



Workshop: Regional and local approaches to fight energy poverty
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Improving energy efficiency in social apartments using smart monitoring solutions

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Social Green
Interreg Europe



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European Union | European Regional Development Fund

Social Green



Aim: Improve policies and operational programs for greening social housing, focusing on the link between social housing, energy efficiency and greening interventions, taking into account the political, institutional, financial and technical levels

Social Green addressed the **RO Regional Operational Programme**, 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

Action Plan included a pilot action based on lessons learned from Tallinn and Tartu, Estonia



REGIONAL ACTION PLAN
for
ALBA IULIA MUNICIPALITY, ROMANIA
March 2019





Pilot Project

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

Use 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 then upgraded to 10





Social Housing in Alba Iulia Municipality

- Good condition (built in 2013)
- Insulation of 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



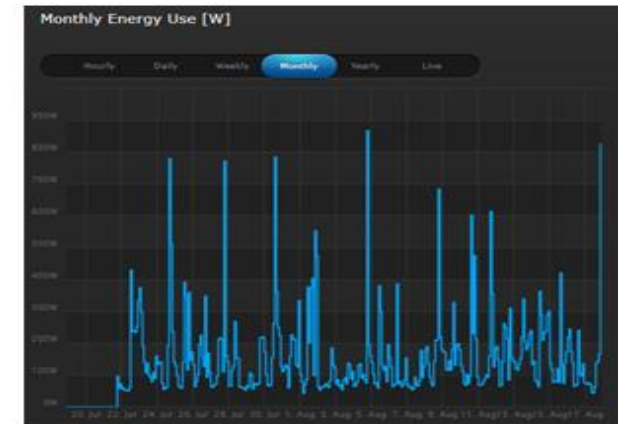
Technical solution (based on a smart home system)



- 1 Smart Home Gateway
- 2 Smart heat controller
- 3 Temperature sensor
- 4 Smoke sensor
- 5 Climate sensors
- 6 Smart plug
- 7 Electricity meter



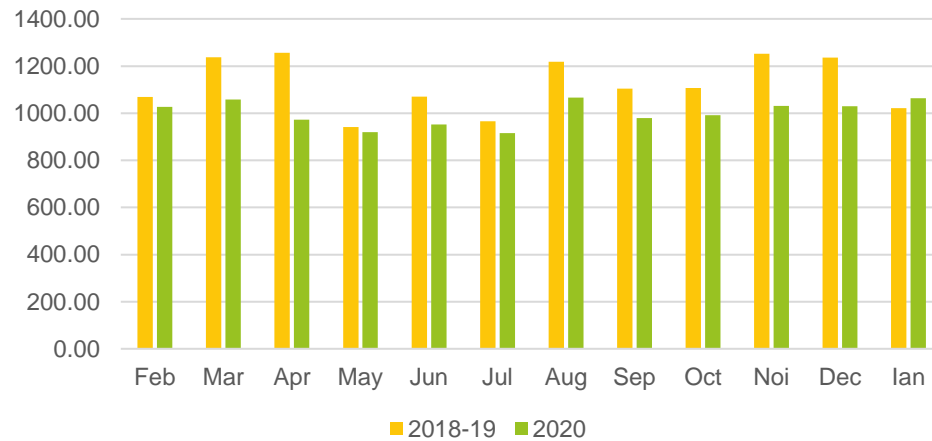
User (smart phone) and administrative system applications



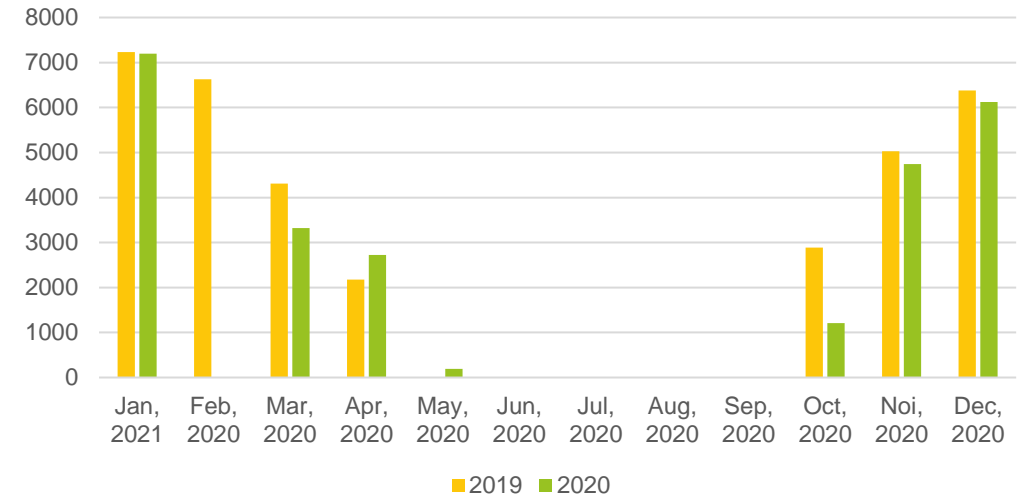


Main results (February 2021)

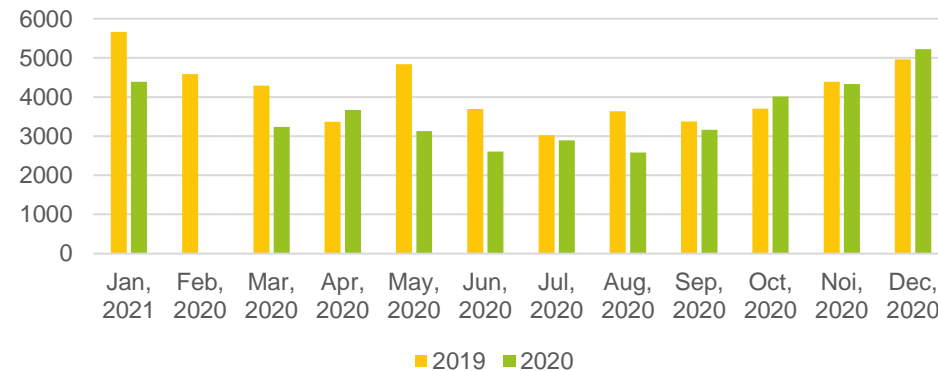
Electricity consumption - 1 year (-11%)



Total heating, kWh (-7%)



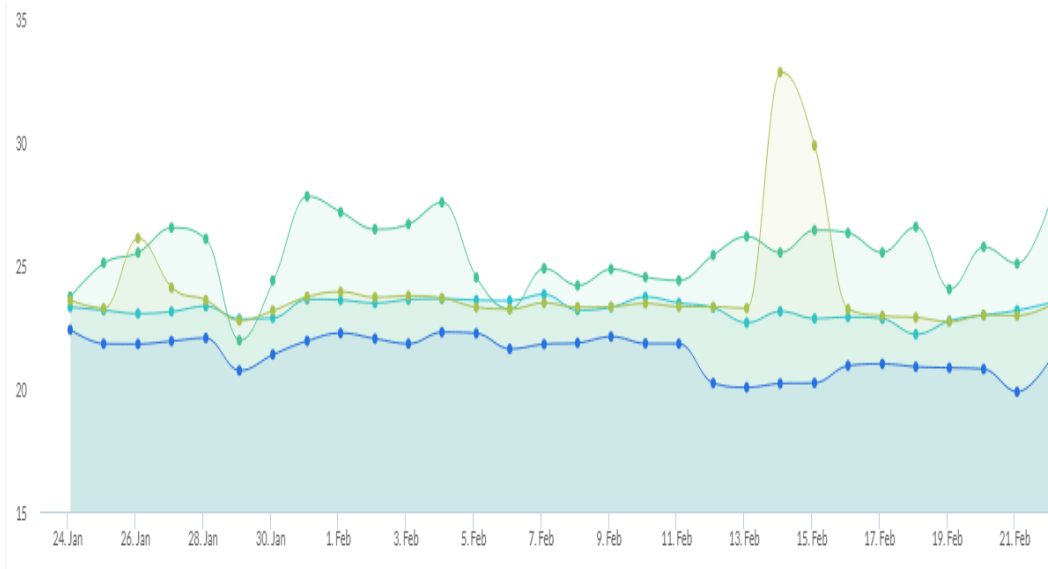
Energy, kWh for hot water (-13%)



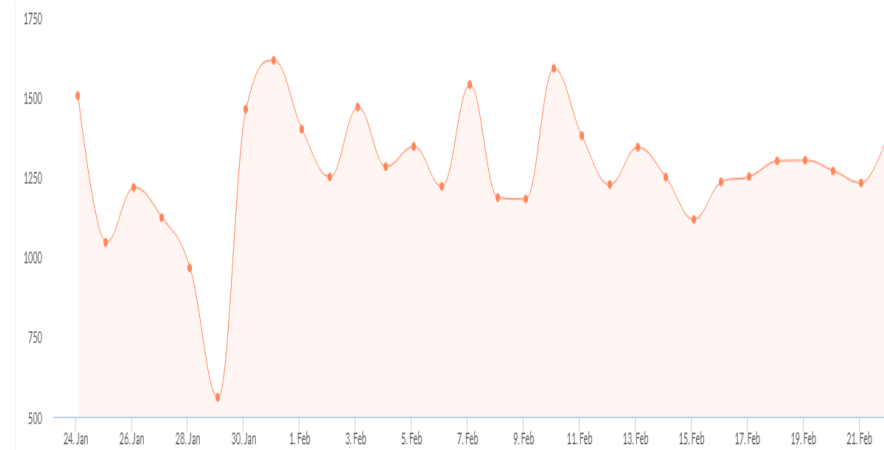


Monitoring

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 wall condensation.

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



Conclusions

- The human factor was highly important in the process
- With proper guidance, users were able to check the potential of such solutions (high adoption rate after talks with the users)
- Information regarding utilities consumption and costs together with realistic expectations and benefits of such systems must be addressed during the project
- Installation is recommended during rehabilitation of buildings, in order to minimize discomfort
- Information and expert services (for installation, configuration, support) are highly recommended

Conclusions

- Results are very encouraging, especially considering that during 2020 due to pandemic restrictions, many tenants changed their lifestyle (work/learn from home)
- Smart systems are evolving very fast; next phase should be sensors and automation for all utilities, integrated in a Building Energy Management System
- Smart solutions require a significant initial mid-term investment and are recommended to be included in all energy efficiency projects
- Find out more in the Implementation Report



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SOCIAL GREEN - REGIONAL POLICIES TOWARDS GREENING THE SOCIAL HOUSING SECTOR

**IMPLEMENTATION REPORT FOR
SOCIAL GREEN PILOT ACTION IN ALBA IULIA
“Improving energy efficiency in social apartments using
smart monitoring solutions”**

Includes:

- [Initial report \(technical and social data analysis, system configuration, initial feedback\)](#)
- [Mid-term report \(system installation, monitoring, feedback, preliminary results\)](#)
- [Final report \(monitoring, system extension, feedback, results, conclusions\)](#)

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Thank you!

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