

Upon examining existing structures within the city across defined periods, it is evident that residences lack a sustainable facade design, leading to heightened energy consumption and adverse physiological effects on residents. Addressing this challenge necessitates a thoughtful plan that prioritizes analytical studies over theoretical considerations. Despite the time-intensive nature of such endeavors, some fundamental guidelines for designers can be identified. Firstly, the proportion of windows in a building should align with the climatic conditions and the function of the space, ideally falling within a range of 60% to 75%, especially given the prevalence of single-facade homes. Diversifying misinformation elements, beyond just balconies, is crucial. The selection of materials significantly influences thermal performance, emphasizing the importance of strategic placement for insulating materials. Advancements in natural lighting technology and exploration of alternative solutions suitable for similar climates are imperative. The process begins with the building owner's choice of land, highlighting the environmental impact of the built direction on well-being and stressing the need for educating designers in this regard. In essence, mitigating these issues requires a comprehensive and informed approach to redefining the facade design of city homes.

IVCONCLUSION

In conclusion, this research focused on sustainable façade design during the preliminary phase, particularly examining three facades in Zakho, Iraq. A crucial finding highlights the necessity of adapting window proportions to align with climatic conditions and intended space function, recommending a 60-75% window-to-wall ratio. Material selection's impact on thermal performance emerged as a key consideration, emphasizing the strategic placement of insulating materials within the building envelope. The study underscores the need for technological advancements in natural lighting techniques and the exploration of alternative solutions suited to specific geographical climates. Furthermore, the research advocates for the incorporation of various design elements, such as balconies, and the judicious use of misinformation as essential strategies for achieving sustainable façades. The study places significant emphasis on the role of building owners in the early construction stages, highlighting their pivotal role in land acquisition and the selection of the building's orientation.

Additionally, there is a call for increased awareness among designers regarding the environmental implications of their choices, particularly to the built environment's impact on overall well-being. In summary, this study offers practical insights into essential parameters for sustainable façades, emphasizing a holistic approach that considers climatic factors, material choices, and informed decision-making from the outset of the design process. As global efforts toward sustainability intensify, findings from studies like these provide invaluable guidance for architects, designers, and policymakers, facilitating the creation of built environments that are both environmentally responsible and conducive to human well-being.

REFERENCES

- [1].Mensah, J. (2019). Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review. *Cogent social sciences*, 5(1), 1653531.
- [2].Schrijver, N. J. (2009). *The evolution of sustainable development in international law: inception, meaning and status* (Vol. 2). Brill.
- [3].Maciel, A. A., Ford, B., & Lamberts, R. (2007). Main influences on the design philosophy and knowledge basis to bioclimatic integration into architectural design The example of best practices. *Building and Environment*, 42(10), 3762-3773.
- [4].Illies, C., & Ray, N. (2009). Philosophy of architecture. In *Philosophy of technology and engineering sciences* (pp. 1199-1256). North-Holland.
- [5].Oktar, N. P. (2023). *Influences of structural systems on form and space integrity of free-form buildings: an investigation through case studies* (Doctoral dissertation, Bilkent University).
- [6].Ahmed, O. M., Haji, L. M., Ahmed, A. M., & Salih, N. M. (2023). Bitcoin Price Prediction using the Hybrid Convolutional Recurrent Model Architecture. *Engineering, Technology & Applied Science Research*, 13(5), 11735-11738.
- [7].Prieto, A., Knaack, U., Auer, T., & Klein, T. (2019). COOLFACADE: State-of-the-art review and evaluation of solar cooling technologies on their potential for façade integration. *Renewable and Sustainable Energy Reviews*, 101, 395-414.
- [8].Halawa, E., Ghaffarianhoseini, A., Ghaffarianhoseini, A., Trombley, J., Hassan, N., Baig, M., Ismail, M. A. (2018). A review on energy conscious designs of building façades in hot and humid climates: Lessons for Kuala

Lumpur and Darwin. *Renewable and Sustainable Energy Reviews*, 82, 2147-2161.

[9].Aksamija, A. (2013). *Sustainable facades: Design methods for high-performance building envelopes*. John Wiley & Sons.

[10].Moghtadernejad, S., Chouinard, L. E., & Mirza, M. S. (2020). Design strategies using multi-criteria decision-making tools to enhance the performance of building façades. *Journal of Building Engineering*, 30, 101274.

[11].Akram, M. W., Hasannuzaman, M., Cuce, E., & Cuce, P. M. (2023). Global technological advancement and challenges of glazed window, facade system and vertical greenery-based energy savings in buildings: A comprehensive review. *Energy and Built Environment*, 4(2), 206-226.

[12].Besir, A. B., & Cuce, E. (2018). Green roofs and facades: A comprehensive review. *Renewable and Sustainable Energy Reviews*, 82, 915-939.

[13].Coma, J., Perez, G., de Gracia, A., Burés, S., Urrestarazu, M., & Cabeza, L. F. (2017). Vertical greenery systems for energy savings in buildings: A comparative study between green walls and green facades. *Building and environment*, 111, 228-237.

[14].Wang, W., Yang, H., & Xiang, C. (2023). Green roofs and facades with integrated photovoltaic system for zero energy eco-friendly building—A review. *Sustainable Energy Technologies and Assessments*, 60, 103426.

[15].Sandhu, A. R., Lakhiar, M. T., Jhatial, A. A., Karira, H., & Jamali, Q. B. (2019). Effect of River Indus Sand and Recycled Concrete Aggregates as Fine and Coarse Replacement on Properties of Concrete. *Engineering, Technology & Applied Science Research*, 9(1).

[16].Ahmed, S., Memon, A. H., Memon, N. A., Laghari, A. N., Akhund, M. A., & Imad, H. U. (2018). Common factors of cost escalation in construction industry of Pakistan. *Engineering, Technology & Applied Science Research*, 8(6), 3508-3511.

[17].Casini, M. (2016). *Smart buildings: Advanced materials and nanotechnology to improve energy-efficiency and environmental performance*. Woodhead Publishing.

[18].Sarihi, S., Saradj, F. M., & Faizi, M. (2021). A critical review of façade retrofit measures for minimizing heating and cooling demand in existing buildings. *Sustainable Cities and Society*, 64, 102525.

[19].Tong, S., Wen, J., Wong, N. H., & Tan, E. (2021). Impact of façade design on indoor air temperatures and cooling loads in residential buildings in the tropical climate. *Energy and Buildings*, 243, 110972.

[20].Parhizkar, H., Khoraskani, R. A., & Tahbaz, M. (2020). Double skin façade with Azolla; ventilation, indoor air quality and thermal performance assessment. *Journal of Cleaner Production*, 249, 119313.

[21].Song, J., Huang, X., Shi, D., Lin, W. E., Fan, S., & Linden, P. F. (2021). Natural ventilation in London: Towards energy-efficient and healthy buildings. *Building and Environment*, 195, 107722.

[22].Raswol, L. M., & Khorsheed, J. B. (2017). regeneration of old city center case study old bazar in zakho city center, kurdistan region-iraq. *Journal of Duhok University*, 7-14.

[23].Troup, L., Phillips, R., Eckelman, M. J., & Fannon, D. (2019). Effect of window-to-wall ratio on measured energy consumption in US office buildings. *Energy and Buildings*, 203, 109434.

[24].Alghoul, S. K., Rijabo, H. G., & Mashena, M. E. (2017). Energy consumption in buildings: A correlation for the influence of window to wall ratio and window orientation in Tripoli, Libya. *Journal of Building Engineering*, 11, 82-86.

[25].Goia, F. (2016). Search for the optimal window-to-wall ratio in office buildings in different European climates and the implications on total energy saving potential. *Solar Energy*, 132, 467-492.

[26].Hwang, T., & Kim, J. T. (2011). Effects of indoor lighting on occupants' visual comfort and eye health in a green building. *Indoor and Built Environment*, 20(1), 75-90.

[27].Osibona, O., Solomon, B. D., & Fecht, D. (2021). Lighting in the home and health: A systematic review. *International journal of environmental research and public health*, 18(2), 609.

[28].Bluyssen, P. M. (2010). Towards new methods and ways to create healthy and comfortable buildings. *Building and environment*, 45(4), 808-818.

[29].Abdullah, H. K., & Alibaba, H. Z. (2017). Retrofits for energy efficient office buildings: integration of optimized photovoltaics in the form of responsive shading devices. *Sustainability*, 9(11), 2096.

[30].Kanniyapan, G., Mohammad, I. S., Nesan, L. J., Mohammed, A. H., & Ganisen, S. (2015). Façade material selection criteria for optimising building maintainability. *Jurnal Teknologi*, 75(10), 17-25.

[31].Dabous, S. A., Ibrahim, T., Shareef, S., Mushtaha, E., & Alsyouf, I. (2022). Sustainable façade cladding selection for buildings in hot climates based on thermal performance and energy consumption. *Results in Engineering*, 16, 100643.

[32].Zhang, H. (Ed.). (2011). *Building materials in civil engineering*. Elsevier.

[33].Poloju, K. K. (2022). *Advanced Materials and Sustainability in Civil Engineering*. Springer.

[34].Tavares, P., Ingi, D., Araújo, L., Pinho, P., & Bhusal, P. (2021). Reviewing the role of outdoor lighting in achieving sustainable development goals. *Sustainability*, 13(22), 12657.

[35].Bui, D. K., Nguyen, T. N., Ghazlan, A., Ngo, N. T., & Ngo, T. D. (2020). Enhancing building energy efficiency by adaptive façade: A computational optimization approach. *Applied energy*, 265, 114797.

[36].Hanzlik, P., Diniz, S., Grazini, A., Grigoriu, M., & Simiu, E. (2005). Building orientation and wind effects estimation. *Journal of engineering mechanics*, 131(3), 254-258.

[37].Hamdani, M., Bekkouche, S. M. E. A., Benouaz, T., Belarbi, R., & Cherier, M. K. (2014). Minimization of indoor temperatures and total solar insolation by optimizing the building orientation in hot climate. *Engineering structures and technologies*, 6(3), 131-149.

[38].Fallahtafti, R., & Mahdavinejad, M. (2015). Optimisation of building shape and orientation for better energy efficient architecture. *International Journal of Energy Sector Management*, 9(4), 593-618.

[39].Pacheco, R., Ordóñez, J., & Martínez, G. (2012). Energy efficient design of building: A review. *Renewable and Sustainable Energy Reviews*, 16(6), 3559-3573.