**PLANNING MALAYSIA:**
*Journal of the Malaysian Institute of Planners*
**VOLUME 23 ISSUE 1** (2025), Page 202 – 214

# CHARACTERISTICS AND STRATEGIC IMPLEMENTATION OF LOW-CARBON INITIATIVES IN SHAH ALAM, SELANGOR, MALAYSIA: INSIGHTS FROM KEY STAKEHOLDERS

**Nur Fatiha Nadzirah M. Hamdan[1], Zakiah Ponrahono[2], Siti Afiqah Mohammad Sabri[3]**

[1,2,3] *Faculty of Forestry and Environment,*
UNIVERSITI PUTRA MALAYSIA

## Abstract

This study highlights the critical challenges faced by Shah Alam, such as rapid population growth driven by urbanization and economic development. This surge has intensified traffic congestion, reflecting the city's burgeoning economic prominence through the expansion of its industrial areas. Addressing these issues necessitates sustainable urban planning strategies to mitigate environmental impacts and ensure the well-being of residents amid continued growth. The study aims to (i) determine the characteristics of a Low Carbon City in Shah Alam and (ii) explore the strategic initiatives required to achieve impactful low-carbon urban development. The study utilized a qualitative methodology, focusing on expert interviews to investigate characteristics and initiatives related to low-carbon cities. Six key informants, chosen for their expertise in low-carbon city projects, participated in both face-to-face and online interviews to address the study objectives effectively. Thematic analysis of the interviews provided detailed insights into the characteristics and initiatives of Shah Alam's Low Carbon City. Findings reveal that the characteristics of low-carbon cities are based on five main elements: energy, water, waste, mobility, and greenery. These elements were measured to determine whether an area has achieved carbon and greenhouse gas (GHG) reductions. The Low Carbon City (LCC) initiative in Section 14, Section 1, and Section 5 of Shah Alam has led to a reduction in GHG emissions since the baseline years of 2015 and 2017. Additionally, community cooperation was found to be crucial in advancing low-carbon city efforts. The research concludes that Shah Alam continues to make efforts to reduce carbon emissions, evidenced by the reductions achieved during the implementation of the LCC initiative.

***Keywords***: Low Carbon City, Low Carbon City Framework, Greenhouse Gases, Sustainable Green City, Carbon Emissions

[2] Corresponding Author Email: zakh@upm.edu.my

## INTRODUCTION

Malaysia's rapid development and urbanisation pose challenges due to its high carbon dioxide ($CO_2$) emissions. As of 2019, the country's carbon footprint per capita surpassed the global average, standing at 10.158 tonnes of $CO_2$ equivalent per person (Ministry of Natural Resources, Environment and Climate Change, 2022). In the ASEAN region, Malaysia is among the largest emitters of greenhouse gases, contributing 0.52% to global carbon emissions (Association of Southeast Asian Nations, 2021). Due to population growth and economics, the energy sector is likely to be the biggest contributor, and other sectors, such as transportation and agriculture, might also play a role in the country's carbon footprint (Solaymani, 2022). Local authorities have implemented various programmes and initiatives to boost renewable energy enhance energy efficiency, adopt green building techniques, improve transportation infrastructure, and promote sustainable land use. These efforts aim to improve urban resilience to environmental challenges and mitigate the impacts of climate change (Haliza, 2020).

Shah Alam city has achieved notable success in reducing its carbon footprint and tackling greenhouse gas (GHG) emissions, as evidenced by its dominance at the Malaysian Low Carbon City Awards 2023, where the Shah Alam City Council secured the highest number of accolades (Malaysian Green Technology And Climate Change Corporation (MGTC), 2024). The local government in Shah Alam plays a crucial role in implementing Low Carbon City initiatives by developing and enforcing policies for sustainability, coordinating with stakeholders, integrating renewable energy and energy-efficient technologies, promoting green transportation, managing waste effectively, and ensuring sustainable land use practices (Farah Nadia, Zarina, & Nor Azira, 2023). Shah Alam offers a successful illustration of how cities can effectively address greenhouse gas emissions and transition to a more sustainable and low-carbon future.

The choice of Shah Alam as a case study is driven by its status as a rapidly expanding urban center grappling with substantial challenges in carbon emissions and environmental sustainability. This paper aims to (i) define the unique attributes of a low-carbon city in Shah Alam and (ii) investigate the strategic initiatives essential for achieving meaningful progress in low-carbon urban development. The study's findings offer empirically-grounded insights into Shah Alam's evolution toward a low-carbon city, illuminating its characteristics, effects, and management strategies. These insights are crucial for shaping informed policies and guiding decision-making processes effectively.

## LITERATURE REVIEW

### The Concept of Low Carbon City Framework

Many cities around the world have set the objective of becoming low-carbon cities (Su, et al., 2013). A sustainable city indicator system is essential for guiding low-carbon strategies, urban planning, and policy implementation (Tan, Yang , & Yan, 2015). The Low Carbon City Framework (LCCF) serves as a crucial tool in mitigating the environmental impact of climate change (Siti Kartina, Dasimah, Siti Mazwin, & Mohd Sallehuddin, The Implementation Low Carbon Cities Framework of Local Authority in Development Control towards Green Cities, 2019). The common indicators used in the LCCF for evaluation include Economic, Energy patterns, Social and Living, Carbon and Environment, Urban mobility, Solid waste, and Water (Tan, et al., 2017). The LCCF provides a comprehensive framework for assessing and monitoring the effectiveness of low-carbon initiatives, enabling cities to track their progress towards achieving sustainability goals (Siti Kartina , Dasimah, Siti Mazwin , & Ismail, 2022). This study aims to measure progress by exploring the characteristics of a low-carbon city, with the ultimate goal of reducing carbon emissions and promoting sustainable development. By focusing on key areas, such as energy consumption, waste management, and transportation, cities can identify opportunities for improvement and implement targeted strategies to reduce their carbon footprint.

### Low Carbon City Framework (LCCF) of local authority in development control

The planning department within each local authority is typically responsible for overseeing the administration and management of low-carbon city approaches in a local context (Jamaluddin, et al., 2023). Strong urban governance, bolstered by a robust institutional framework and a sustainable development approach, is intricately linked to addressing climate change issues while fostering partnerships with relevant stakeholders such as businesses and civil society organisations can enhance the effectiveness of climate change mitigation efforts (Nor Baizura, Yusfida Ayu, D. Ary Adriansyah, Nurul Shakila, & Na'asah, 2023). Inclusivity and transparency in decision-making processes are imperative to gain support for sustainable initiatives among stakeholders, particularly the local community (Yusfida Ayu, Khalid, Nor Baizura, Marlyana Azyyati, & Mohammad, 2023). Su et al. (2013) suggests that the evaluation of how well an urban area progress towards becoming low-carbon by considering both the specific actions and initiatives taken at the local level (bottom-up), as well as the broader policies and strategies at the city or national level (top-down). Therefore, this study aims to elucidate the measurement and management approaches of Shah Alam low-

carbon city. By comprehending the management approach in urban areas, policymakers can make informed decisions for sustainable development.

## RESEARCH METHODOLOGY

This study utilised a qualitative approach by conducting interviews with key informants, such as officers from the Shah Alam City Council (MBSA), the Malaysian Green Technology and Climate Change Corporation (GREENTECH MALAYSIA), and experts from UiTM Puncak Alam in Landscape Architecture. The study objectives were addressed through face-to-face and online interviews with a maximum of six key informants selected based on their expertise in low-carbon city projects, as shown in Table 1, which presents their profiles.

Thematic analysis was employed to analyze the data, concentrating on uncovering and interpreting the underlying meanings within the gathered information. This method involved systematically identifying, organizing, and offering insights into patterns or themes across the data set. By doing so, it facilitated a deeper understanding of the key characteristics and strategic initiatives associated with low-carbon city implementation in Shah Alam. The process included coding the data, searching for themes, reviewing these themes, and defining and naming them to provide a comprehensive analysis. This approach enabled the researchers to derive detailed insights into the elements and initiatives of a low-carbon city. This method allowed for the identification of recurring themes and patterns, providing valuable insights into perspectives on the characteristics and impact of implementing a low-carbon city in Shah Alam. Data triangulation was employed to ensure the validity and dependability of the research findings. This involved cross-referencing data from various sources or methodologies to verify and confirm the findings.

**Table 1:** Profile of Key Informants

| Position | Experiences | Responsibilities | Code |
|---|---|---|---|
| Analyst at Malaysian Green Technology and Climate Change Centre (MGTC) | 2 years | Analyze data and trends for improvement. | Informant 1 |
| Assistant Town Planning Officer, Planning Department, Shah Alam City Council (MBSA) | 4 years | Optimize land usage through site analysis. | Informant 2 |
| Assistant Town Planning Officer, Landscape Department, Shah Alam City Council (MBSA) | 2 years | Data-driven urban planning decisions. | Informant 3 |
| Assistant Town Planning Officer, Landscape Department, Shah Alam City Council (MBSA) | 2 years | Community involvement in planning projects | Informant 4 |
| Associate Professor, Coordinator Studies of Landscape Architecture at UiTM Puncak Alam | 2 years | Education and influential research in Landscape Architecture | Informant 5 |
| Senior Lecturer of Landscape Architecture at UiTM Puncak Alam | 2 years | Education and influential research in Landscape Architecture | Informant 6 |

## ANALYSIS AND DISCUSSION

### The Definition of Low Carbon City

The concept of a low-carbon city entails building infrastructure with minimal impact on residents' lives, while emphasising the integration of renewable energy, localised transportation systems, and green buildings (Tan, et al., 2017). However, achieving "Zero Carbon City" status is challenging in areas such as Shah Alam because of industrial presence and lifestyle factors. Informants' express confidence in the concept's potential but highlight difficulties in achieving zero carbon emissions, particularly in industrialized regions. This reflects an ongoing struggle to balance urban expansion with environmental goals

| |
|---|
| " *A Low Carbon City is a location that can achieve zero carbon emissions*." |
| Informant 1 |
| ""A Low Carbon City is a city capable of providing essential urban development without compromising the needs of its residents" |
| Informant 2 |
| "Despite the presence of industrial regions here, achieving the 0% carbon target and reducing carbon emissions in Shah Alam remains challenging." |
| Informant 5 |
| "Because Shah Alam still contains many industrial areas, it is not possible to set a target of 0% carbon emissions." |
| Informant 6 |

Informants 1 and 2 expressed confidence in Shah Alam's city ability to become Low-Carbon City and achieve zero carbon emissions, and provide sustainable urban development. However, Informants 5 and 6 highlighted the difficulty of achieving the 0% carbon target for the city due to the presence of many industrial areas. The combination of urban expansion and environmental goals in a city like Shah Alam highlights the ongoing struggle towards full carbon neutrality.

### Characteristics of Low-Carbon City

The informants highlighted five key elements of a low-carbon city: energy, water, mobility, greenery, and waste management. Informant 2 underscored the significance of integrating green technology and city services to enhance residents' quality of life while simultaneously reducing greenhouse gas emissions within a low-carbon city.

Informant 3 suggested adopting SMART Lighting or LED lamps in buildings as a practical strategy for optimising energy consumption. Prioritising renewable energy sources and efficient energy reuse is fundamental, along with sustainable water management, to understand their impact on greenhouse gas

emissions. Mobility solutions involve reducing private vehicle use and implementing restrictions on petrol and diesel vehicles in cities.

Informant 6 also stressed the importance of cities' commitment to sustainability, advocating for the incorporation of 10% green space in all developments. Green spaces are crucial for carbon sequestration, whereas efficient waste recycling programmes are essential for reducing emissions. Integrating green technology with city services further enhances urban sustainability and reduces greenhouse gas emissions. Overall, prioritising sustainable energy, water, transportation, green spaces, and waste management is essential for achieving a low-carbon status and improving urban sustainability.

> "*Among the main characteristics of a low-carbon city is the integration of green technology and the latest initiatives with city services to improve the quality of life in order to achieve a reduction in the intensity of greenhouse gas (GHG) emissions."*
>
> -Informant 2
>
> "*A characteristic of a city implementing Low Carbon City (LCC) is that the majority of buildings within the city use SMART Lighting or LED lamps, which can help optimize energy consumption."*
>
> -Informant 3
>
> "*A characteristic of a sustainable city is that every development conducted within the city must incorporate 10% green space to conserve sustainability in the urban environment.*"
>
> -Informant 6

These insights collectively contribute to a holistic vision of a city that prioritises environmental responsibility alongside the well-being and sustainable progress of its inhabitants. Through triangulation methods including interviews and document analysis, the study effectively identified the key characteristics of Shah Alam as a zero-carbon city. Figure 1 illustrates the measurement and management approach of Shah Alam Low Carbon City, offering a comprehensive framework for other cities seeking to reduce their carbon footprint.

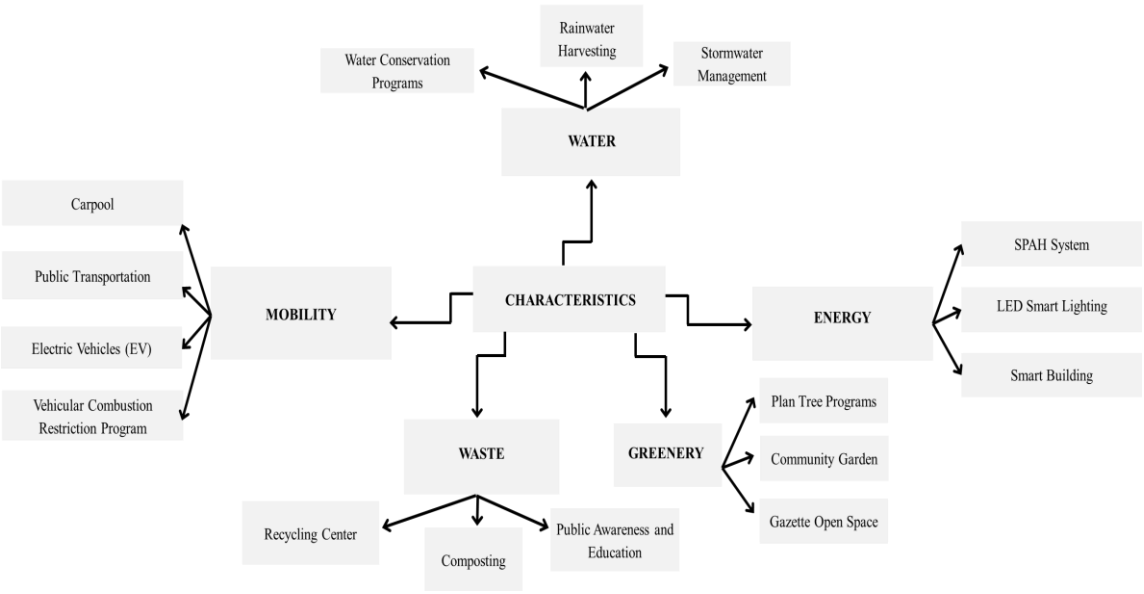


**Figure 1:** Framework of Characteristics of a Low Carbon City in Shah Alam

**Navigating Challenges for Achieving Low-Carbon Cities in Shah Alam**

According to Informant 3, financial constraints present a significant barrier to transforming Shah Alam into a low-carbon city as they hinder the implementation of high-impact projects, particularly those measurable within the carbon measurement programme. Converting old or non-green buildings into environment-friendly structures requires substantial capital investment, primarily due to the extensive upgrades involved. Additionally, adopting green technology, developing sustainable infrastructure, and transitioning to renewable energy sources often incur high costs, particularly in the context of urban development, where financial resources may be limited. The difficulty of securing adequate funds and investments further exacerbates this challenge. Despite the long-term benefits, approximately 40 projects may face neglect or delay due to financial constraints, as highlighted by the respondents.

Informant 3 also identified lack of community awareness as a significant obstacle to fostering active community participation in low-carbon urban development initiatives. This lack of awareness stems from a limited understanding of the concept and significance of low-carbon practices in the area. Communities are not exposed to the positive outcomes of areas with low carbon emissions, nor do they grasp the importance of adopting sustainable lifestyles in their daily lives. Their indifference further hampers efforts to educate them on low-carbon city concepts. The interview participants emphasised the need for

comprehensive and impactful education programmes and awareness campaigns that can communicate sustainability information in a manner that is easily understandable and relevant to the community's daily lives.

Informant 4 pointed out that a significant challenge lies in community behaviour, which poses a notable barrier to achieving a low-carbon city. The main daily lifestyle of the population is the use of private vehicles from one destination to another, particularly on weekdays. Every community in Shah Alam uses their own vehicle without using the carpool method, which is sharing a vehicle to work. This practice is very difficult for local residents because of the large area of Shah Alam city and the different destinations they want to go to. Apart from the use of one's own vehicle to go to work, the use of energy in daily life also contributes to high carbon emissions where the excessive use of electricity when it is not turned off after use causes the flow of electricity to continue and contributes to the impact on the environment.

Similarly, Informant 5 highlighted the issue of unsustainable efforts. Transitioning to a sustainable, low-carbon city necessitates continuous and coordinated efforts to accelerate its change. The informant stated that non-constant efforts will be difficult in making a low-carbon city. The challenge faced in the early stages of the application of low-carbon elements in development in Shah Alam is the difficulty in changing the lifestyle of the people of Shah Alam towards a more effective and low-carbon lifestyle. Efforts to change this lifestyle require a careful and continuous approach as well as a deep understanding of the factors that influence society's behaviour.

> ""In Shah Alam, one of the challenges in becoming a low-carbon city is cost. For instance, the expense involved in retrofitting buildings to adopt green technologies, such as transitioning from fluorescent to LED lights, is significant. Moreover, there is resistance to shifting from conventional systems to more sustainable alternatives like the SPAH system. Additionally, community awareness poses another hurdle, as not all residents are willing to participate in low-carbon initiatives due to limited understanding of carbon emissions."
>
> -Informant 3
>
> "A significant challenge faced by Shah Alam as a low-carbon city is the social culture that contributes to carbon emissions. Factors such as increasing reliance on air conditioners and widespread use of private vehicles for commuting exacerbate environmental impacts."
>
> -Informant 4
>
> "Another challenge lies in maintaining sustainable efforts. Achieving a transition to a sustainable, low-carbon city requires continuous and concerted efforts to accelerate change."
>
> -Informant 5

To summarize, the process of turning Shah Alam into a low-carbon metropolis encounters significant obstacles that require holistic resolutions. The implementation of critical initiatives is hindered by financial constraints. Additionally, development is further impeded by a lack of community awareness

and participation, as well as ingrained practices such as reliance on private automobiles and inefficient energy usage. To overcome these barriers, it is necessary to make focused and coordinated efforts to get sufficient funds, improve community knowledge and involvement, and encourage sustainable practices. An uninterrupted, synchronized strategy is crucial, highlighting the necessity for persistent dedication and determination to achieve Shah Alam's goal of a more environmentally friendly and sustainable urban setting.

**Criteria Strategies Implemented to Reduce Carbon Emissions**

After evaluating the Shah Alam Low Carbon Action Plan 2035, several strategies were identified to reduce carbon emissions. These strategies include promoting energy management, efficiency, and renewable energy; adopting transit-oriented urban development; enhancing waste management practices; integrating development with nature; ensuring effective city governance; and increasing awareness through communication and education efforts. During the interviews, the informants were asked about the progress and updates of the implementation of these strategies.

**Transport Policies to Promote Zero Carbon Mobility**

The informants emphasised the importance of efficient transportation management in reducing the city's carbon emissions and improving its quality of life. In the Shah Alam Low-Carbon Action Plan 2035, the Council will continue to promote a transit-oriented city by prioritising sustainable development. Four action plans have been outlined to achieve this target: the improvement of transit-oriented cities, the implementation of "City for Walking and Cycling" elements, the promotion of energy-efficient vehicles, and the provision of an inclusive and efficient transportation system. The aim is to achieve the maximum level of carbon reduction, creating a greener and more viable city.

| |
|---|
| "In Shah Alam, the zero-carbon mobility transport policy aims to enhance transit-oriented development, implement elements of 'City for Walking and Cycling', promote energy-efficient vehicles, and establish an inclusive and efficient transport system." |
| -Informant 1 |
| " The zero-carbon mobility initiative aims to encourage communities to utilize public transport or implement carpooling measures to reduce carbon emissions." |
| -Informant 2 |
| " To mitigate carbon emissions, there is a proposal to restrict the entry of petrol or diesel vehicles into the city during specific times." |
| -Informant 3 |

Informant 1 emphasises Transit-oriented development, "City for Walking and Cycling," and energy-efficient vehicles for Shah Alam's zero-carbon mobility policy. Informant 2 underscored the promotion of public

transport and carpooling, while Informant 3 suggested restricting petrol/diesel vehicles during specific times to reduce carbon emissions. These insights collectively outline a multifaceted strategy for achieving low carbon mobility in Shah Alam.

**Waste Management Practices in Shah Alam**

As Malaysia's waste production continues to grow, sustainable waste management has become a pressing issue. The volume of daily garbage reached roughly 25,000 tonnes in 2016 and is predicted to increase to 30,000 tonnes by 2020. The Malaysian government has responded by investing in waste collection, transportation, and disposal, particularly in urban areas, resulting in increased carbon generation.

To address this challenge, the Council has developed three integrated action plans for sustainable solid-waste management to limit the impact of carbon emissions. Green and sustainable waste management, reduction of green waste, and enhanced awareness, education, and participation of all stakeholders are among these initiatives. Malaysia hopes to accomplish more effective waste reduction and reduce its negative impact on the population and environment through this initiative.

> "In Shah Alam, for green waste management and to reduce waste disposal for zero carbon emissions, the Council has established three action plans for sustainable solid waste management. These include implementing green and sustainable waste management practices, reducing green waste, and raising awareness through education and engagement of all stakeholders."
>
> -Informant 2
>
> "In Shah Alam, waste management initiatives aimed at minimizing carbon emissions and promoting sustainability focus on encouraging community waste segregation. Various educational programs are also organized to enhance public knowledge of proper waste management practices."
>
> -Informant 3
>
> "Color-coded waste management is employed in Shah Alam, where initiatives such as recycling textiles and daily household waste are visibly integrated into housing developments. The community in Shah Alam has been provided with blue and green bins for waste disposal."
>
> -Informant 4

Shah Alam employs a three-step sustainable waste management plan, emphasising green practices, waste reduction, and community awareness. The approach also includes carbon reduction through waste management, promoting waste segregation and education. Practical measures, such as color-coded waste bins, enhance recycling visibility, contributing to Shah Alam's goal of reducing carbon emissions and fostering sustainability.

**Building and Design Optimized for Energy Efficiency and Neutrality Carbon**

The key approach to achieving a 45% reduction in greenhouse gas (GHG) emissions in Shah Alam City by 2035 is to promote Energy Management, Energy Efficiency, and Clean Energy for buildings. This approach aims to promote Energy Management (EM), Energy Efficiency (EE), and Renewable Energy (RE) as efficient, high-quality water management systems. This strategy will strengthen policies and incentive frameworks, establish policies and energy performance indicators, practice energy management and efficiency in buildings, increase the use of clean energy technologies, increase participation through community awareness and education programs, efficiently reduce water use through six action plans, and put in place a high-quality water-management system for buildings. The ultimate goal is to minimise energy use, expenses, the impact of climate change, and reliance on fossil fuels by 2035.

> "In Shah Alam, buildings and urban designs optimized for energy efficiency and carbon neutrality include zero energy buildings. These buildings are designed with features such as extensive use of glass to maximize natural lighting, installation of rooftops on every building, and promotion of smart buildings equipped with solar technology."
>
> -Informant 1
>
> "A building that enhances energy efficiency in Shah Alam incorporates features like mirrors, proper ventilation systems, and surrounding greenery to mitigate carbon emissions."
>
> -Informant 4
>
> "Buildings in Shah Alam that improve energy efficiency utilize the SPAH system, adopt green water systems for sewage, and switch from fluorescent lights to LED lights."
>
> -Informant 6

Shah Alam focuses on energy-efficient buildings with features like glassfilled structures, rooftops, and solar smart technology. Enhancing efficiency involves mirrors, ventilation, trees, SPAH systems, green water sewage, and light-emitting diode (LED) lights. These initiatives align with Shah Alam's commitment to sustainable urban design and carbon reduction.

The progress of Low Carbon City (LCC) in Shah Alam in the last few years reflects positive achievements in the implementation of the initiative. There is increasing acceptance among the local population of the LCC concept. Urban governance plays a crucial role in the administration and management of LCC interventions, and involves various substantive factors and strategies related to the institutional framework and urban governance necessary for LCC development. Among others, the strategies include establishing a database system for LCC; specific guidelines for LCC development; an institutional framework with job descriptions, work plans, and partnerships; and considerations for funding and green finance practices, monitoring, and benchmarking, among other integral elements (Yusfida, et al., 2022).

## CONCLUSION

Shah Alam is still working towards achieving a low-carbon city, despite having reduced carbon emissions in the city since the baseline in 2015. The positive response from the collaborative efforts and initiatives among Shah Alam stakeholders demonstrates a discernible decrease in carbon emissions. This positive outcome can be attributed to the effective implementation of Shah Alam's strategy. With continued cooperation from various parties such as communities, NGOs, government agencies, and manufacturers, Shah Alam will undoubtedly become a low-carbon city, thereby ensuring that the quality of life of future generations is preserved. Furthermore, the experts and interviewees agreed that raising community awareness and public participation is crucial. This can be accomplished through regular monitoring by responsible agencies, as well as public support and cooperation.

## ACKNOWLEDGEMENT

We extend our heartfelt gratitude to the town planning authorities, the Shah Alam City Council (MBSA), the Malaysian Green Technology and Climate Change Corporation (MGTC), and the landscape architects for their generous sharing of expertise and tireless efforts in advancing low-carbon city initiatives. Their invaluable contributions have significantly enriched this study, and we are deeply appreciative of their unwavering support and collaborative spirit.

## REFERENCES

Association of Southeast Asian Nations. (2021). *ASIAN State of Climate Change Report.* Retrieved from https://asean.org/wp-content/uploads/2021/10/ASCCR-e-publication-Correction_8-June.pdf

Farah Nadia, A., Zarina, M., & Nor Azira, A. (2023). Role of Local Government in Implementing Low Carbon City in Shah Alam., (pp. 299-304).

Haliza, A. (2020). Malaysia Commitment towards Low Carbon Cities. *International Journal of Academic Research in Business and Social Science, 10*(15), 253-266.

Jamaluddin, N., Abdullah, Y., Yakob, H., Nasrudin, N., Hassan, M., & Zainudin, K. (2023). Low Carbon City (LCC) Governance through Administrative and Operational Approaches by Malaysian Local Government. *IOP Conf. Series: Earth and Environmental Science*, *1217*, pp. 1-16.

Malaysian Green Technology And Climate Change Corporation (MGTC). (2024, February). Retrieved from MGTC: http://www.mgtc.gov.my

Ministry of Natural Resources, Environment and Climate Change. (2022). *Malaysia: Fourth Biennial Update Report under the UNFCCC.* Retrieved from https://unfccc.int/sites/default/files/resource/MY%20BUR4_2022.pdf

Nor Baizura, J., Yusfida Ayu, A., D. Ary Adriansyah, S., Nurul Shakila, K., & Na'asah, N. (2023). Determining Low Carbon City (LCC) Indicators for Government at Local Government in Malaysia. *16*(2), 58-70.

Siti Kartina , J., Dasimah, O., Siti Mazwin , K., & Ismail, M. (2022). Does The Approach Of Building Element Under Low Carbon Cities Framework (LCCF) Will Reduce The Energy And Water Consumption. *International Journal of Education, Islamic Studies and Social Sciences Research, 7*(2), 70-77.

Siti Kartina, J., Dasimah, O., Siti Mazwin, K., & Mohd Sallehuddin, M. (2019). The Implementation Low Carbon Cities Framework of Local Authority in Development Control towards Green Cities. *Green CIties* (pp. 107-114). UiTM Institutional Repository. Retrieved from https://ir.uitm.edu.my/id/eprint/40239/1/40239.pdf

Solaymani, S. (2022). CO2 Emissions and The Transport Sector in Malaysia. *Frontiers in Environmental Science, 9*, 1-11.

Su, M., Li, R., Lu , W., Chen, C., Chen, B., & Yang , Z. (2013). Evaluation of a Low-Carbon City: Method and Application. *Entropy, 15*, 1172-1185.

Tan, S., Yang , J., & Yan, J. (2015). Development of the Low-carbon City Indicator (LCCI) Framework. *Energy Procedia, 75*, 2516 – 2522.

Tan, S., Yang, J., Yan, J., Lee, C., Hashim, H., & Chen, B. (2017). A holistic low carbon city indicator framework for sustainable development. *Applied Energy*, 1919–1930.

Yusfida Ayu, A., Khalid, Z., Nor Baizura, J., Marlyana Azyyati, M., & Mohammad, Y. (2023). An Exploration of Community Engagement and Participation in LCC Initiatives: Case Study of Majlis Bandaraya Shah Alam. *PLANNING MALAYSIA: Journal of the Malaysian Institute of Planners, 21*(5), 357-372.

Yusfida, A., Nor Baizura, J., Hamizah, Y., Mohd Azren , H., Na'asah, N., Mohammad , Y., . . . Khalid, Z. (2022). Urban Governance Approaches for Low Carbon Cities; The Case of Shah Alam Local Government, Malaysia. *PLANNING Malaysia: Journal of the Malaysian Institute of Planners, 20*(4), 311–330.

Received: 19th March 2024. Accepted: 17th October 2024

 