

Pre-monitoring of the energy consumption and indoor air quality in the demo building in Kašava

Pavel Mlejnek

During the pre-reconstruction monitoring, several sensors were mounted in the Kasava building in June 2022. The sensors cover three main fields of interest: indoor air quality (IAQ) parameters, energy consumption and weather conditions.

IAQ sensors were installed on two floors. There were three sensors on the ground floor and three sensors on the first floor (highlighted in the following figure).

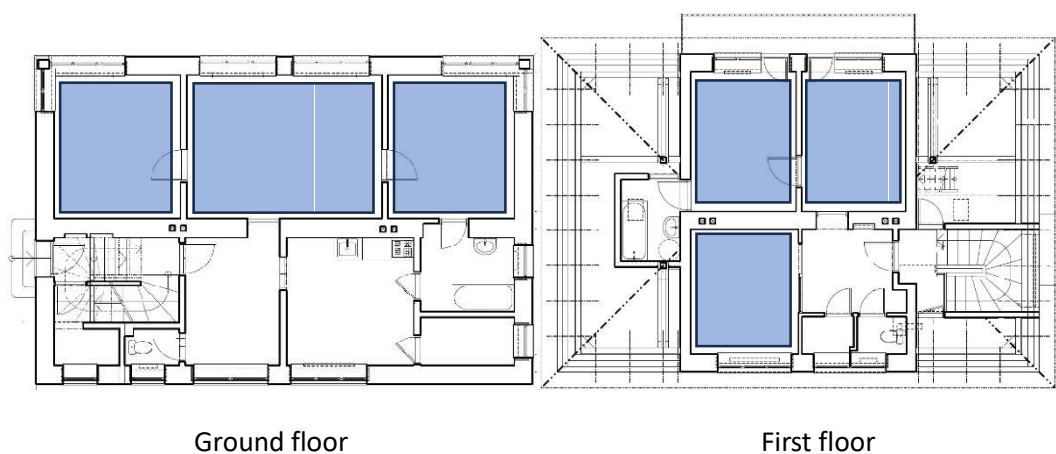
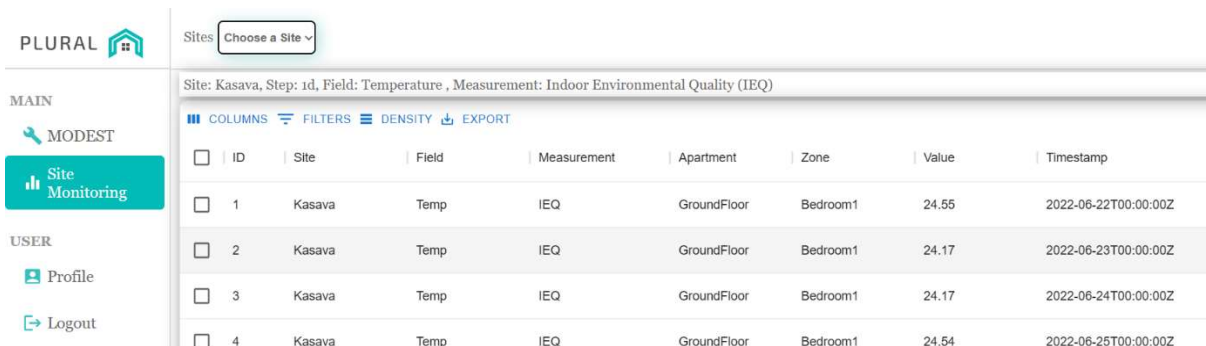


Figure 1 Ground floor and first floor plans with highlighted rooms with IAQ sensors

The IAQ sensors measure temperature, humidity, CO₂ concentrations, VOC concentrations and illuminance every 15 minutes and send the data to the web database in the LYSIS platform. The database presents data in the raw values with selectable steps (15 minutes, hourly, daily, weekly, and monthly). The database uses the data average for steps longer than 15 minutes (see an example in the following figure with daily steps).



ID	Site	Field	Measurement	Apartment	Zone	Value	Timestamp
1	Kasava	Temp	IEQ	GroundFloor	Bedroom1	24.55	2022-06-22T00:00:00Z
2	Kasava	Temp	IEQ	GroundFloor	Bedroom1	24.17	2022-06-23T00:00:00Z
3	Kasava	Temp	IEQ	GroundFloor	Bedroom1	24.17	2022-06-24T00:00:00Z
4	Kasava	Temp	IEQ	GroundFloor	Bedroom1	24.54	2022-06-25T00:00:00Z

Figure 2 The raw data from the database in daily step

Except for the raw data presentation, the database presents data in a graphical view during monitoring. The typical presentation is in the next figure which shows the temperature on a daily basis for the common room on the ground floor.

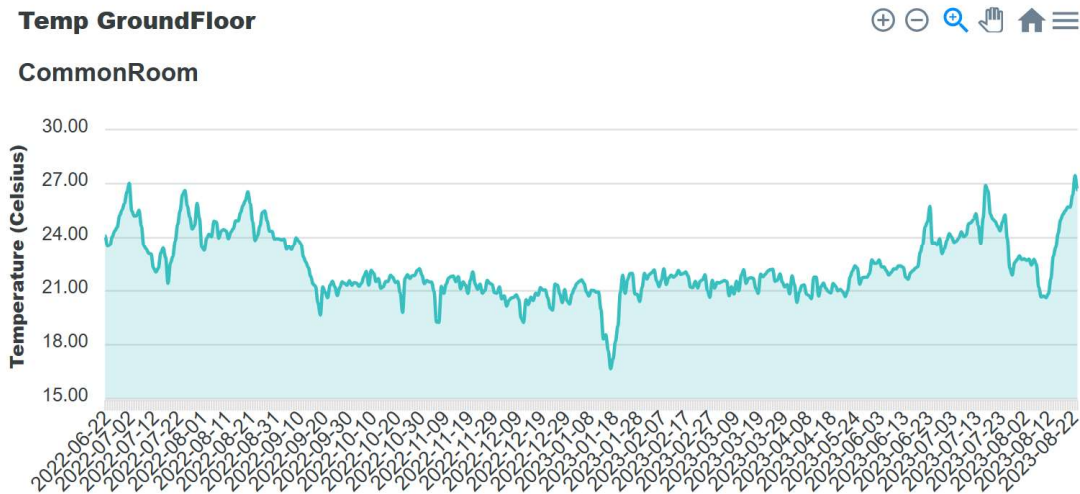


Figure 3 Graphical representation of the data

Five smart energy meters were installed to measure electric energy consumption in individual flats and common places like staircases and underground floor. Two energy meters measure the energy demand for domestic hot water preparation of the flats.

The heating gas consumption is measured by two gas flow meters – one for the first floor and the second for the whole object (first floor +ground floor). Gas is used in boilers for heat preparation. The radiators are used for the distribution of the heat, and it is measured by heat flow meters (calorimeters) individually for the flats.



Figure 4 Smart energy meters for electric consumption measurement and calorimeter for heat demand

The database presents the energy data with the same steps as in the same case of IAQ sensors in raw format or a graphical representation.

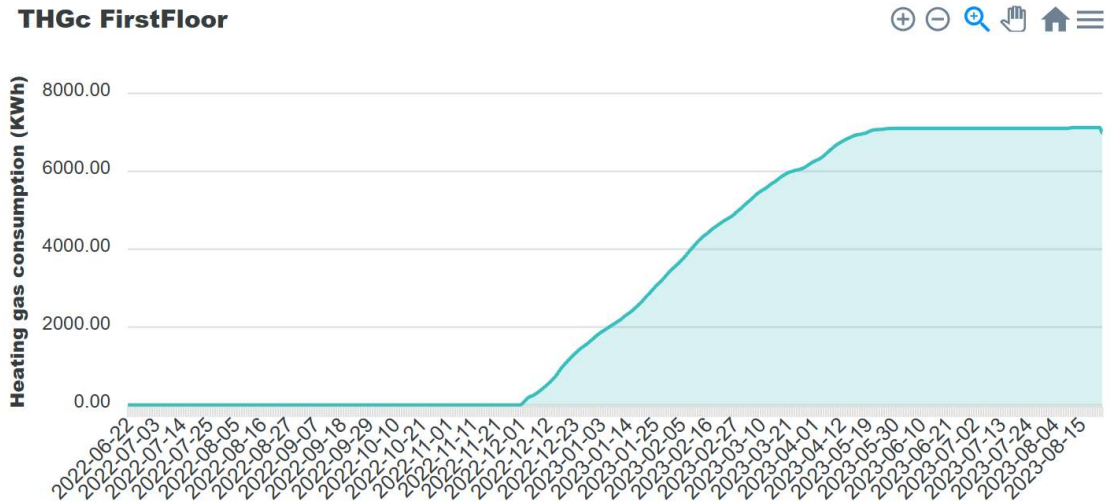


Figure 5 Graphical representation of the gas consumption with daily step

Finally, the weather conditions are measured by the weather station placed on the chimney (see the next figure). The basic parameters of the outdoor environment are measured – temperature, relative humidity, solar radiation, and illuminance. All the parameters are sent to the same database.



Figure 6 Weather station on the chimney

Data from the database are available after logging on to the web page: <https://modest.plural.rid-intrasoft.eu>.

For more information visit the PLURAL website www.plural-renovation.eu.

Project coordinator: Maria Founti, NTUA

Contact email: info@plural-renovation.eu