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### COMPARATIVE ANALYSIS OF MICROCLIMATE PARAMETERS OF LOW-FLOOR RESIDENTIAL BUILDINGS WITH DIFFERENT HEATING SYSTEMS

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**Problem statement.** Now, more than ever, people want to live in their own houses with more comfortable and more ecological conditions. These conditions are provided by normative parameters of microclimate: temperature, humidity, a level of carbon dioxide, levels of which are under the influence of many factors, particularly of a heating system type. It is therefore essential to learn how various heating systems affect the microclimate.

**Purpose of the study.** To compare the microclimate parameters of low-rise residential buildings with different heating systems, specifically with a natural gas-fueled heating, an electric heating, a solid-fueled boiler heating. To get the empirical data in the form of graphics, that show the microclimate parameters dependency on actions and conditions. To identify a heating system with a less harmful impact on the microclimate of the buildings and with more economical use. The comparison of the impact analysis of the electric and gas boilers should be conducted in buildings with identical architectural and constructive components and with identical winterization of foundations, walls, roofs.

**Main results.** There was conducted the device research of three buildings with different heating systems: measurement of three parameters of microclimate: a level of carbon dioxide, a temperature, air humidity; a topographical shooting of the buildings. On the basis of measurements there were built some development graphics of the microclimate parameters; given the best possible solution to keep the microclimate parameters on the standard marks. There were detected some benefits and weaknesses of the different heating systems to facilitate of taking some decisions when choosing another heating system. The buildings with the natural gas-fueled and electric boilers have got almost the same microclimate parameters. In option with electric boiler, the level of the carbon dioxide is slightly lower than with gas-fueled boiler, and the boiler temperature of warming up and cooling off dynamics is almost identical; the air humidity does not reach the standard mark in both cases; the more temperature level, the more bottoming out air humidity; the air is extremely dry and it needs humidification. The standard marks of the microclimate parameters of the carbon dioxide and % RH parameters can be reached by using a simple open window. The aeration for 30 minutes is not enough if the level of carbon dioxide and % RH is far greater than the standard mark. But if we keep the open window for 45 minutes, the temperature significantly drops inside the building. The optimum airing mode to keep the microclimate parameters is to airing the room by open the window three times a day for 30 minutes, but it's inappropriate because the temperature indicators constantly drop. Therefore, there is the best option to install a rotor recuperator 60 %. The building with a solid-fueled boiler heating (wood burning) has closer level of carbon dioxide to the standard mark than previous buildings with gas and electric heating systems. It is characterized by some facts that this building is not residential and it was not heated in winter, it is in an ecologically clean area and the main – it has got high-quality exhaust system, nothing gets from furnace inside the building. But the humidity level is low; air is overly dry. All three buildings don't match the standard level of carbon dioxide, air humidity, temperature. They need the installation of the recuperators 60 %.

**Conclusion.** The study finds that the heating system with the electric boiler is more comfortable and less harmful for the microclimate of the building: in the building with electric boiler by devices was defined the lowest level of carbon dioxide; the most stable temperature and air humidity indicators. They were the closest to the standard, but this option is more expensive during the period of operation. The heating system with a gas boiler goes one step past the microclimate indicators, but it's more economical. The heating system with the solid-fueled boiler is clearly inferior to the electric and gas boilers by the microclimate indicators, but it is more economical than the other systems. Obtained scientific-practical results can be used by educational institutions, that train specialists in energy audit specialty. The graphics and the comparative specifications of microclimate can be used by developers and investors in selecting the appropriate heating system.

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