DESIGNING ENERGY EFFICIENT AND PASSIVE HOUSES

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ABSTRACT

The main principles of designing an energy-efficient residential building are the use of alternative energy sources and all possibilities for heat storage.

Keywords: *energy, residence, exploitation, passive house, sketch, project, construction, design, architecture, premises, configuration.*

Projects of energy-efficient residential buildings with small energy needs are becoming more and more popular. But the choice will be different. You may need 70 or 15 kW/(m^2×year) of energy to heat a residential building that is considered cheap for operating activities. Residential buildings that meet the first, high level of energy consumption are energy-efficient buildings, energy consumption levels from 15 kW/(m^2×year) are the main criteria for passive houses in Europe: -The relative consumption of heat energy for heating a residential building should not exceed 15 kW/(m^2×year) according to the indicator determined using the "Passive House Design Kit". -The total consumption of primary energy (provided from external sources) for all household needs (heating, hot water, lighting and electrical appliances) should not exceed 120 kW/(m^2×year). For comparison, in a simple energy-efficient home, this figure is 250 kW/(m^2×year). The prospect of paying minimal costs for heating your home is very exciting. However, the costs of building an energy-efficient or passive house should be carefully analyzed. Фарқи жуда катта бўлиши мумкин. The main principles of designing an energy-efficient residential building are the use of alternative energy sources and all possibilities for heat storage; - the energy-saving direction of the building corresponds to a part of the horizon in terms of the location of window panes and buffer zones; - volume-plan solutions; - form of energy-efficient residential

building-which provides the minimum area of external walls; -optimal window area; -the presence of drums at the entrances. The main concept in construction conditions for harsh climates is regional control of environmental parameters. This is expressed in the orientation of the house, in the construction of its spatial shell and glass, in the management of the internal climate and energy consumption. American architect Ralph Knowles (Ralph Knowles) found that "the ratio of the area of external barrier structures to the volume of the building (S/V) affects the energy efficiency of the building. The smaller the ratio of the area of external barrier structures to the volume of the building, the less the influence of the climate on the building. Similar ratios can be obtained for the perimeter of a building of the same height and its area. This comparative ratio between the perimeter of the building P and its area F is in favor of a wide-body residential building with 20% less wall surface. Today, according to the state requirements, the building should be insulated with high efficiency. In general, in order to ensure a comfortable microclimate in the rooms, the comfort of the room - the temperature of the air in the room, the relative humidity, the speed of movement, the level of cleanliness, the temperature of the inner surface of the outer walls and walls, the temperature of the floor surface, while the energy consumption does not exceed 15kW/m^2 meet the requirements. The design of a passive residential building must meet the following standards: - external barrier structures (external wall, roof and first floor floor) with a heat transfer coefficient U< 0.15 W/(m^2xK) should be hermetic (airtight); absence of "cold bridges"; -the absence of entrances and exits in external walls (compactness), reducing the relative perimeter indicator to 0.25 m/m^2 (comparative perimeter-the ratio of the perimeter of the external wall to the total area of the floor); -the use of solar energy that does not cast a shadow, oriented to the south; -high-quality special window panes and the specified heat transfer coefficient, ensuring that air does not enter and exit (hermetic) from the shell of the window-building, and when the pressure difference between the inside and outside air is 50 Pa, the amount of air exchange should be n 0.6/ч50; -in order to effectively provide heat return, the volume of air returned from the controlled ventilation system should not be less than >75%; -use of equipment that consumes less electricity in daily life; -heating drinking

water using solar collectors; -use of ground heat in heating the air entering the room due to the use of a controlled ventilation system. Therefore, the design of passive buildings is much more complicated than the design of ordinary buildings, as can be seen from the following: -the architectural-construction part of the project must meet European standards and be adapted to the conditions of Uzbekistan (normative and legislative); -a working project that meets European standards must have all structural calculations, including static force; -reinforcement should be designed according to static calculations; -all engineering networks should be fully designed; -build a construction sequence, including a complete list of materials and components used. It is necessary to carefully design, build and use (exploitation) a building object created using innovative technologies. For this, those involved in the design must work together as a team in the design, construction and operation of the building. This requires that all project participants in the same team work in a coordinated manner during the design, construction and operation of the residential building.

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