

Feasibility of Implementing Zero Energy Buildings in Iran and Examining Its Economic and Technical Aspects

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Abstract : Zero energy buildings refer to buildings that have zero annual energy consumption and do not produce carbon emissions. In today's world, considering the limited resources of fossil fuels, buildings, industries and other organizations have moved towards using other available energies. The idea and principle of net zero energy consumption has attracted a lot of attention because the use of renewable energy is a means and a solution to eliminate pollutants and greenhouse gases. Due to the increase in the cost of fossil fuels and their destructive effects on the environment and disrupting the ecological balance, today the plans related to zero energy principles have become very practical and have gained particular popularity. In this research, building modeling has been done in the Design Builder software environment. Based on the changes in the required energy throughout the year in different roof thickness conditions, it has been observed that with the increase in roof thickness, the amount of heating energy required has a downward trend, from 6730 kilowatt hours in the roof thickness of 10 cm to 6408 kilowatt hours in the roof thickness condition. 20 cm is reached, which represents a reduction of about 4.7% in energy if the roof thickness is doubled. Also, with the increase in the thickness of the roof throughout the year, the amount of cooling energy required has a gentle downward trend and has reached from 4964 kilowatt hours in the case of a roof thickness of 10 cm to 4859 kilowatt hours in the case of a roof thickness of 20 cm, which is a decrease equal to It displays 2%. It can be seen that the trend of changes in the energy required for cooling and heating is not much affected by the thickness of the roof (with an effect of 98%) and therefore there is no technical and economic recommendation to increase the thickness of the roof in this sector. Finally, based on the changes in the carbon dioxide produced in different states of the roof thickness, it has been observed that with the increase in the roof thickness, energy consumption and consequently the production of carbon dioxide has decreased. By increasing the thickness of the roof from 10 cm to 20 cm, the amount of carbon dioxide produced by heating the building has decreased by 27%. Also, this amount of reduction has been obtained based on the cooling system and for different amounts of roof thickness equal to 19%.

Keywords : energy consumption, green building, design builder, AHP

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