How to account the heat consumption of an apartment?

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Everyone has its own indoor temperature when he or she feels comfortable. Therefore it is good if during the heating season the heat from radiators can be adjusted according to individual needs. Even better - if payments can be done according to real heat consumption and not only depending on the total space of heated area of the apartment. In most of new apartment buildings, it is already possible. But what can do owners of flats in old standard type building in houses constructed more than hundred years ago? Here we are introducing to the two possible solutions. However, it is important to remember that for application of these solutions either renovation of the heating system (at least installation of thermostatic valves on each radiator) or construction of a completely new heating system will likely be required.

Solution No. 1. Heat energy meter

It is a device that consists of the flow meter of heating fluid, two temperature sensors and a calculator that calculates the energy consumption in kilowatt-hours (kWh). Such meter has to be installed in each apartment of the building. Individual heating costs are calculated by aggregating the cost of the measured heat consumption of apartment, heat consumption resulting from the heat loss from heating pipes and heating of staircase.

Heat energy meter - pros and cons

☺ it measures the actual heat consumption in easy understandable units (in kWh)
☺ it is simply to split the costs among apartments, complicated method for calculations is not required
☺ if the meter is installed outside the apartment e.g., in the staircase, it is easy to obtain the measurement data

☹ the meter shall be verified at least once every 2 years (i.e. requires additional operational costs)
☹ it can be used only in horizontal two-pipe heating systems
☹ it measures the overall heat consumption of a flat, but not in single rooms
☹ some parts of a meter are in contact with the heating fluid, thus there is a risk of damage of these parts (service time of cheapest models is only 5-6 years)
☹ installation of the system is expensive

Solution No. 2. Heat cost allocator

Heat cost allocator is an electronic device for detecting the share of heat output of each single radiator in the apartments. Heat cost allocators can be installed practically on all types of radiators – on new panel type radiators made of steel as well on section type radiators e.g., on old cast iron radiators (exception is floor heating systems). Heat cost allocators are suitable both for single-pipe as well as for two-pipe heating systems. Charge for heat is calculated by dividing the total costs for heating of the building proportionally to the measurements of allocators. It is more convenient for data collection and compilation to use remote data collection systems in order to avoid a need of entering each apartment.

The total heating costs of the house are determined by the total heat consumption indicated by heat meter of the heating unit of the building. Heating costs for each department consist of 2 parts: one part comes from the measured radiators, and the other originates from heating of risers, horizontal distribution pipes, heating of staircase and from heat loss. Ratio of these two parts may vary in different houses and the procedure for determining these parts shall be presented in the method to be approved by a majority of apartment owners. In order to balance the cost of heating, for apartments with objectively lower heat resistance, e.g., in apartments situated on the first floor or at the outer edge of the building, the apartment owners may also agree on application of particular correction coefficients for heating costs.

Heat costs allocator - pros and cons

☺ when installing heat cost allocators, the heating system of the whole building is inventoried, dimensions and the heat output of each radiator in apartments are identified
☺ consent and involvement of all flat owners of the building is advisable, but not required
☺ heat consumption in each room can be found out
☺ lifetime of the device is 10 years
☺ very low risk of defects

☹ relatively complicated method of allocating the costs per apartments
☹ the system does not take into account the heat output from risers which may vary in different apartments

Installation of individual heat consumption meters is feasible also in non-renovated (un-insulated) buildings. However, experts suggest to insulate the building before installing such meters, in order to avoid the situation when trying to save as much as possible, dwellers lower temperature too much in apartments or start implementing technically inadequate insulation measures inside apartment, which can lead to increased moisture and growth of mould in rooms.

Neither heat energy meters, nor heat cost allocators, of course, do not reduce the heat consumption directly, but rather encourage to pay more attention towards heat consumption habits. However, when wishing to save, one should not fall into extremity. Improper temperature can cause damage to health as well as to building construction. Even if we do not live in the apartment for some time, room temperature should not be lower than $+16^{o}$C.

Very bad practice is to close the thermostatic radiator valves and heat the flat at the expenses of neighbouring apartments. Technically it is possible to adjust these valves so that they may not be closed fully. However, the method introduced in Lithuania is even more effective – here for the apartments that have consumed less than 50% of the average heat consumption of the house, additional fee is applied that the payment is not less than 50% of the average heat consumption of the building. As the result intelligent heat consumption habits are promoted and excessive frugality is prevented.