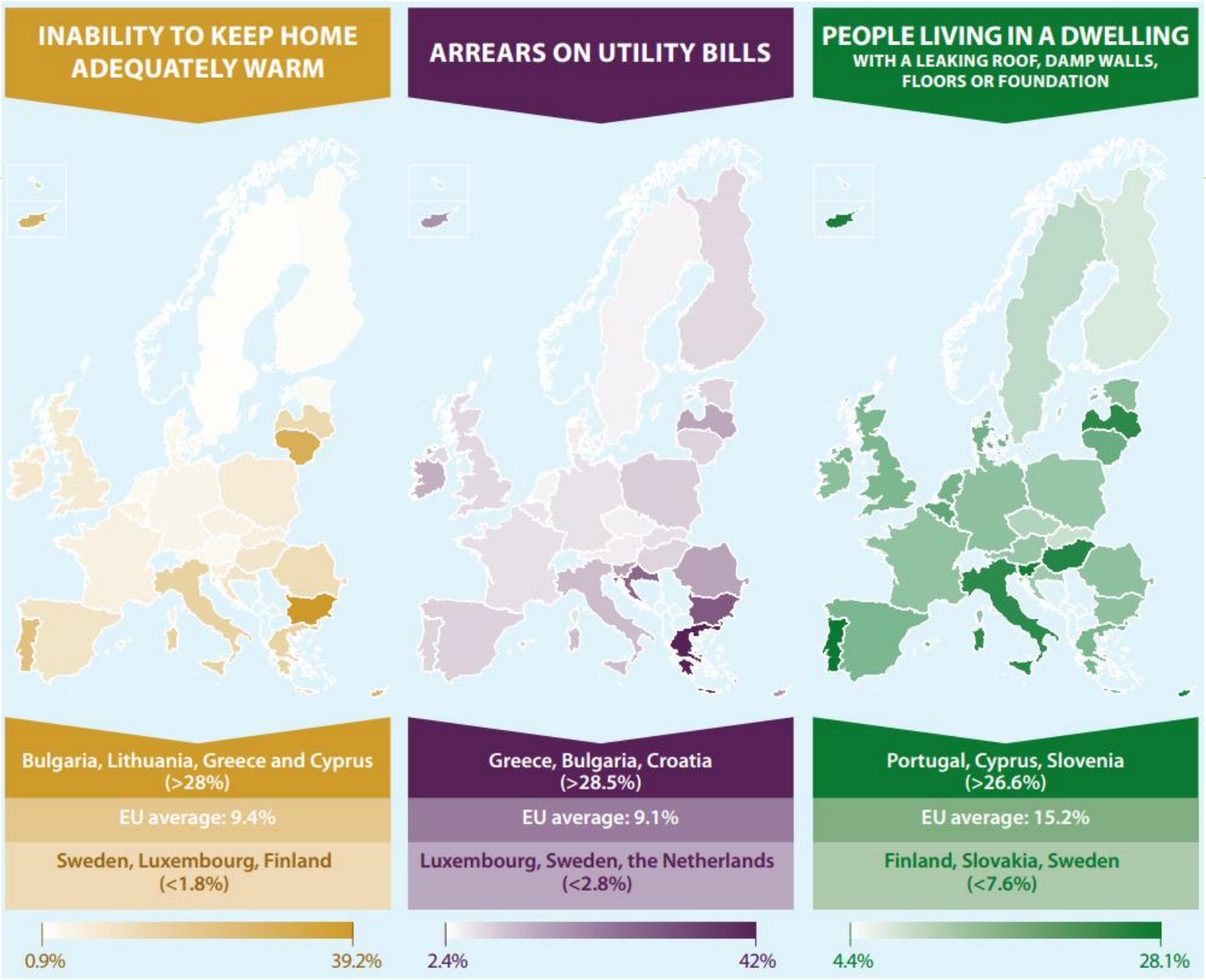
Introduction

- **Energy poverty** – a condition typically manifested by the inability to secure adequate levels of domestic energy services (such as heating, lighting, cooling, appliances) has become a major issue in Europe – 50 million households in the EU experience energy poverty
- Energy poverty is a distinct form of poverty associated with a range of adverse consequences for people's health and wellbeing –
  - ✓ *with respiratory and cardiac illnesses, and mental health, exacerbated due to low temperatures*
  - ✓ *and stress associated with unaffordable energy bills.*
- In fact, energy poverty has an indirect effect on many policy areas - including health, environment and productivity.

Indicators of energy poverty



According to the European Portal for Energy Efficiency in Buildings (2017)

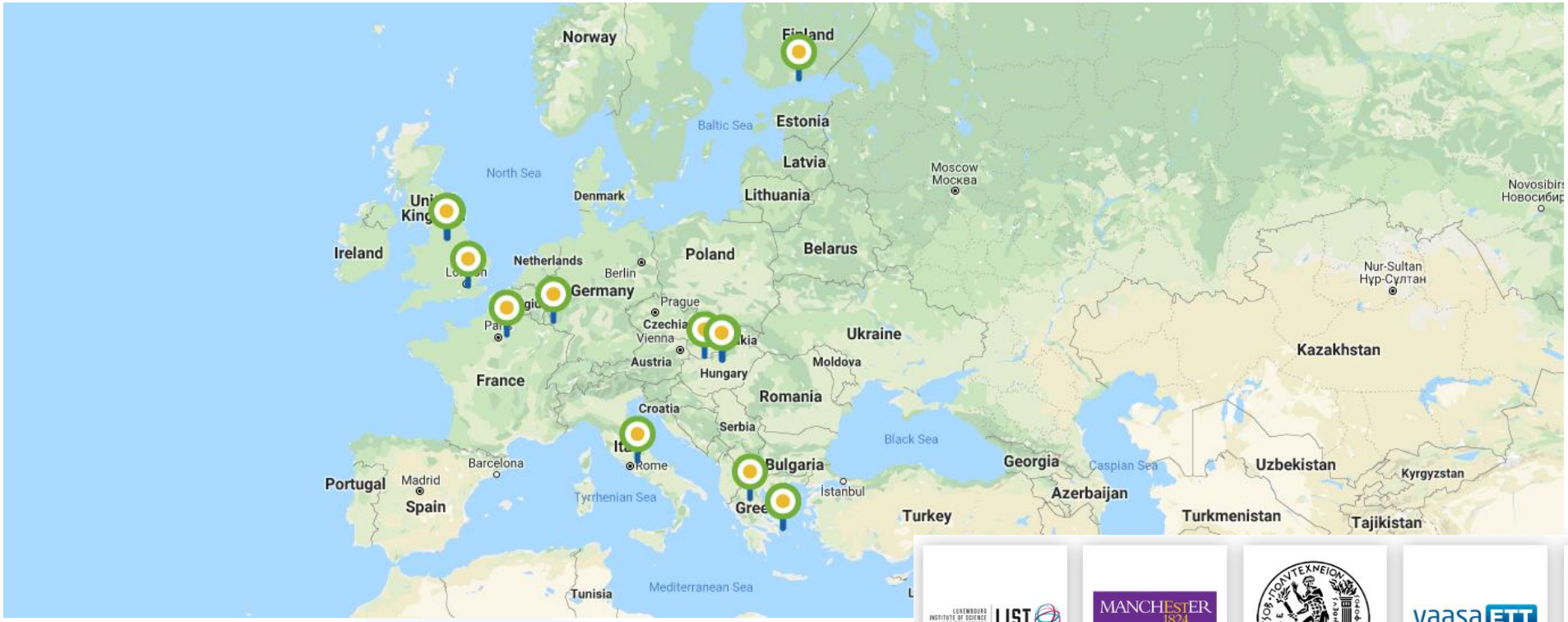
General characteristics of the project

Aims and objectives, consortium, methodology

Overall structure

- STEP-IN is a **coordination and support project** (CSA) funded by the European Union's **Horizon 2020** programme (30 months duration).
- It aims to help those in need to improve their quality of life, household energy efficiency and overall comfort levels.
- STEP-IN consists of a network of Living Labs across Europe. Through a strong Network of Interest, STEP-IN engages with local, national and EU organisations and experts to define policies for reducing energy poverty.
- The consortium brings together a wide expertise in the area of energy poverty: research institutes, universities, municipalities, energy providers, charities, consumer associations and regulatory authorities.

Partners - Consortium



“Global methodology”

STEP-IN has identified three highly challenging locations with diverse characteristics across Europe including:

- **a mountainous region in Greece** (Metsovo),
- **a rural area in Hungary** (Niyrbator), and
- **an urban area in the UK** (Manchester).

At each of these locations a Living Lab is being set up which brings together local experts and stakeholders with energy poor consumers. These labs consist of a range of approaches including:

- **energy cafes**,
- **advisor visits**, and
- **ICT systems**.

The Living Labs

Introduction


Ηνωμένο
Manchester
Λετονία
Λιθουανία
Λευκορωσία
Nyirbator
Σλοβακία
Γαλλία
Ελβετία
Ουγγαρία
Ρουμανία
Σερβία
Μαύρη
Θαλασσα
Βουλγαρία
Metsovo
Ελλάδα


ΤΑΒΕΡΝΑ
ΕΣΤΙΑΤΟΡΙΟ

Metsovo, GR: the mountainous LL

- Energy poverty has become a serious problem in Greece, especially in its mountainous areas, which are by cold climatic conditions.
- 87.8% of Metsovo's households are characterised as vulnerable. Households there spend an average of 18% of their income on energy. The percentage becomes 20% for households under the official poverty threshold
- The LL is operated mainly by NTUA in collaboration with the Municipality of Metsovo.
- The Living Lab therefore aims to implement, test, and evaluate several different tools, processes and actions to tackle energy vulnerability for the very first time in this area.
- It also aims at assessing the effectiveness of measures that have been implemented by the Greek Government.

Citizens in Metsovo benefit from more sustainable energy behaviour and choices without compromising comfort levels, and assistance with available energy efficiency measures such as tax credits. We help people to use their wood and oil more efficiently, and to better understand their energy bills and alternative energy schemes available to them.

Dimitrios Kaliampakos
Professor, National Technical University of Athens

Metsovo, GR: LL characteristics

The Mountainous Area Living Lab targets low income households, elderly households, households living in old dwellings, and households using different heating systems (wood and oil).

300

HOUSEHOLDS INVITED TO HAVE AN ENERGY ADVISOR VISIT

150

HOUSEHOLDS HAVE ENERGY ADVISOR VISITS

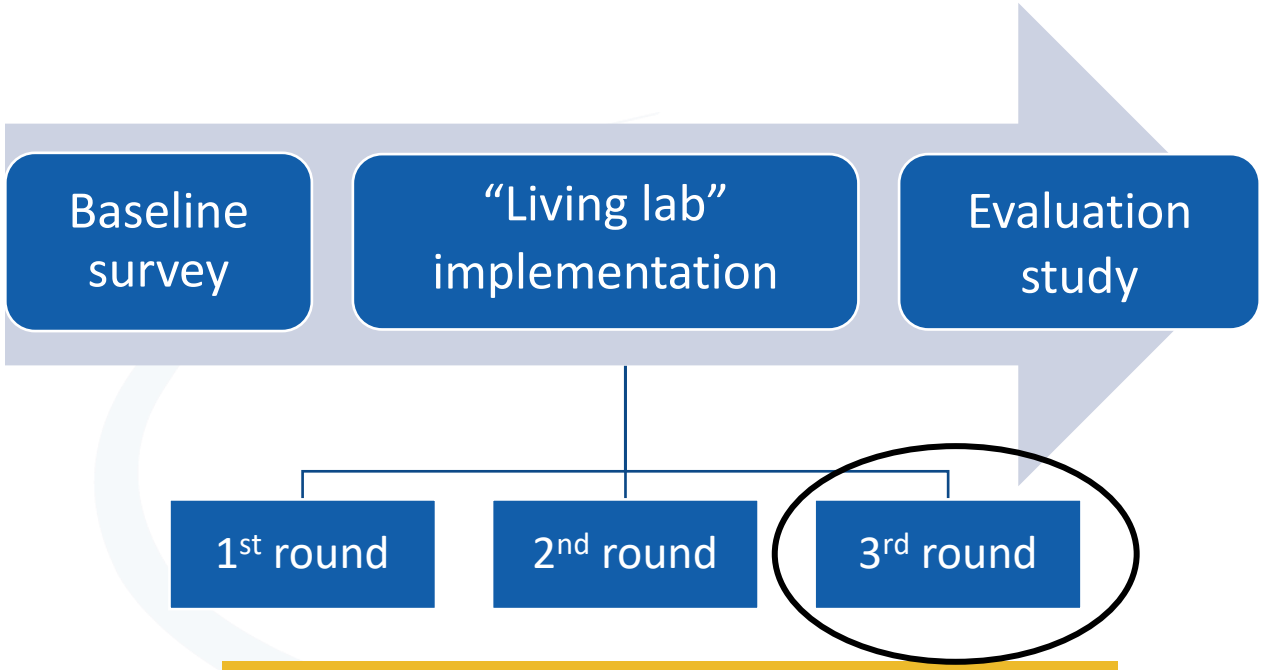
300

HOUSEHOLDS WHICH WILL ADAPT PROPOSED MEASURES

750

PEOPLE WITH IMPROVED QUALITY OF LIFE

Methodological structure



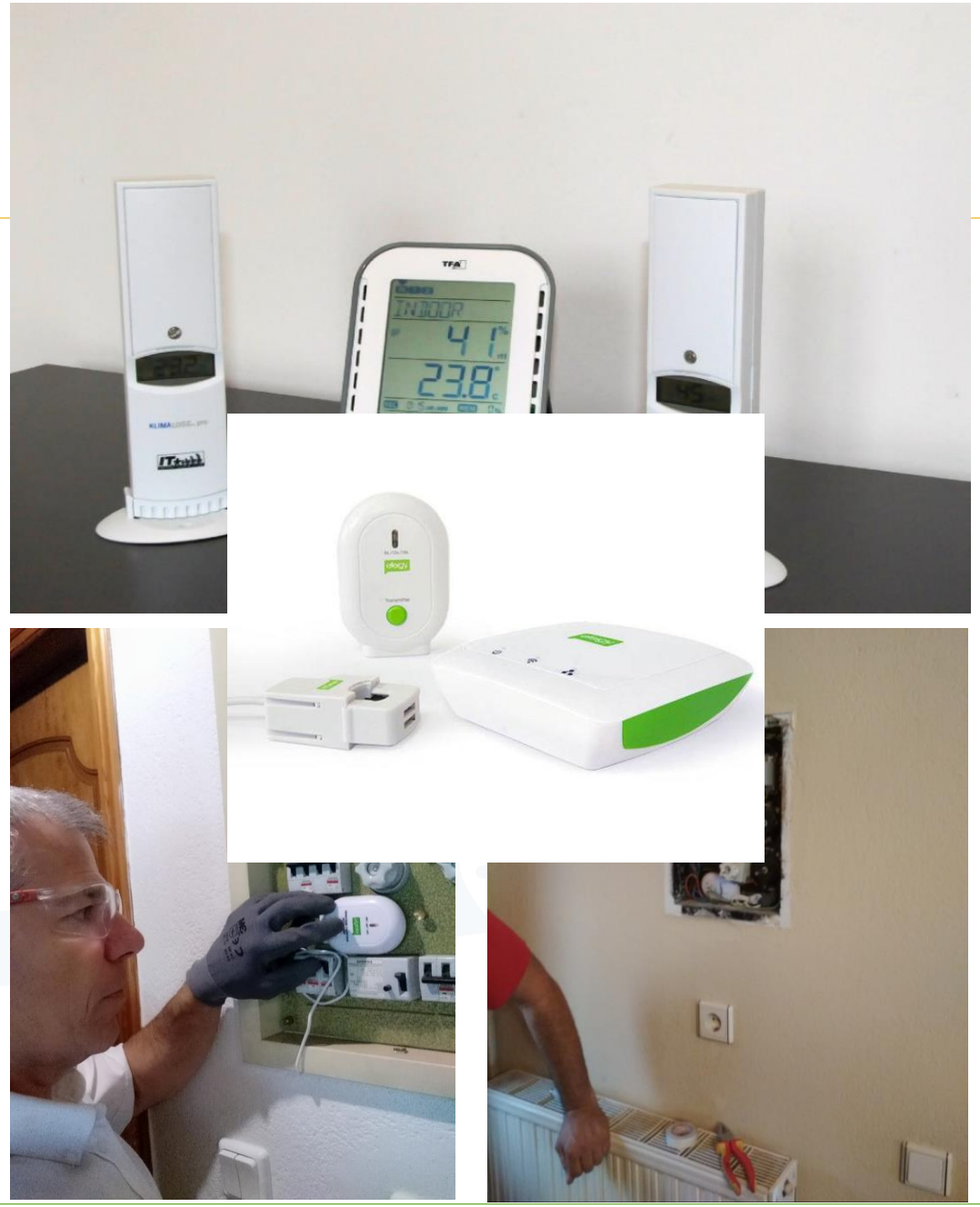
- Energy cafés
- Home energy advisor visits
- Installation of monitoring equipment
- Information Campaign
- ICT tools

Experiences and evidence from the LL of Metsovo

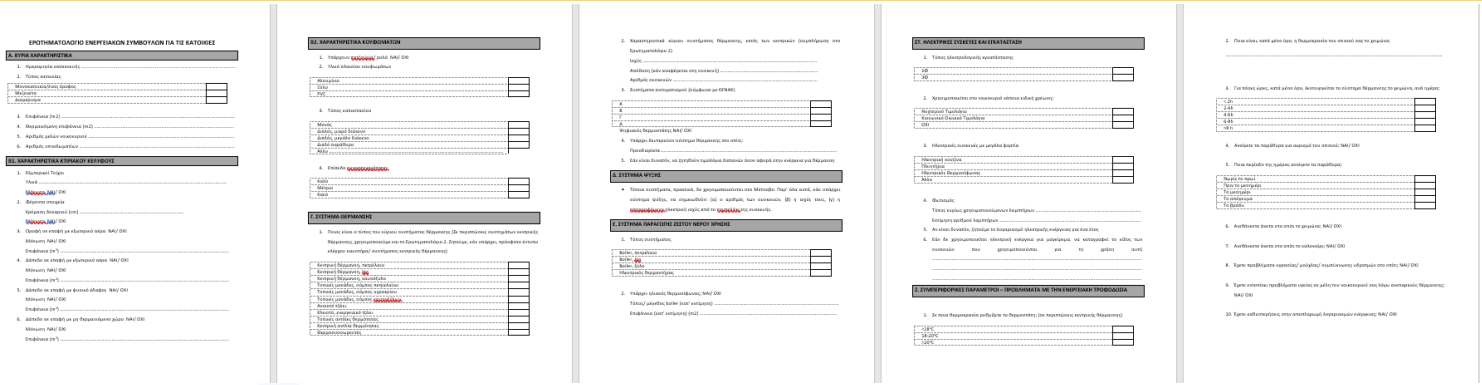
Interesting results

Main measurements

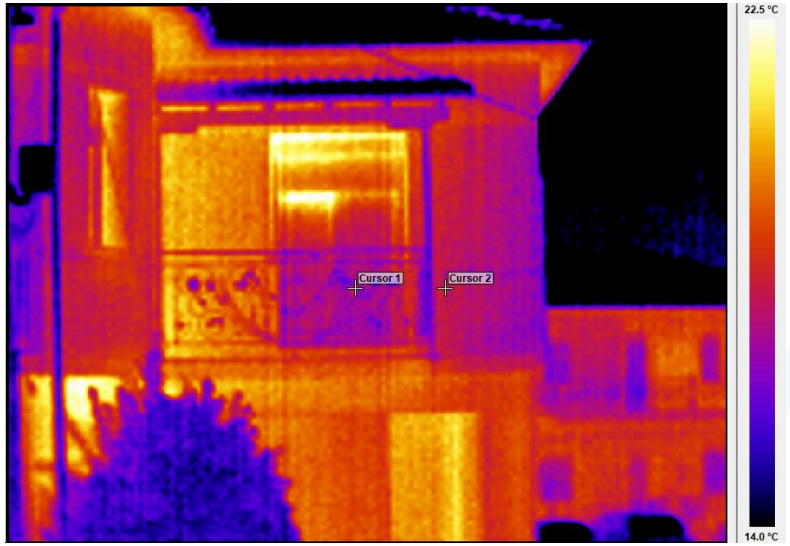
- Electrical consumption
- Indoor temperature
- Indoor humidity
- Outdoor meteorological parameters



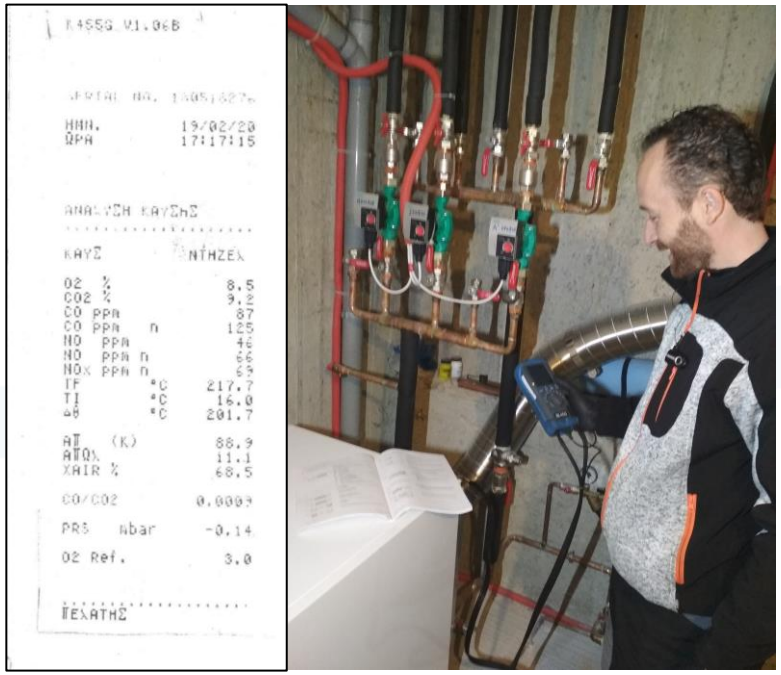
Collecting supplementary data



- Questionnaires



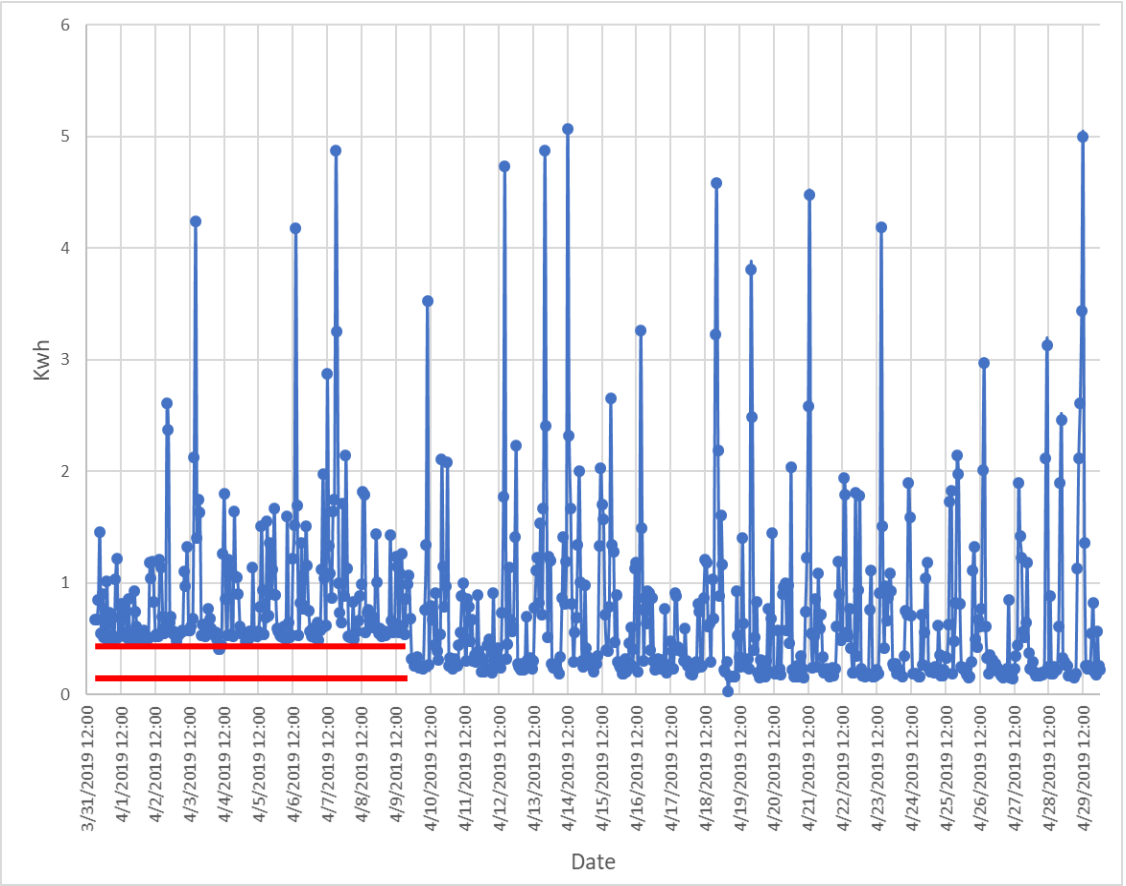
- Thermal Imaging



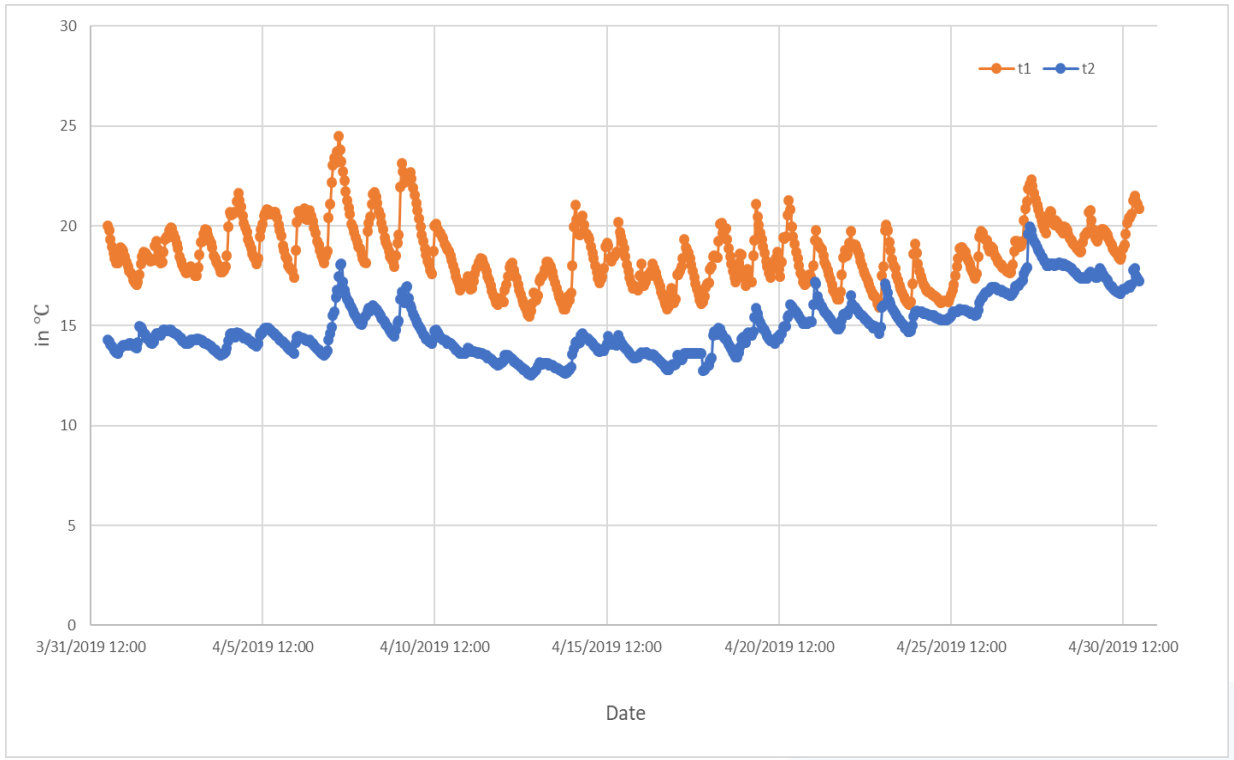
- Measuring exhaust gaseous emissions of heating systems

Monitoring is helpful!

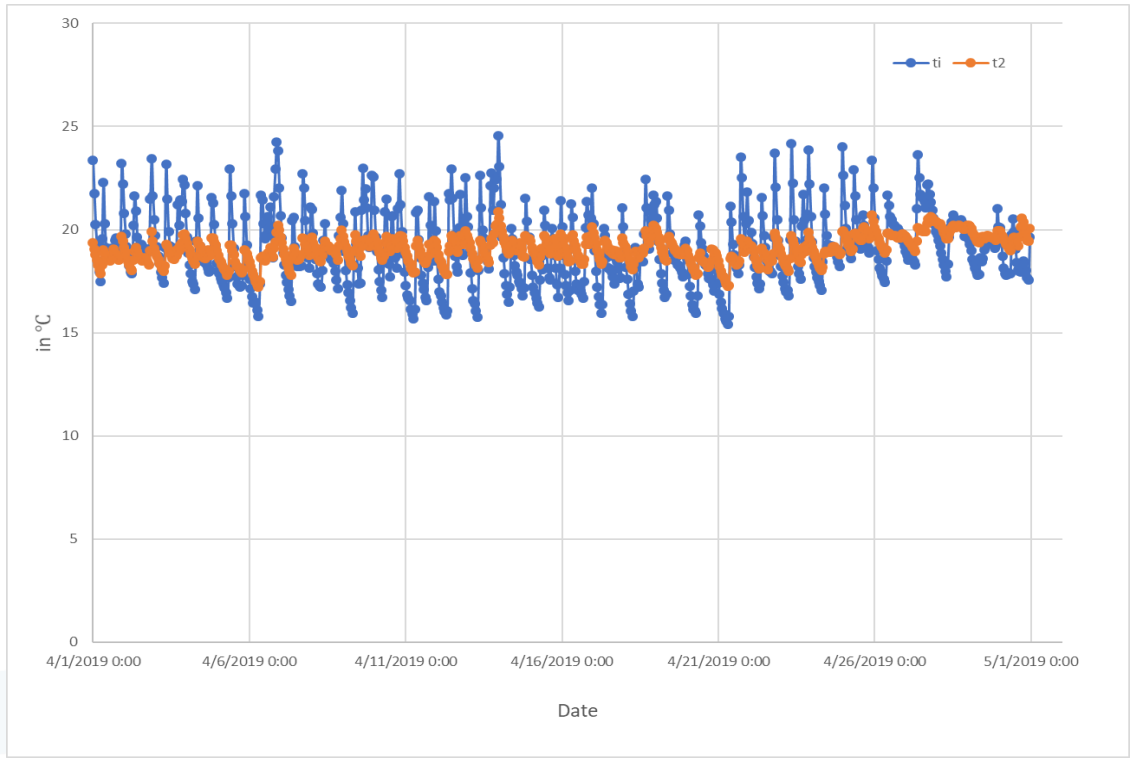
- By measuring electrical consumption we have been able to observe problems in the operation of appliances
- For example, a household was using an old refrigerator with high consumption
- As soon as they replaced it the consumption baseline was reduced



Differences in indoor conditions



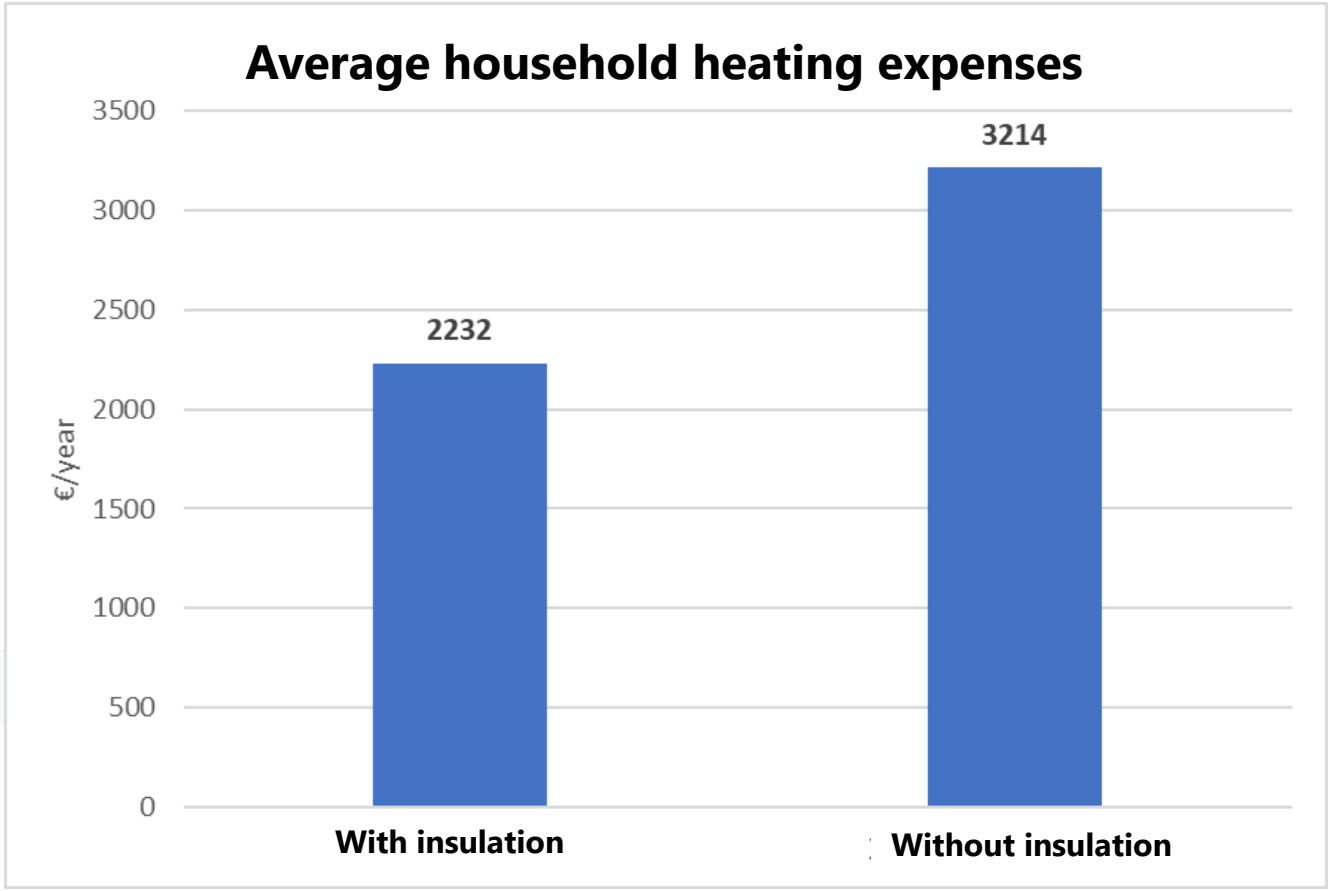
Difference between living room and bedroom (April 2019)



Difference between rooms with north and south orientation (April 2019)

The importance of thermal insulation

- The presence of thermal insulation leads to 30% lower heating expenses, in average
- During the operation of the LL, one household decided to install external thermal insulation to walls and roof.

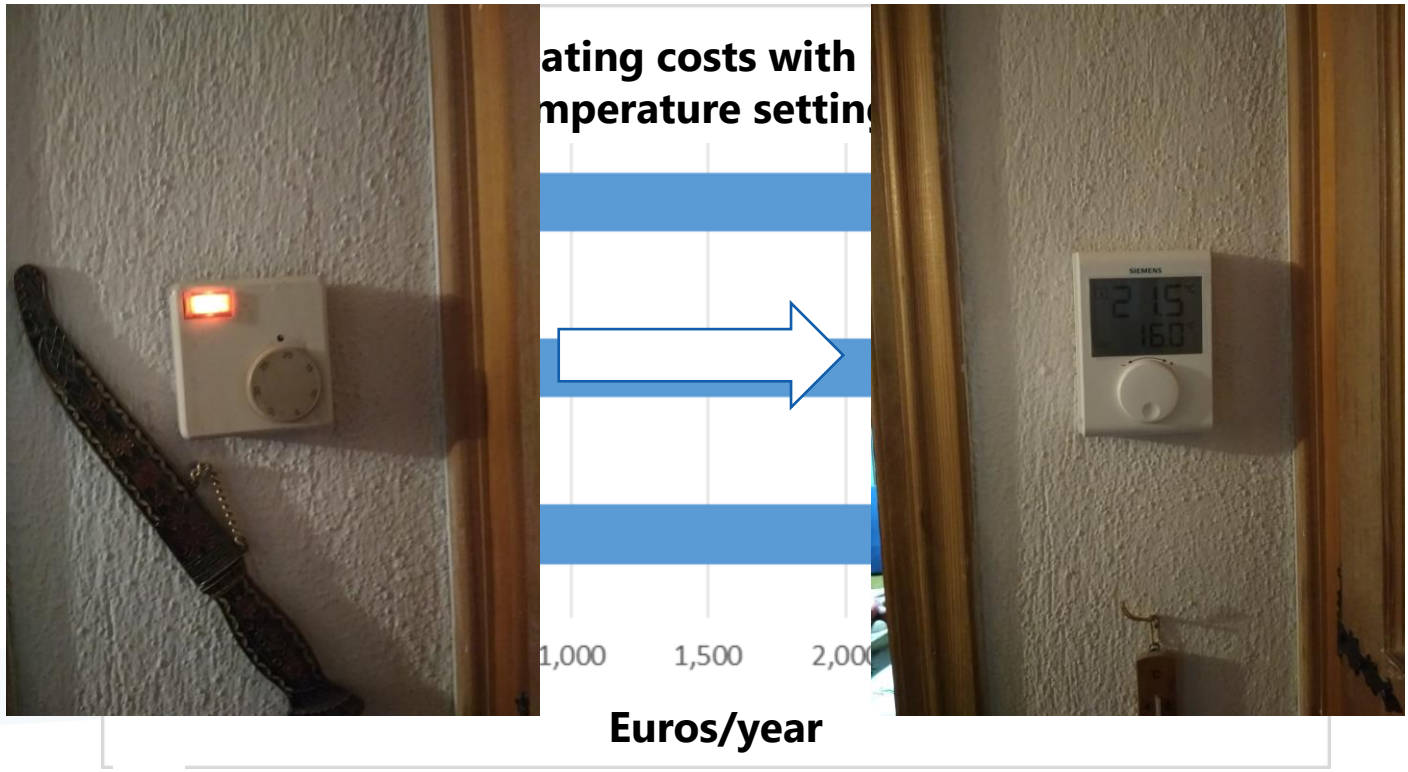


Not well-maintained heating systems increase energy expenses

- During the LL operation, it was observed that many households had diesel fired heating systems with low efficiency ratio (lower than 84% - 90% is the proper rate)
- In Metsovo, this can lead even to 170 €/year increase in energy costs
- The maintenance cost is usually 70€

The importance of temperature setting

- If indoor temperature exceeds 20oC, heating expenses can increase even by 1,000 €/year
- So, setting the right temperature is crucial
- Towards this, replacing old analogue thermostats with digital ones is useful and cost--efficient



Advice customized for each participating household

Υφιστάμενη κατάσταση κατοικίας/ θέρμανση

Η κατοικία διαθέτει κάποια μέτρα ενεργειακής θωράκισης αλλά υπάρχουν σημαντικές θερμικές απώλειες που σε συνδυασμό με τη χρήση πετρελαίου αυξάνουν το κόστος θέρμανσης.

Με βάση τους υπολογισμούς και τις μετρήσεις που έγιναν από την ερευνητική ομάδα του ΕΜΠ και του ΜΕΚΔΕ, ειδικά για την κατοικία σας, προέκυψαν τα ακόλουθα:

ΣΥΝΘΗΚΕΣ ΘΕΡΜΟΚΡΑΣΙΑΣ / ΥΓΡΑΣΙΑΣ

- Η θερμοκρασία, κατά μέσο όρο, είναι κάτω από το «όριο» άνεσης (είναι κοντά στους 21oC)
- Η υγρασία είναι, κατά μέσο όρο, υψηλότερη από 50% και παρατηρούνται περιπτώσεις με ιδιαίτερα αυξημένες τιμές

ΚΑΤΑΝΑΛΩΣΗ ΕΝΕΡΓΕΙΑΣ ΓΙΑ ΘΕΡΜΑΝΣΗ και ΖΕΣΤΟΥ ΝΕΡΟΥ (ΑΠΑΙΤΟΥΜΕΝΗ)

- 28.250 kWh/ έτος

ΣΥΝΟΛΙΚΟ ΚΟΣΤΟΣ ΘΕΡΜΑΝΣΗΣ και ΖΕΣΤΟΥ ΝΕΡΟΥ (ΑΠΑΙΤΟΥΜΕΝΟ)

- 3.180 €

Υφιστάμενη κατάσταση κατοικίας/ ηλεκτρισμός

Υπολογίστηκε, βάσει μετρήσεων, ότι η ετήσια κατανάλωση ηλεκτρικής ενέργειας της κατοικίας είναι χαμηλότερη από το μέσο όρο της χώρας, στις 2.540 kWh. Το κόστος για τον ηλεκτρισμό εκτιμάται σε 510 € ανά έτος.

Η εξοικονομούμενη ενέργεια είναι η πιο πλούσια πηγή ενέργειας!

ΜΕΤΡΑ ΕΞΟΙΚΟΝΟΜΗΣΗΣ ΕΝΕΡΓΕΙΑΣ ΓΙΑ ΘΕΡΜΑΝΣΗ

Για να μπορέσετε να έχετε περισσότερη θερμική άνεση στην κατοικία σας (υψηλότερη θερμοκρασία) πρέπει η κατάσταση να τροποποιηθεί, ώστε το απαιτούμενο κόστος θέρμανσης να μειωθεί.

ΧΡΗΣΗ PELLETS

Η χρήση βιομάζας μπορεί να μειώσει το κόστος θέρμανσης σημαντικά. Ειδικά ένας λέβητας pellets είναι εύκολος στη χρήση και έχει καλή απόδοση.

- Όφελος: 1.020 €/ έτος
- Εκτίμηση κόστους εφαρμογής: 4.000 €

ΜΕΤΡΑ ΕΞΟΙΚΟΝΟΜΗΣΗΣ ΕΝΕΡΓΕΙΑΣ ΓΙΑ ΗΛΕΚΤΡΙΣΜΟ

Καλό είναι να κάνετε αίτηση για νυχτερινό τιμολόγιο, ώστε να εξοικονομήσετε ένα ποσό της τάξης των 100 € ετησίως

ΜΕΤΡΑ ΓΙΑ ΤΗ ΒΕΛΤΙΩΣΗ ΤΩΝ ΣΥΝΘΗΚΩΝ ΣΤΗΝ ΚΑΤΟΙΚΙΑ

Είναι καλό να χρησιμοποιήσετε αφυγραντήρα για τον έλεγχο της υγρασίας και την αποφυγή προβλημάτων που σχετίζονται με αυτήν (συμπύκνωση υδρατμών/ μούχλα).

Has been STEP-IN successful?

- 80% of the participants stated that the project was useful to them, for example:
  - ✓ **25% maintained their heating system**
  - ✓ **22% gained a better understanding of electricity bills**
  - ✓ **20% learned how to use their heating system more efficiently, etc.**
- ~ 35% of the participants stated that they noticed an improvement in the quality of their life (e.g. reduction in moisture problems, improvement in thermal comfort, etc.)
- 12% reported changing bad habits related to energy use
- A small percentage started using the Night Residential Tariff or switched electricity supplier
- **~ 80% of the participants said that the installation of electricity consumption meters motivated them to check regularly their electricity consumption** (30% of them said that they did so, several times per week or at least once per day)
- Almost all of them stated that the monitoring equipment helped them in taking energy efficiency decisions, i.e. the replacement of energy-consuming electrical appliances, the purchase of a dehumidifier, etc.

Thank you for your attention

Questions???