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THE ROLE OF MOSQUES IN SUSTAINABLE COMMUNITIES: BOSNIA AND MALAYSIA COMPARED

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Abstract

Mosques play a vital role in Muslim communities, extending beyond places of worship to function as social, educational, and cultural hubs fostering identity and sustainability. Despite their significance, many modern Mosques struggle with inefficient spatial utilization and high energy demands, undermining their roles. This study conducts a comparative analysis of two iconic Mosques, the Federal Territory Mosque in Malaysia and the Gazi Husrev-Beg Mosque in Bosnia. By employing a qualitative case study approach. This paper proposes specific contributions to the field of sustainable religious architecture, (1) comparative assessment framework in occupancy ratio, energy consumption, sustainability, and urban planning integration. (2) Demonstrating Mosque typology significant impact on its performance. (3) Synthesizing energy audit data to identify design interventions to balance religious and cultural authenticity with energy goals. The findings highlight key architectural issues, the Federal Territory Mosque reflects a grand-scale design, resulting in underutilization and high energy dependency, while the Gazi Husrev-Beg Mosque exemplifies a community-centered approach with efficient space use and passive environmental strategies. The study emphasizes the necessity of adopting adaptive architectural solutions that align with cultural and religious significance while incorporating modern sustainability practices. This research provides actionable design recommendations to regulate sustainable religious architecture.

Keywords: Religious Architecture, Sustainable Architecture, Mosque Utility Efficiency, Community Engagement, Energy Consumption, Bosnia, Malaysia

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INTRODUCTION

Mosques have historically served as more than places of worship; they act as social and cultural urban anchors reflecting the region's cultural heritage and fostering social cohesion. Each Mosque have a distinguished characteristics that is driven to flourish the cultural identity and region's history "*Historical architectural sites have demonstrated that spatial and decorative design elements are key to maintaining cultural identity while also ensuring functional and aesthetic integration*" (Baydoun et al., 2024). In both Bosnia and Malaysia, Mosque architecture embodies distinct historical trajectories. In Malaysia, Mosque architecture has evolved from modest timber and village based "*surau*" into monumental post-independence landmark such as the Federal Territory Mosque (2000), which blend Malay, Middle Eastern, and modern stylistic influences. These large-scale grandeur designs symbolize national Muslim identity and Islamic heritage (Afridi, 2011). In Bosnia, Ottoman rule introduced a rich legacy of Islamic architecture, where Mosques such as the Gazi Husrev-Beg Mosque (1530s) became enduring symbols of faith, and cultural resilience. Their compact forms, integration within urban fabric, and emphasis on passive environmental strategies illustrate how traditional design supported both spiritual and social life (Dervisevic, 2020). While this cultural richness is significant, however, modern Mosque designs often prioritize grand aesthetics over functional sustainability, leading to sustainable challenges such as inefficient spatial utilization, high energy consumption, and limited community engagement (Ismail et al., 2015). The Federal Territory Mosque in Malaysia is built to accommodate massive congregations, however, they often suffer from underutilization and significant energy wastage (Al-Hafith et al., 2021). In contrast, smaller Mosques like the Gazi Husrev-Beg Mosque in Bosnia emphasize compact, community driven designs that promotes sustainability. This study aims to explore the role of Mosques in achieving sustainable communities by comparing two distinct architectural approaches. The research is examining how spatial planning, energy efficiency, and urban integration influence their long-term viability. A qualitative case study analysis is employed to assess four key factors: **(i) occupancy patterns, (ii) energy consumption, (iii) sustainability aspects, and (iv) urban planning integration**. These factors provide insight into how Mosques can optimize their functionality while minimizing their environmental footprint. By analyzing two Mosques from different socio-cultural and climatic contexts, this study contributes to the discourse on sustainable religious architecture. It highlights the need for adaptive design strategies that align with Islamic values while embracing modern sustainability practices. The findings will offer practical recommendations for enhancing Mosque architecture, ensuring to remain environmentally responsible, socially engaging, and culturally significant in contemporary urban landscapes.

LITERATURE REVIEW

The Concept of Sustainability and Energy Efficiency in Mosques

Sustainability in architecture is creating structures that minimize environmental impact while ensuring long-term efficiency and resource conservation (M. Yilmaz, 2006). The term “Sustainability” is often overused without concern for long-term consequences. The focus should shift from “Architecture about Sustainability” to “Architecture for Sustainability. Therefore, sustainability should be seen as a core architectural design principle rather than an optional feature (Azmi et al., 2019). Within Mosques, utility systems encompass space utilization efficiency, lighting, ventilation, and facility management. Effective spatial planning ensures that Mosque structures align with community needs while minimizing environmental impact (Budaiwi et al., 2005).

Energy Usage in Mosques

Mosques have unusual energy consumption patterns due to their intermittent use throughout the day for prayer rituals. Typically, they operate daily five times for brief durations, with peak attendance during religious events. Despite this infrequent use, many Mosques, particularly in Malaysia, rely significantly on artificial lighting and mechanical air conditioning systems to maintain thermal comfort (Ismail et al., 2015). Studies reveal that passive energy-saving methods, such as natural ventilation and daylight optimization, can reduce Mosque energy use by 30-50% while maintaining adequate thermal comfort (Azmi et al., 2019).

Occupancy Patterns in Mosques

“Effective spatial distribution in historical structures has long been recognized as a key factor in enhancing both visual harmony and functional sustainability” (Baydoun et al., 2024). The efficiency of a Mosque’s utility system is greatly impacted by its occupancy pattern. In Malaysia, the Mosque construction trends favor large-scale structures with expensive facilities, the Federal Territory Mosque in Kuala Lumpur spans 47,000 square meters and can accommodate 17,000 worshippers. However, outside peak prayer times, it remains largely unoccupied, resulting in substantial energy wastage (Nayeem et al., 2019). In contrast, Bosnian Mosques, such as the 400 square meter Gazi Husrev-Beg Mosque, with its compact scale home-like design fosters stronger community engagement and efficient space utilization. Illustrating the importance of aligning architectural design with cultural and social dynamics (Dervisevic, 2020)

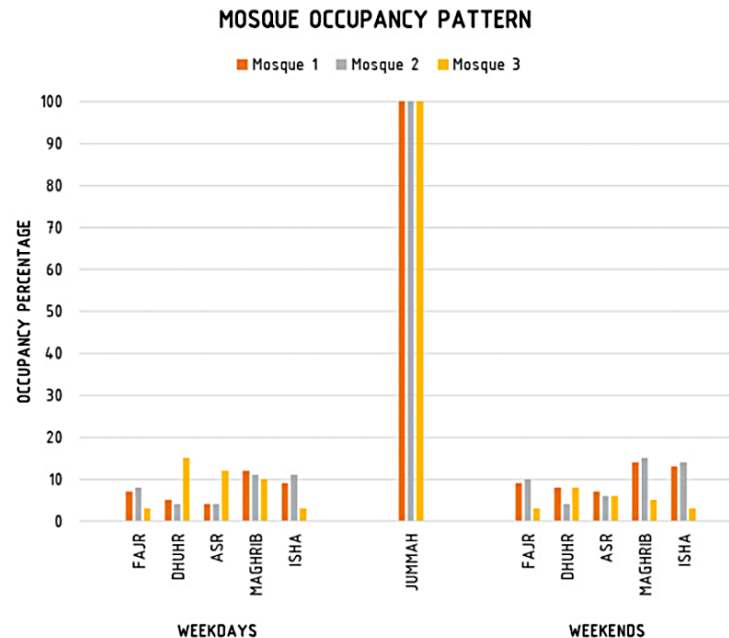


Figure 1: Chart based on the occupancy pattern in 3 Mosques in Malaysia
Source: Published research by Azmi & Kandar, 2019

Bosnian Mosques Features

Bosnian Mosques embody a distinct architectural philosophy that prioritizes community-centered planning. It was argued by (Baydoun et al., 2024). That “*Architectural designs that integrate historical elements while adapting to modern needs have proven to be more sustainable and culturally resilient over time*”. The Gazi Husrev-Beg Mosque adheres to traditional Ottoman design principles, incorporating functional spaces within the Mosque complex (Hercegovini, 2016). Bosnian Mosques are more sustainable due to their lower size and planned spatial design, which optimizes natural ventilation and daylight (Gekić et al., 2020).

Malaysian Mosques Features

Malaysian Mosque architecture is distinguished by its grand scales, drawing inspiration from Ottoman, Persian, and Moghul influences. The Federal Territory Mosque integrate elements from the Blue Mosque in Turkey, the Shah Mosque in Iran, and the Taj Mahal in India (Afridi, 2011).

“Islamic architectural designs are inspired by diverse influences, including Ottoman, Safavid, Central Asian, Persian, and Mughal styles, resulting in an eclectic yet distinctly Islamic city identity.” Adding to that “Islamic artistic traditions rely heavily on the utilization of geometric, floral, and calligraphy patterns, which are essential in defining architectural identity while also contributing to environmental sustainability through shading and ventilation elements.” Argued by (Baydoun et al. 2023).

Importance of Mosques in Muslim Communities

Placemaking and Community Attachment to Mosque

Placemaking involves fostering an emotional and cultural bond between individuals and physical spaces. According to research, Mosque architecture has a significant impact on community attachment and involvement, it can achieve the sustainable meaning for a community. The inclusion of communal facilities, accessible spaces, and cultural relevance enhances the Mosque’s role as an inclusive urban space (Altman et al., 1992).

The Islamic perspective on Sustainability in Mosque Architecture

Islamic teachings emphasize resource conservation and environmental stewardship. The Quran explicitly cautions against wastefulness: *“But do not waste: verily, He does not love the wasteful” (Al-Araf: 31)*. In Islam, wastefulness is *“Tabdir”* while extravagance is known as *“Israf”*. Both are *“Haram”* or forbidden (prohibited). In the Quranic verse, the word *“Israf”* refers to the use in a wasteful manner. It is defended by (Baydoun et al., 2024) that *“Sustainable architecture in Islamic history was deeply rooted in resource-conscious design, where structures were planned to minimize excess and maximize functional longevity”*. Islamic architectural philosophy encompasses sustainability across economic, environmental, and social dimensions. Analyzing this verse to be a guideline within an Islamic concept frame would add a religious dimension to this research.

RESEARCH METHODOLOGY

1- Approach and Case Selection Justification

This study adopts a qualitative case study approach to analyze how Mosque architecture impacts sustainability, focusing on spatial utilization, energy efficiency, and community engagement. The selection of the Federal Territory Mosque in Malaysia and the Gazi Husrev-Beg Mosque in Bosnia is justified by their contrasting architectural scales, energy reliance, and integration within their respective urban contexts.

2- Data Collection & Analysis Methods

To ensure a comprehensive analysis, this study utilizes three primary data sources. The first source, energy performance analysis, relies on previous energy audits, direct field observations, and ventilation assessments to evaluate cooling systems, lighting consumption, and natural ventilation efficiency. These assessments are supported by studies such as (Azmi et al., 2019). The second data source focuses on occupancy and spatial utilization, employing *direct observational surveys*. The third source involves an *investigation* of sustainability strategies and architectural elements through archival research. By integrating these methods, the study provides a structured and transparent approach to evaluating Mosque sustainability.

3- Benchmark Comparison for Mosque Sustainability

To enhance the validity of the findings, this article compares the energy performances and sustainability strategies of the selected Mosques with documented best practices in Mosque sustainability. Existing research on energy-efficient Mosques, including studies on passive cooling, daylight optimization, and the integration of renewable energy sources, serves as a reference framework for evaluating the case studies. Additionally, comparative studies on occupancy patterns and spatial utilization provides insight into how Mosque design can enhance community engagement while minimizing environmental impact.

ANALYSIS AND DISCUSSION

“Mosques are to be ingeniously and skillfully planned, designed, and built to satisfy the religious, social, educational, and welfare requirements of the people” (Spahic, 2013). A place is formed by the people’s emotional relationship with its physical environment, identifying it as “Place identity, Place attachment, Sense of Place, or Space Utility” (Altman et al., 1992).

Here, a newly encouraged approach for Mosques brought back into the light *“Urban Mosque refers to the representative religious edifice constructed by Muslims who reside primarily within urban locales, it is where the faithful gather to engage in communal worship, spiritual retreat, matrimony, education, and other significant socio-cultural activities”* (Kahera et al., 2007).

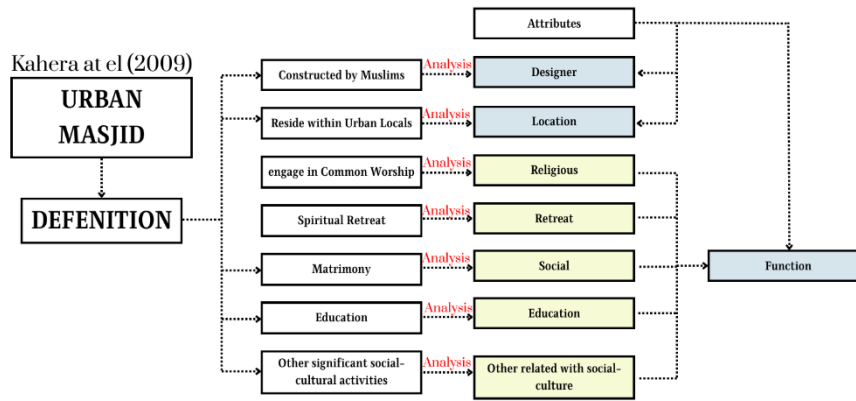


Figure 2: Definition of Urban Mosque
Source: Published research by Kahera et al. 2007

The Federal Territory Mosque “Wilayah” is classified as an urban Mosque, but an issue remains: no expected attendance, as with all other grand Mosques in Malaysia. So, for comparative seeking, a view of the Malaysian Mosque’s history should be taken. Malaysia has a Muslim-majority nation from back at the time, the earlier typological construction of a Mosque was purely a timber product based on a timber frame, small in size, with the usual characteristics of two tiers pyramidal roof with a long gable house type, it was a repetitive picture of the typical Malay house mentioned by (Utaberta et al., 2012). The villages were smaller and surrounding the Mosques, they were treated as an actual community centers regardless of the size. Nowadays, many influences attributed to the Mosque architecture design, creating a trace of all historical events that significantly changed Malaysia, argued by (Nayeem el al., 2019). Over the decades, Malaysia faced the Portuguese and Colonial periods, which extensively influenced the presentation and construction of the architecture in the region (Nayeem el al., 2019). So, the Mosques became a historical language of the Malay community. Now, Malaysia has huge states with huge Muslim populations, so they adopted the idea of having bigger Mosques, creating a display of Malaysian cultural and historical events more than a community-bonding structure as the “Kampung Masjid” was once (Ahmad, 1999).

A scope of the study was defined under the title “*Public Attachment to Religious Places: a Study of Place Attachment to Mosques in Malaysia*” by (Najafi et al., 2011). The survey in the study was conducted targeting locals only, questioning three statements:

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- Mean values of the components of functional attachment
- Mean values of the components of place identity
- Mean values of the people's emotional component attached to the selected Mosques

Table 1: Mean values of the components of functional attachment.

Components	Statements	Mean Value				
		Negara	Putra	Wilayah	Sembilan	Al-Azim
Emotional Attachment N=288	01 I am very attached to this mosque	3.53	3.69	3.86	3.78	3.77
	02 I have positive impression about this place	4.04	4.18	4.23	4.12	4.24
	03 Coming here is one of the most satisfying things to do	4.14	4.16	4.26	4.24	4.57
	04 I enjoy being here more than being in any other mosque	3.32	3.72	3.50	3.86	3.67
	05 I would prefer to spend more time here if I could	3.64	3.67	3.74	3.94	4.03
	06 I feel I am closer to Allah when I am here	4.03	4.14	3.77	4.34	4.41
	07 Here I can concentrate on my religious activities more than any other mosque	2.99	3.39	3.03	3.13	3.57
	08 The quality of the environment influences my concentration while praying	3.77	3.98	4.05	3.88	4.19
	09 I feel secure being in this mosque	3.27	3.59	3.58	3.24	3.56
Total		3.64	3.84	3.78	3.84	4.00

Table 2: Mean values of the components of place identity.

Component		Mosque				
		Negara	Putra	Wilayah	Sembilan	Al-Azim
01	This mosque is convenient, comfortable and tranquil	3.96	3.95	3.98	4.04	3.97
02	This mosque has appropriate facilities and equipment	3.78	3.79	3.92	3.78	3.82
03	This mosque has a very good maintenance and management system	3.53	4.79	3.63	3.56	3.64
04	No other place can compare to this place	3.15	3.32	3.22	2.71	3.12
05	The access of this mosque is more and better	3.57	3.31	3.63	3.69	3.58
06	A lot of social activities are done in this mosque	3.31	3.03	3.29	3.50	3.30
07	The good facilities and equipment of this mosque influence my better concentration while doing religious activities	3.85	3.97	4.03	3.90	3.97

Table 3: Mean values of the meanings associated with the selected Mosque.

Components	Statements	Mean Value				
		Negara	Putra	Wilayah	Sembilan	Al-Azim
Place Identity N=288	01 This place says a lot about who I am	3.60	3.65	3.78	3.78	3.78
	02 I feel most most in this place	3.99	4.16	4.25	4.12	4.27
	03 Everything in this place is a reflection of me	4.13	4.11	4.25	4.24	4.57
	04 This place reflects the type of person I am	3.73	3.84	3.84	3.94	3.84
	05 This place is part of me	3.63	3.67	3.75	3.94	4.03
Total		3.72	4.16	4.25	3.83	3.79

Source: Published research by Najafi, 2011

Survey results indicate strong attachment toward the Federal Territory Mosque, comparable to other Mosques. Respondents acknowledged its significance as an urban Mosque for the Malay Muslim community. However, the survey was conducted after *Juma'a* prayer, primarily among the elderly, limiting its scope to broader community engagement. Highlighting the need for further study on weekday attendance and diverse demographic participation. On the other side of the comparative study, the Mosques in Bosnia were partly based on a Christian Church upon the Constantinople conquest; it aimed to show that culture and religion don't exist in isolation. Notwithstanding, the Bosnian Muslim community was always under the pressure of the Christian world, wars barely ended. Bosnian history has been written through religious architecture since the 15th century. Bosnia coexistence is reflected in their insistence constructing their identity through the lens of rebuilt and newly built Mosques following the same architectural style as the first-ever Mosques in the region (Aksamija et al., 2011)

The research related to environmental sustainability, specifically energy consumption, is limited, but it has been observed that Mosques consume a significant amount of energy, unfortunately, in an unsustainable manner (Sobri et al., 2021). Malaysian Mosques experience extreme heat due to their equatorial location, making high humidity and temperature significant challenges in ensuring occupant comfort (Fauziah et al., 2016). Poor ventilation and insulation further exacerbate discomfort, necessitating green sustainable design approaches to improve indoor air quality, however, most Malaysian Mosques rely heavily on air conditioning and artificial lighting, leading to high energy consumption (Sobri et al., 2021). Large-scale Mosque designs, such as the Federal Territory "Wilayah" Mosque, amplify these challenges. As it is built with a sense of grandeur, it requires significant thermal regulation, often resulting in excessive energy waste (Suhono et al., 2020). Conducting energy audits is essential to quantify energy costs and promote sustainable solutions. Ensuring adequate indoor air quality in urban Mosques is crucial, as factors like airflow behavior, temperature distribution, humidity, and carbon dioxide levels directly affect the high-occupancy environment (Sobri et al., 2021).

This issue manifests in two key scenarios: first, running air conditioning continuously throughout the day, despite low occupancy, leading to excessive energy waste; second, activating air conditioning only during prayers, which does not allow sufficient time for effective cooling. A more efficient solution is pre-cooling, where the space is cooled beforehand, and allowing air conditioning to remain off during prayer times. Thus, balancing thermal comfort with reduced energy consumption (Atmaca et al., 2020). Adopting this method can significantly enhance Mosque sustainability while maintaining a comfortable worship environment.

Both the Federal Territory “Wilayah” Mosque and Gazi Husrev-Beg Mosque have an increased height of prayer hall; the difference is in the overall size of both Mosques, “Wilayah” Mosque is bigger and depends on the air conditioning system for its huge prayer hall, Gazi Husrev-Beg is making use of the prayer hall design for passive natural ventilation which permitted the praying hall to stay relatively cool while overhead sun-heated air is closer to the ceiling (Gekić et al., 2020). Overall, it is proved that natural ventilation achieves better indoor air quality than air conditioning.

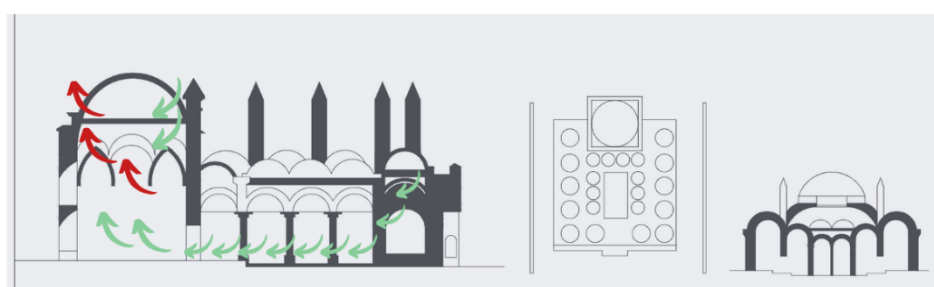


Figure 3: Gazi Husrev-Beg Medresesi, drawing by the author
 Source: Original Drawings by Dr. Tuna Alp, 1983

Another aspect is related for achieving a sustainable urban Mosque, efficient lighting. In simple words, the energy used in lightning can be reduced by replacing it with daylight in the daytime. A suggested solution is using solar VP on the Mosque’s rooftop. It is an experienced practice in Malaysia in a few Mosques before, including Sultan Ismail Mosque, in which the solar system reduced UTM’s electricity bill by 33,000 RM annually by around 47% of reduction (Rashid et al. 2011).

Table 4: Suggested sustainable design strategies for Urban Mosque in Malaysia

Sustainable Design Principles	Sustainable Design Strategies for Mosque
Energy Efficient	Solar PV Wind Turbine Water Treatment
Climate Condition	Daylighting Natural Ventilation Thermal Comfort
Sustainable Materials	Local Materials
Indoor Air Quality	Natural Ventilation Daylighting

Source: Journal of Islamic Architecture, 2021

Religious institution should be planned according to sustainable factors in terms of form, spaces or activities. Mosque design gives a significant impact on enriching the quality of life. For the reason that the religious institution is faithfully related to the presence of a Muslim believer (Jaffar et al., 2020). Sustainable urban Mosque building methods are not a recent new idea in Islam. *“Authentic Islamic architecture is sustainable, not only in terms of environmental and economic aspects but also in terms of social, educational, and spiritual development. Similarly, a truly sustainable architecture is rightly called 'Islamic', rather than those architectural traditions that endorse literal symbolism, shallow formalism and blind following.”* (Spahic, 2013).

CONCLUSION

This study demonstrates that Mosque typology and spatial scale significantly influence sustainability outcomes. Oversized Mosque complexes with limited daily use tend to embed high operational energy demands, whereas compact, community-embedded models are better positioned to harness passive strategies and achieve continuous functional use. The comparative analysis highlights how the Federal Territory Mosque reflects the risks of over-dimensioning and mechanical reliance, while the Gazi Husrev-Beg Mosque illustrates the enduring value of courtyards and ventilation pathways, in balancing environmental performance with cultural continuity. The findings underscore broader implications for sustainable religious architecture. Firstly, Mosque design must prioritize right-sizing in relation to actual patterns of occupancy, ensuring that prayer halls and ancillary spaces are adaptable to community activities beyond ritual use. Secondly, environmental performance should privilege passive systems by demanding responsive technologies to minimize reliance on mechanical conditioning. Thirdly, urban siting and integrations are critical, enabling Mosques to function as accessible civic anchors rather than episodic religious destinations.

To advance this discourse, further research is required to establish Mosque specific sustainability benchmarks. Recommended directions: (1) development of standardized performance indicators (e.g., energy use per worshipper, space-use intensity); (2) longitudinal monitoring of energy consumption, thermal comfort, and occupancy patterns; and (3) systematic investigation of social and cultural dimensions, including place attachment and their relationship to environmental performance. To advance sustainability in Mosque architecture, policy frameworks and architectural strategies must align with evidence-based research and contextual considerations. Architectural solutions must integrate proven sustainable strategies. Mosques should function to enhance community participation. By incorporating learning facilities, social activity spaces, and environmental awareness initiatives, they can reinforce their

role in sustainable urban planning. Still, it is noticed that there are modern sustainable Mosque examples in Malaysia, it was stated by (Dariyadi et al., 2022) that Putra Mosque in Putrajaya exemplifies modern sustainable mosque design by integrating geometric patterns for shading, passive cooling, and natural lighting. Its porous arches enhance ventilation, reducing energy use while maintaining cultural authenticity.

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REFERENCES

- Ahmad, A. G. (1999). The architectural styles of mosques in Malaysia: From vernacular to modern structures. In *Proceedings of the Symposium on Mosque Architecture: The Historic and Urban Developments of Mosque Architecture* (pp. 147–169). King Saud University. https://cap.ksu.edu.sa/sites/cap.ksu.edu.sa/files/attach/sma_vol_2_e_09.pdf
- Aidi, M. A. K. (2011). Contributions of mosques towards building Malay society: A case study on Masjid Wilayah Persekutuan, Kuala Lumpur. International Islamic University Malaysia. http://irep.iium.edu.my/8419/1/Masjid_Wilayah_Artical.pdf
- Aksamija, A. (2011). *Our mosques are us: Rewriting national history of Bosnia-Herzegovina through religious architecture* (Doctoral dissertation, Massachusetts Institute of Technology). MIT DSpace. <https://hdl.handle.net/1721.1/68415>
- Al-Hafith, O., Gadi, M., & Muhammad, R. (2021). Mosque design strategy for energy and water saving. *Engineering*, 7(1), 11–22. <https://doi.org/10.1515/eng-2021-0070>
- Asif, N., Utaberta, N., & Sarram, A. (2019). Urban mosque in the compact city of Kuala Lumpur: Suitability and design considerations. *Geographia Technica*, 14(Special Issue), 138–147. https://doi.org/10.21163/GT_2019.141.27
- Atmaca, A. B., & Zorer Gedik, G. (2020). Determination of thermal comfort of religious buildings by measurement and survey methods: Examples of mosques in a temperate-humid climate. *Journal of Building Engineering*, 30, 101246. <https://doi.org/10.1016/j.jobbe.2020.101246>
- Azmi, N. A., & Kandar, M. Z. (2019). Factors contributing in the design of environmentally sustainable mosques. *Journal of Building Engineering*, 23, 27–37. <https://doi.org/10.1016/j.jobbe.2019.01.024>
- Baydoun, Z., Alghamdi, N. A., & Kamarudin, Z. (2023). The Islamic art and design elements applied in the Islamic city: A case study of Putrajaya Islamic City. *Planning Malaysia*, 21, 314–328. <https://doi.org/10.21837/pm.v21i25.1241>

- Baydoun, Z., Norishah, T., Baydoun, R., & Adam, M. (2024). Placement principles of Islamic calligraphy in architecture: Insights from the al-hambra and al-Azem Palaces. *Buildings*, 14(7), 2025. <https://doi.org/10.3390/buildings14072025>
- Budaiwi, I., Al-Homoud, M. S., & Abdou, A. (2005). Mosque energy performance, Energy audit and use trends based on the analysis of utility billing data. [Report/Article]. https://www.researchgate.net/publication/38108075_Mosque_Energy_Performance_Part_I_Energy_Audit_and_Use_Trends_Based_on_the_Analysis_of_Utility_Billing_Data_ada_altaqt_fy_almsajd_aljz_alawl_maynt_astkhdamat_altaqt_bnaa_ly_thlyl_byanat_fwatyr_asthlak
- Dariyadi, M. W., Baydoun, Z., Kamarudin, Z., & Murtadho, N. (2022). The Islamic art and design elements applied in the Islamic city. *City, Territory and Architecture*, 9(1). <https://doi.org/10.1186/s40410-022-00155-4>
- Dervišević, H. (2020, December 12). Ottoman masterpiece in Sarajevo. *Islamic Arts*. http://islamicartsmagazine.com/magazine/view/the_ottoman_masterpiece_in_sarajevo/
- Fauziah, H., Abdul Majid, N. H., & Othman, R. (2016). Defining Issue of Thermal Comfort Control through Urban Mosque Façade Design. ScienceDirect. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1877042816315130>
- Gekić, H., & Bidžan-Gekić, A. (2020). The valorization of architectural heritage from the Ottoman period in the Sarajevo tourist region. *Proceedings of the 1st Istanbul International Geography Congress*, 1–12. <https://doi.org/10.26650/PB/PS12.2019.002.008>
- Islamska zajednica u Bosni i Hercegovini. (2016). *Gazi Husrev-Beg's Mosque*. <https://begovadzamija.ba/en/ghazi-husrev-begs-mosque/>
- Ismail, N. A., Utaberta, N., Supni, S. A., & Ismail, S. (2015). Review on effective energy management system for urban mosques in Malaysia. *Advances in Environmental Biology*, 9(24), 11–14. <https://www.researchgate.net/publication/286622802>
- Jaffar, N., Harun, N. Z., & Abdullah, A. (2020). Enlivening the mosque as a public space for social sustainability of traditional Malay settlements. *Planning Malaysia*, 18(2), 145–157. <https://doi.org/10.21837/pm.v18i2.750>
- Kahera, A. I., Abdulmalik, L., & Anz, C. (2009). *Design criteria for mosques and Islamic centers*. Architectural Press.
- Najafi, M., & Shariff, M. K. B. M. (2011). Factors influencing public attachment to mosques in Malaysia. *ArchNet-IJAR: International Journal of Architectural Research*, 5(3), 7–24. <https://www.proquest.com/scholarly-journals/factors-influencing-public-attachment-mosques/docview/1010055583/se-2>
- Rashid, E. E., Alwi, S. R. W., & Manan, Z. A. (2011). Evaluation of photovoltaic system installation for a mosque in Universiti Teknologi Malaysia. *Perintis e-Journal*, 1(Special Issue on Science for Sustainability), 61–81. <http://perintis.org.my/ejournal/wp-content/uploads/2018/11/11-40-1-pb.pdf>
- Sobri, M. I., Ismail, S., Sabil, Y., Yusof, H., Asif, N., & Setiyowati, E. (2021). Systematic review of sustainable design approach for mosque. *Journal of Islamic Architecture*, 6(4), 369–375. <https://doi.org/10.18860/jia.v6i4.14016>

- Spahic, O. (2013, May 14). A code of conduct for establishing and using mosques. IslamiCity. <https://www.islamicity.org/5260/a-code-of-conduct-for-establishing-and-using-mosques/>
- Suhono, S., Athaya, A. D., Anwari, L. H., Sinaga, F. D. H., Hadaina, S. F., & Novantri, S. O. (2020, November). Analysis of energy usage in mosques in urban area with tropical climate: Case study in Yogyakarta, Indonesia. In *IOP Conference Series: Earth and Environmental Science*, 599, Article 012091. IOP Publishing. <https://doi.org/10.1088/1755-1315/599/1/012091>
- Utaberta, N., Sojak, S. D. M., Surat, M., Che-Ani, A. I., & Tahir, M. M. (2012). Typological study of traditional mosque ornamentation in Malaysia – Prospect of traditional ornament in urban mosque. *World Academy of Science, Engineering and Technology*, 67, 624–631. <https://doi.org/10.5281/zenodo.1080133>
- Yilmaz, M. (2006, May). Sustainable design in architecture. In *Proceedings of the International Design Conference* (pp. 1443–1450).

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