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Living Wall Systems: An Approach for Reducing Energy Consumption in Curtain Wall Façades

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Abstract : Nowadays, Urbanism and climate change lead to the rapid growth in energy consumption and the increase of using air-conditioning for cooling. In a hot climate area, there is a need for a new sustainable alternative that is more convenient for an existing situation. The Building envelope controls the heat transfer between the outside and inside the building. While the building façade is the most critical part, types of façade material play a vital role in influences of the energy demand for heating and cooling due to exposure to direct solar radiation throughout the day. Since the beginning of the twentieth century, the use of curtain walls in office buildings façades started to increase rapidly, which lead to more cooling loads in energy consumption. Integrating the living wall system in urban areas as a sustainable renovation and energy-saving method for the built environment will reduce the energy demand of buildings and will also provide environmental benefits. Also, it will balance the urban ecology and enhance urban life quality. The results show that the living wall systems reduce the internal temperature up to 4.0 °C. This research carries on an analytical study by highlighting the different types of living wall systems and verifying their thermal performance, energy-saving, and life potential on the building. These assessing criteria include the reason for using the Living wall systems in the building façade as well as the effect it has upon the surrounding environment. Finally, the paper ends with concluding the effect of using living wall systems on building. And, it suggests a system as long-lasting, and energy-efficient solution to be applied in curtain wall façades in a hot climate area.

Keywords : living wall systems, energy consumption, curtain walls, energy-saving, sustainability, urban life quality
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