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ABOUT ”Social Green” project Pilot in Alba Iulia

"Improving energy efficiency in social apartments through intelligent monitoring solutions“

Regional Operational Program – Axis 3 “Supporting the transition to a low carbon economy”; Project index: PGI01473

https://www.interregeurope.eu/socialgreen/

Project: EURE - Effectiveness of Environmental Urban policies to improve Resources Efficiency

EURE EVENT: ONLINE STUDY VISIT and THEMATIC SEMINAR

Author: Tudor Drambarean – Project Manager – Alba Iulia Municipality - Romania

DATE: Sep 28, 2021

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Social Green Project Objectives

The project is funded by the European Union through the European INTERREG EUROPE Program, under Priority Axis 3 - Supporting the transition to a low carbon economy in all sectors.

The aim of the project is to improve policies and operational programs aimed at greening the social housing sector, focusing on the link between the social housing sector, energy efficiency and greening interventions, taking into account the political, institutional, financial and technical levels.

Partners

Nordregio – Nordic Centre for Spatial Development (Sweden - Project Leader)

CEIIA - Centre of Excellence and Innovation for the Automotive Industry (Portugal)

Regional Energy Agency North (Croatia)

Extremadura Energy Agency (Spain)

South Muntenia Regional Development Agency (Romania)

CCDRN - Regional Coordination and Development Commission of Norte (Portugal)

Tartu Regional Energy Agency (Estonia)

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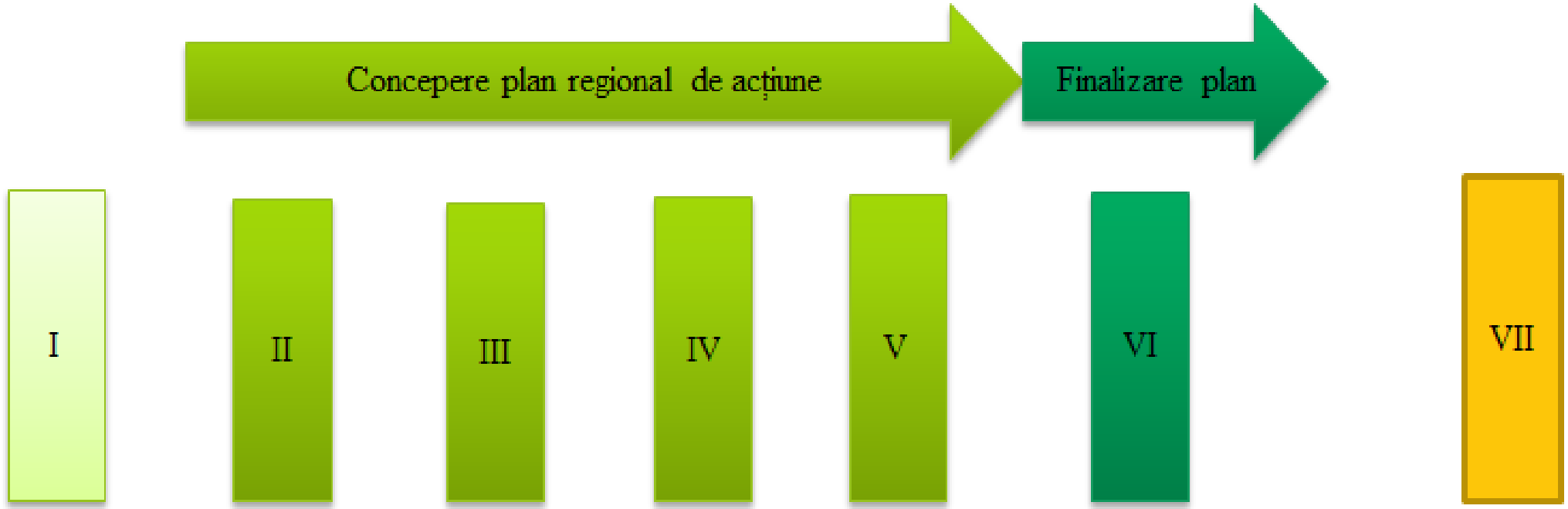
Social Green Project Objectives

The project addressed the Regional Operational Program, which is a useful tool for public authorities in modernizing and increasing the energy efficiency of the existing building stock, but which could be considerably improved in order to have better targeted measures to provide energy innovative measures that address current needs, while correlating with other similar policy instruments at national level, in a smart way.



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Social Green project pilot in Alba Iulia

Pilot project objectives: Improving energy efficiency and consumer behavior in social housing in Alba Iulia

Usage of:

- Informative materials regarding energy consumption, invoices and associated costs.
- Smart home system in order to offer real time data and automation.
- Comparison with historical data for quantifying possible energy reductions after applying such measures.
- Propose improvements in regional financing guides and programs, in order to include such activities and measures in current calls for energy efficiency.

NOTE: project initially funded equipment for 8 apartments and 2 more were funded additionally due to high interest from the tenants

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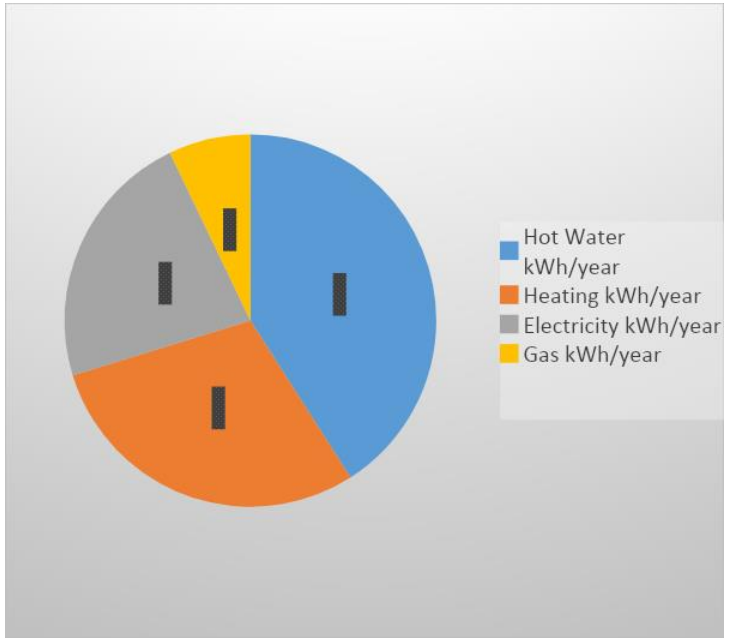
Specific aspects regarding social apartments in Alba Iulia (1)

- Good condition (build in 2013)
- Insulation od exterior walls and double glazed windows (estimated Class A)
- Own boilers (2 x 150 kW) on natural gas for heating and hot water
- Solar panels for hot water during summer
- Individual meters for each flat (analogue, difficult to automate readings)
- Tenants have individual contracts for gas and electricity, rest of utilities being shared according to individual meters manually read by administration

Specific aspects regarding social apartments in Alba Iulia (2)

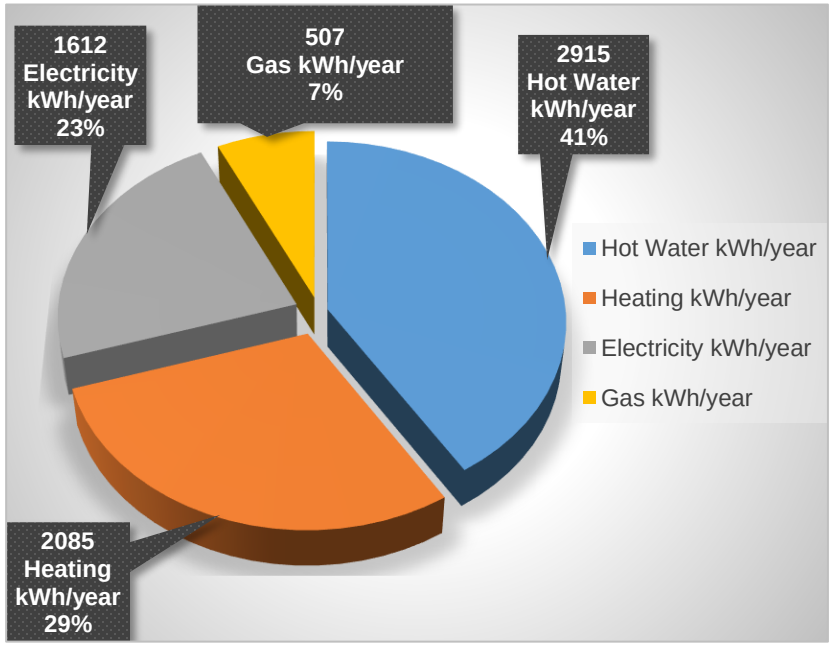
1) Electricity

Average consumption 132kWh/month (91 lei cost/);
Big differencies between apartments (1230 – 2060 kWh/ year)



2) Gas

- Conversion rate 1m3 gas = 10.71 kWh; invoice at 3 months
- Average 1041 kWh/year (880 - 1160 kWh/year).



3) Water (hot/ cold)

Average consumption: 8.9 m3/ month (4.7 m3 cold water, 4.2 m3 hot water)
At costs, used water and rain water are added.
For hot water, costs are calculated to include consumed gas.

4) Heating

Block boilers are ensuring heating, with an average consumption of 2085 kWh/year/apartment (with huge differences – more than double in some cases)

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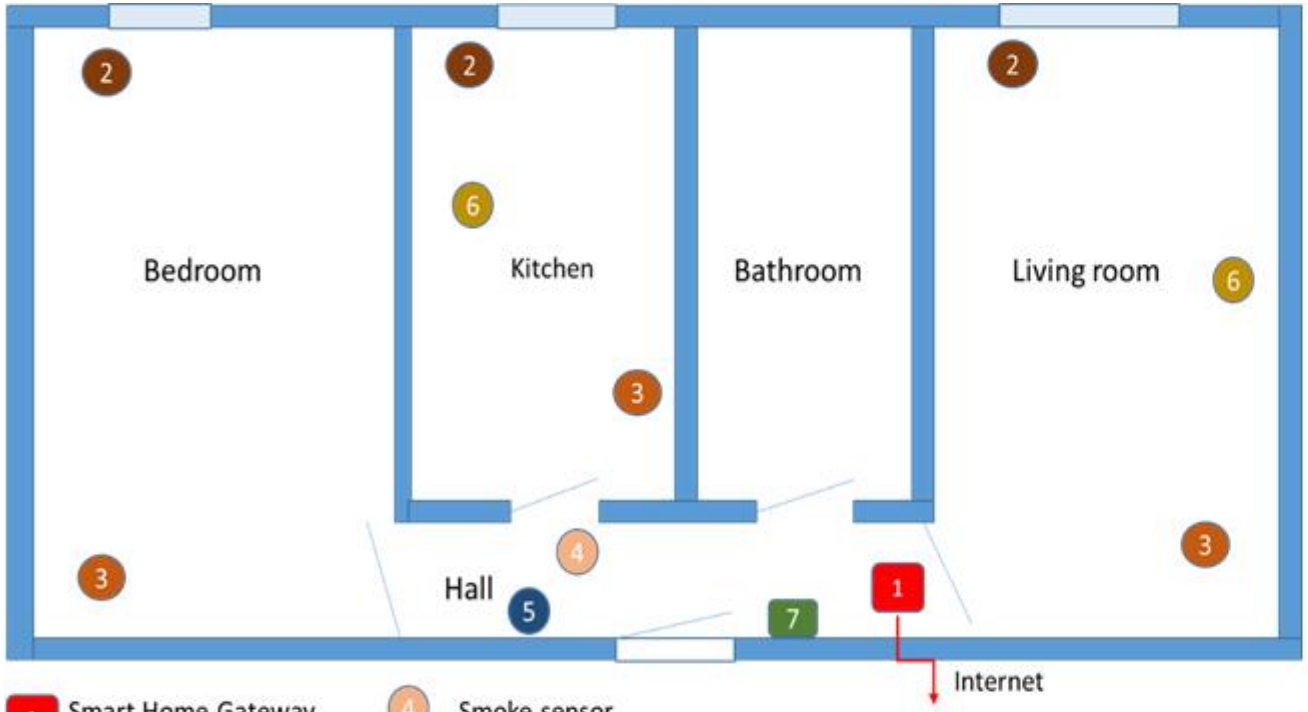
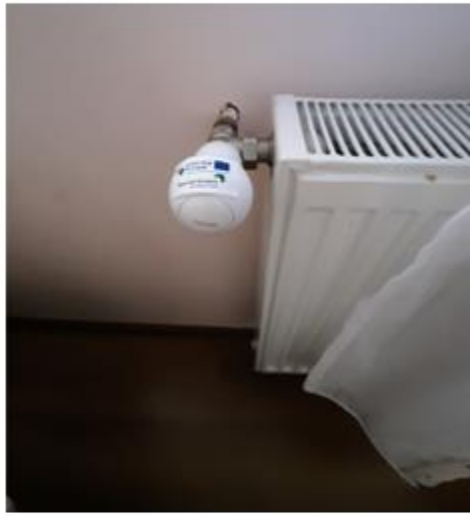
Technical solution (based on a smart home system)





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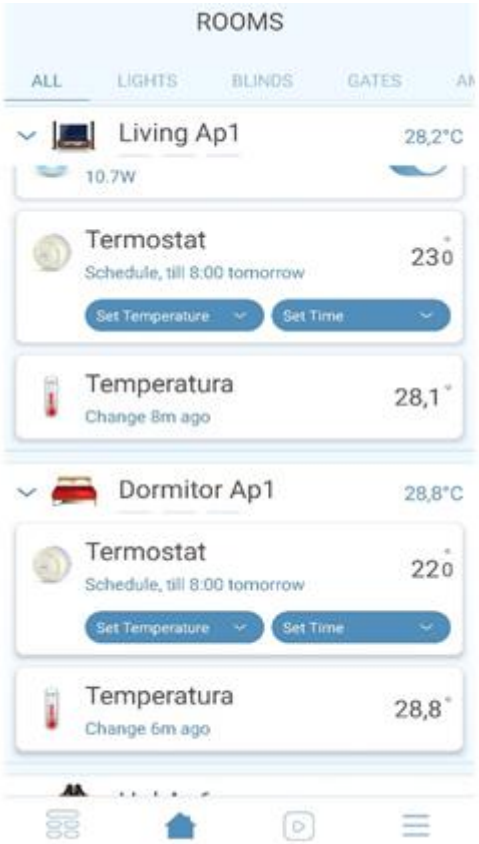
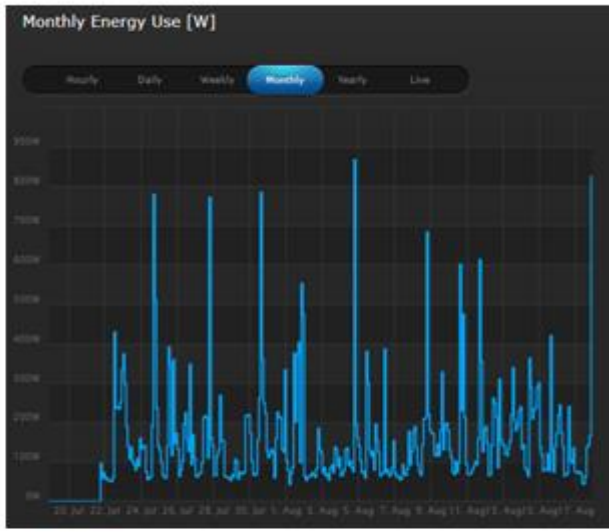
User (smart phone) and administrative system applications





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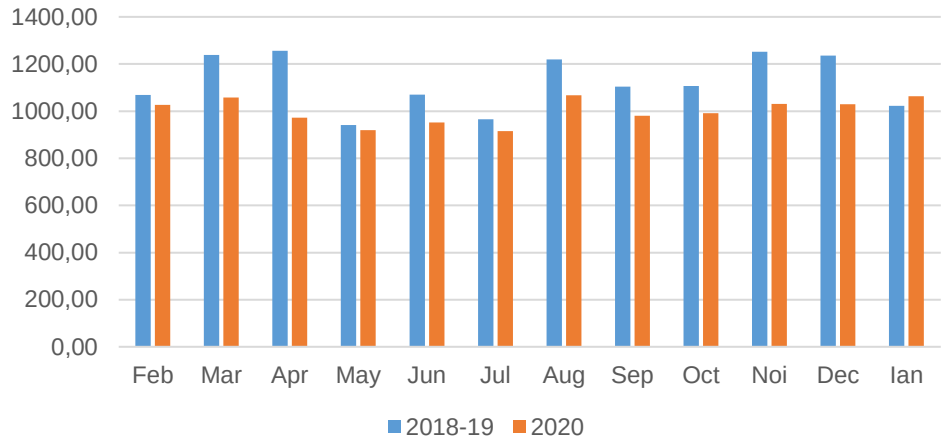
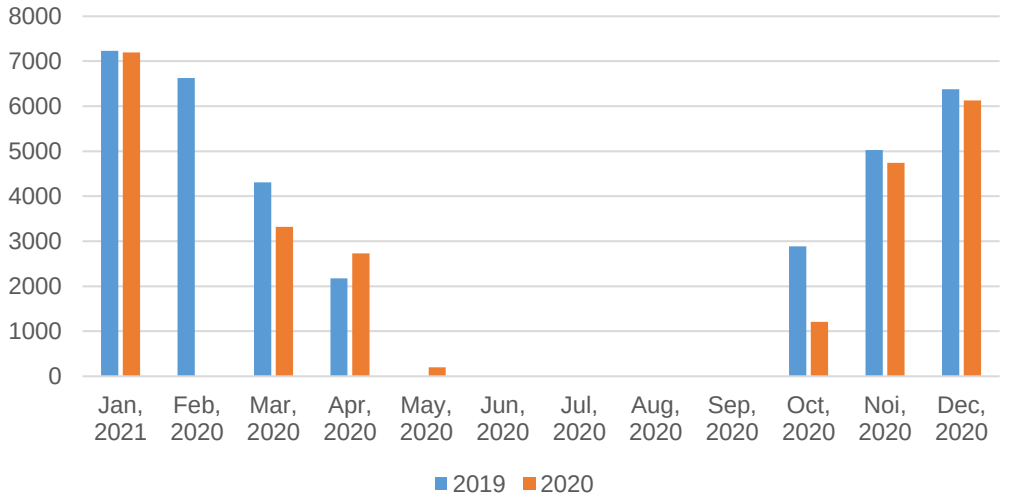
Main results (February 2021)

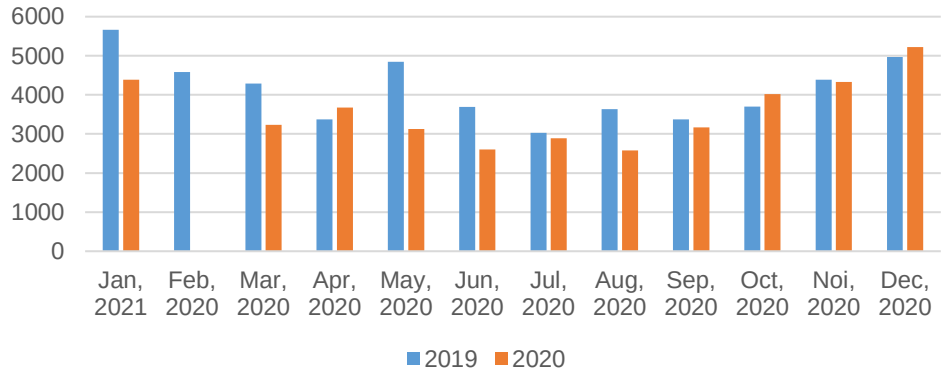
Electricity consumption - 1 year (-11%)



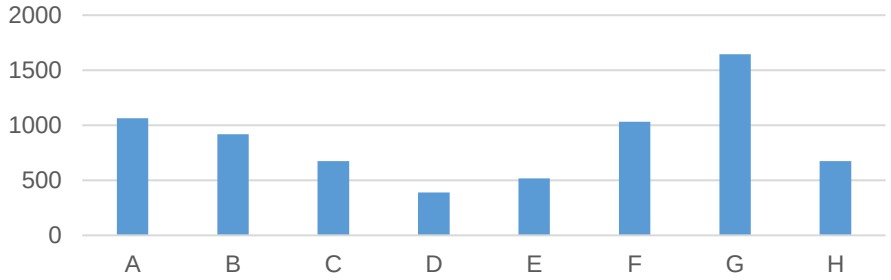
Total heating, kWh (-7%)



Energy, kWh for hot water (-13%)



Natural gas (cooking), kWh/ year/ apartment (no big differences between years)



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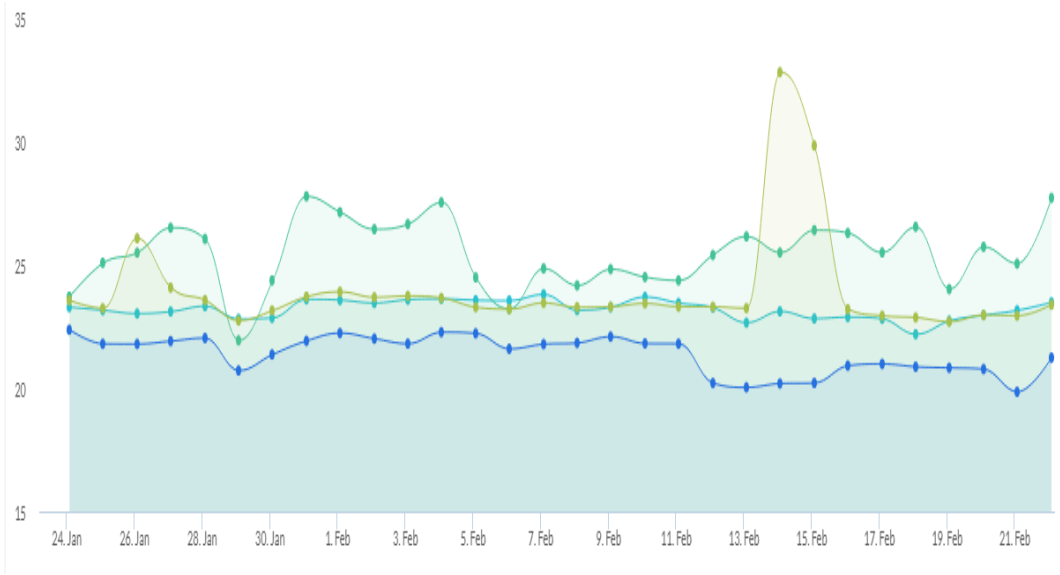
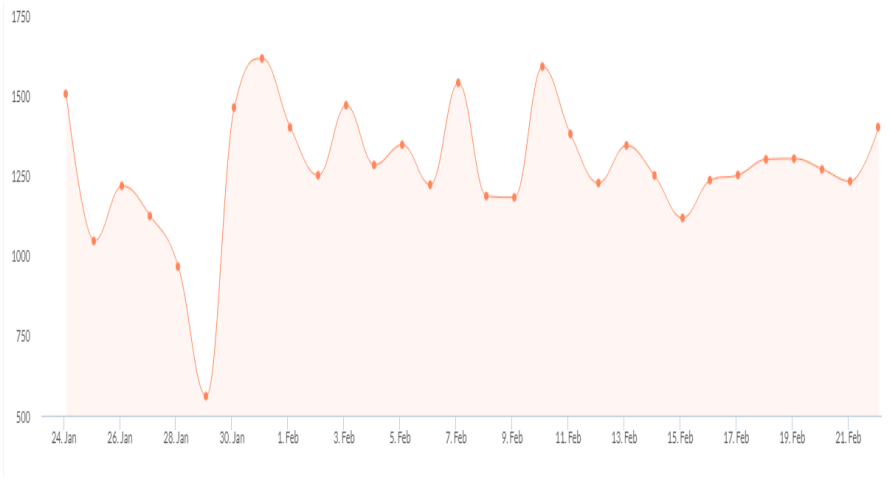
Interior climate and comfort

We were able to monitor: temperature, humidity, CO2 (VOC – just displayed)



Evolution of temperatures and humidity in a social apartment (1 month, winter)



Evolution (1 month, winter) of CO2 in an apartment

Graph shows that interior temperature has 20 – 24 Celsius degrees, which can be considered many times higher than normal. As a result, apartments are well heated during winter.

Sometimes, humidity caused by washing or cooking is much higher than normal (55% instead of 40-45%), which can cause walls sweat.

Many times, concentration of CO2 is over normal value of 1000ppm, imposing a better ventilation.

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Social and energy behavior aspects

We used informing materials, discussions and questionnaires in order to identify social and energy consumption habits changes. Main aspects:

- Users are content with quality of living in social apartments; all have WiFi internet and smart phones.
- All know something about smart home, but never used one and wanted details.
- Very good adoption rate (about 70% wanting to install a smart system).
- Expectations: lower energy/ utilities invoices, comfort, control.
- Changes in habits: more attentive to consumption, usage of devices class A, using application (especially for heating, almost every day).
- Users were content with fast installation, training and support (ensured by a specialized company).
- Smart home systems seem expensive (no users being able to invest in such systems).
- Majority would recommend such systems to other users.

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Informative brochures

For improving behavior related to energy/ utilities consumption, we have prepared two informative materials:

- **One explaining invoices and costs for each utility.**
- **One containing simple "tips and tricks" for lowering energy consumption.**

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Informative material - INFO 1:
What do utility bills include?
Can costs be reduced?

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1. Electricity invoice

- In the absence of online communication by consumers of consumption (meter index, kWh), the bill in the example is an estimate based on previous consumption, and the adjustment will be made quarterly, after a meter reading;
- Because the billed period is 2 months, the total energy is divided into periods for each month
- As can be seen, the prices per kWh are different for the 2 periods (0.45901 / 0.45115 lei / kWh); they include the real price of electricity production (which is much lower), to which are added transmission and distribution costs; the cost for 235 kWh active energy is 107.66 lei (22.15 euro)

To the active energy costs, taxes are added: cogeneration expenses (4.46 lei), green certificates (15.31 lei), excises (1.19 lei) and VAT (24.43 lei), totaling 45.39 lei out of a total invoice of 153.05 lei, the unit price reaching 0.65 lei / kWh (0.13 euro/kWh)

CONCLUSIONS
- In the absence of a monitoring system, no measures can be taken to limit consumption, and the invoice received will be paid; self-control and personal saving measures can be taken;
- Without self-reading, real consumption is found in bills only at 3 months
- The high share of taxes (the production price being only 35% of the final price), pays off the investments in renewable energy sources when consumption is high
- Market liberalization, allows the choice of electricity supplier - see next page

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Proiectul pilot Social Green in Alba Iulia
"Imbunatatirea eficientei energetice in apartamentele sociale prin solutii de monitorizare inteligenta"

INFO 2:
Sfaturi privind reducerea consumurilor si costurilor cu energia si utilitatile

Acest material utilizeaza informatii si prezentari grafice din:
- recomandarile Comisiei Europene – "Reduceti consumurile si emisiile acasa" (https://ec.europa.eu/clima/citizens/tips_ro) si din proiectul European
- "Economie la energie" (www.economielaenergie.eu, https://www.anre.ro/ro/info-consumatori/economie-la-energie)
- Alte surse

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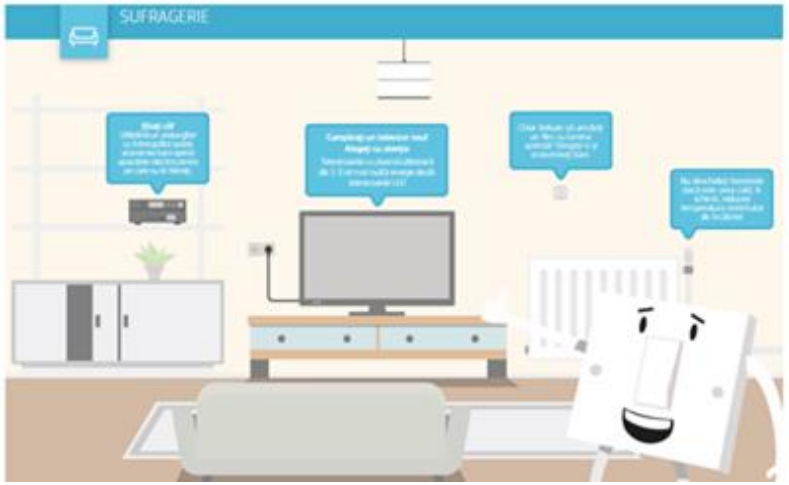

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CONCLUSIONS

- ”Social Green” Pilot project is a premiere in testing Smart Home solutions in social apartments.
- With proper guidance, users were able to check the potential of such solutions (high adoption rate after initial reluctance from the side of the beneficiaries/tenants).
- Information regarding utilities consumption and costs together with realistic expectations and benefits of such systems must be addressed during the project.
- Is recommended installation during rehabilitation of buildings, in order to minimize discomfort.
- Information and expert services (for installation, configuration, support) are highly recommended.
- Results are very encouraging, especially considering that during 2020 due to pandemic restrictions, many tenants changed their lifestyle (tele-work/ learn from home).
- Smart systems are evolving very fast; next phase should propose sensors and automation for all utilities, integrated in and Building Energy Management System.
- Smart solutions require an significant initial mid-term investment and are recommended to be included in all energy efficiency projects.

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