

## ARCHITECTURAL METHODS OF ENSURING ENERGY EFFICIENCY IN MODERN PUBLIC BUILDINGS

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**Annotation:** *This article analyzes architectural methods for ensuring energy efficiency in modern public buildings. Particular attention is paid to the issues of volumetric-plan solution of buildings, structural and facade systems, building orientation, natural lighting, natural ventilation, sun protection and the use of renewable energy sources. Also, when forming energy-efficient public buildings, the relationship of climatic conditions, building function and architectural-compositional solutions is considered. As a result of the study, the main architectural approaches that serve to improve the energy efficiency of modern public buildings are systematized.*

**Keywords:** *public buildings, energy efficiency, energy conservation, architectural solution, environmental architecture, building orientation, natural ventilation, natural lighting, solar radiation, green architecture.*

### INTRODUCTION

Today, the rational use of energy resources and the reduction of energy consumption of buildings is one of the most relevant areas of architecture and urban planning. The increase in the level of urbanization of the population, the expansion of the need for public buildings and the increased demand for energy to ensure a favorable microclimate in buildings necessitate the development of principles of energy-efficient architecture.

Public buildings — educational institutions, administrative buildings, shopping and service centers, facilities such as culture and sports facilities-consume a large amount of energy in the process of use. Therefore, it is important to apply architectural solutions aimed at reducing energy consumption as early as the stage of design of such buildings.

It is not enough to provide energy efficiency only through engineering equipment. The overall shape of the building, orientation, facade structure, location of windows and doors, roof solution, sun protection elements and natural lighting and ventilation options have a direct impact on the energy efficiency of the building.

The concept of energy efficiency in public buildings. An energy efficient building is a building that makes minimal use of energy resources while maintaining the comfort and functional conditions necessary for its users.

Overexpression from solar radiation. The incorrect orientation of large glass facades with respect to the sun causes overheating of the interior of the building during the summer months and an increase in energy consumption to cooling systems.

"On the" new Uzbekistan development strategy for 2022-2026 "" PF-60 of January 28, 2022 "of the president of the Republic of Uzbekistan on the implementation of energy-saving technologies and additional measures for the development of small-capacity renewable energy sources ""PF-220 of September 9, 2022" by actively introducing green economy technologies to all sectors " by 20% increase the efficiency of the economy by 2026 and increase the volume of air-polluted gases by 15-20% the tasks of taking austerity measures, the widespread introduction of renewable energy sources in housing and communal services, objects of the social sphere and other areas and the implementation of measures to improve energy efficiency, as well as the production and use of electric cars are set out.

The construction of energy-efficient blocks or buildings makes it possible to apply energy-saving technologies at a fundamentally higher level than the construction of individual model energy-efficient buildings. "Residential buildings"are classified according to their compliance with environmental requirements as follows: environmentally friendly (environmental); life – sustaining; energy-efficient; energy-efficient: energy-passive; self-sufficient; energy consumption is zero ("zero"), active ("energy-plus"), bio-climatic. The determining factors for all types of environmentally friendly buildings are as follows, energy (energy efficiency) and water conservation, improving the microclimate in construction and buildings at the expense of plan, architectural – spatial and constructive solutions, reducing the negative impact of construction and buildings on the environment. If in the selection of these technologies architects and engineers are limited by the capabilities of the building, conditions are provided in the case of construction and the possibility of studying and applying a wider range of energy-saving technologies taking into account technical economic conditions.

"Methods": energy – efficient buildings used in design and construction practice can be classified according to the degree of interconnection of architectural – spatial and constructive solutions: engineering-technological solutions "innovative"and " reformist". An "innovative" energy efficient building is an inextricable connection of architectural – spatial, constructive and engineering – technological solutions to a single energy system that meets the requirements of energy efficiency. Such a building represents the Union of modern architecture and new engineering technologies. A "reformist" energy – efficient building is a result where architectural – spatial and constructive solutions are not related to its engineering system and equipment. In such cases, buildings retain their traditional architectural – spatial and constructive structure.

Engineering equipment is "installed" or installed in a building regardless of architecture, therefore losing to an innovative building in terms of energy efficiency and resource savings. Zero House (heating costs are zero or energy consumption from external networks is zero), energy passive and energy active houses are energy efficient houses that meet the highest

energy saving standards in world practice. Thus, energy consumption for a Passive House accounts for about 15% of the energy per unit area consumed by most modern buildings for EU countries. Zero, energy passive and energy active houses have the greatest practical experience in the implementation of projects in the countries of Western Europe.

In many countries around the world, energy consumption issues have been implemented since the 1970s through public energy efficiency policies and special programs. Today, the industrial sector accounts for nearly 40% of the world's annual primary energy consumption and approximately that much of global carbon dioxide emissions. In this direction, the international standard ISO 50001 is adopted, which regulates energy efficiency issues.

For example, the activities of most organizations are included in the list of international energy efficiency programs, the largest of which is the International Energy Agency (IEA) — Energy Efficiency. At the same time, such organizations exist in the European Union, in the United Kingdom, Mexico, Canada, the United States, the Republic of South Africa (JAR), Indonesia, South Korea, Japan, India, Iran, the people's Republic of China, New Zealand, the Russian Federation, Brazil, Australia and other countries.

In Uzbekistan, the non-budgetary Inter-Sector Energy Saving Fund under the Ministry of energy carries out its work in this direction. The foundation was established in 2020 by Resolution No. 640 of the Cabinet of Ministers.

The first place in total energy consumption was taken by the United States, the second and third by China and India, and the fourth by Russia. Uzbekistan, according to the, it was ranked 88th on the "world country list for electricity consumption per capita " (2014), and the annual electricity consumption of one citizen of Uzbekistan was 1,645 kilowatt•hours. Another statistic is in the list of countries for the volume of electricity generated per year (teravatt•hour count) Uzbekistan is recorded at number 47.

At the same time, it should be noted that the difference between the volume of electricity generated in Uzbekistan and the volume of consumption in a year is the amount of electricity imported from neighboring countries (Turkmenistan, Tajikistan and Kyrgyzstan /seasonally/, Kazakhstan /pre — berdi/) based on intergovernmental agreements.

Energy efficiency. A set of processes aimed at efficient (rational), that is, rational use of energy resources is a primary definition given to energy efficiency. Achieving the desired result at the expense of less energy consumption for the energy supply or production processes of buildings is also an indicator of efficiency. Including achieving economically justified efficiency in the use of fuel and energy resources at the current level of development of technology and technology, as well as compliance with environmental protection requirements. The set of concepts and knowledge regarding energy efficiency decides at the intersection of engineering, economics, law and social spheres and is formed in the "necessary image" for each society.

It is natural that the peoples of the world have their own traditions and concepts regarding energy efficiency at the stages of their national development, and this is influenced

by climatic conditions. This is exactly what I am in the Uzbek people. The invention of a single maxi-cowhide or doppie-ChopOn, that is, the stagnation of clothing when it comes to the form of this stage in terms of energy efficiency, ease of wearing and camaraderie, is also evidence of our opinion. The invention of our ancestors as the most effective way to warm up on cold weather days-sandals (tancha), cinchli (wooden) houses, porches built so that the heat in the main rooms of the House does not quickly exchange with the climate outside, domed buildings built so that snow and rain do not accumulate on the roof of the building, or specific architectural solutions.

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