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GREEN & SAFE CITIES
2022

“Sustaining the
Resilient, Beautiful and Safe Cities
for a Better Quality of Life”

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“ **Sustaining the Resilient, Beautiful and Safe
Cities for a Better Quality of Life** ”

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LCC IMPLEMENTATION AND ITS BENEFITS TOWARDS THE COMMUNITY IN SHAH ALAM

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Abstract

Low Carbon City (LCC) is a city which comprise of societies that consume sustainable green technology, green practices, and emit relatively low carbon or greenhouse gases (GHG). The concept of LCC is closely related to the sustainable development of a city. With the adoption of sustainability principles, carbon emissions can be reduced significantly through the means and ways in which cities are designed and developed, and the ways resources are consumed. The main objective of this study is to determine the factors in implementing the LCC program and the benefits that the community gain from the program. The factors and the benefits were identified from several past studies. Therefore, a total of 3 respondents were chosen to provide information in order to gather data for this study. The respondents are the officials who in charged directly with the LCC programs. This study found that the factors that contribute to the implementation of LCC is measured through three main areas: 1) environment; 2) transportation; and 3) infrastructure. Whereas the benefits were identified in terms of economy, social and health. This study provides an insight on the importance of having Low Carbon City program in Shah Alam while also indirectly raising the community's awareness and ensuring their acceptance towards the LCC program. Furthermore, the findings from this research can also be adopted by other local governments for the implementation of the program.

Keywords: *Success, Low Carbon City, Implementation, Benefits, Community.*

INTRODUCTION

Malaysia had signed the Paris Agreement in 2016 to commit in reducing the greenhouse gas emission by 2030 (Jalil, 2021). Malaysia have already introduced measures such as developing new cities to achieve carbon neutrality, by giving tax incentives to companies that report and limit their emissions, procuring more environmentally friendly government assets (Haliza, 2018). Over the years, the country had developed strategic plans and policies to steer towards a low carbon economy. Malaysia had introduced its Low Carbon City's (LCC) framework which is in line with the sustainable development goals. The aim is to use green technology and practices to minimize carbon emissions in the city (KeTTHA, 2017). Shah Alam which is among one of the major cities in the Klang Valley had established a Low Carbon City Program with aim to reduce the city's carbon emission by the year 2030 (MetroNews, 2021). According to Nasrudin et al. (2020), the Shah Alam City Council (MBSA) had design its own Low Carbon City 2030 Action Plan, which focused on implementing initiatives to improve the city's mobility and transportation. Despite the fact that Shah Alam had implemented these techniques, environmental pollution has been recorded in the city. According to IQAir (2019), Shah Alam's low air quality was ranked among the top 4 cities in

the country with an air quality reading of 45.5 $\mu\text{g}/\text{m}^3$ in 2019. The high vehicle dependency in Shah Alam not only affect the effectiveness of the Low Carbon City program but it caused haze problems in Malaysia (Rasydan, 2019). Therefore, the objective of this study is to determine the factors that contribute to the LCC implementation in Shah Alam as well as to study the benefits of LCC program towards the community.

LITERATURE REVIEW

Determination for LCC Program

Urban Environment

To transform a city into a low carbon city, certain elements are considered for the engagement of a low carbon transformation. Among some of the elements include the environment, industry, economy, infrastructure, and multi-layered governance which ensures a low carbon emission in the city (Baumler et al., Mi et al., 2019). The fundamental objective is to decarbonize the city's energy systems, which comprise of energy consumption, management and supply. Gouldson et al. (2016) stated that about 18% reduction of GHG emission is related to the energy usage attained in the urban environment globally. One of the key mitigations is linked to the building sectors, which are supported by renewable energy and compact urban forms. According to Macnaughton et al. (2018), the improvements towards the performance of building energy has the potential for the reduction of cost-effective emissions and cost savings in the long run.

In the UNFCCC (2020), it highlighted that the urban environment created by the low-carbon implementation allows for more targeted and impactful support in the developing countries. This facilitates the achievement of the national sustainable development goals and mitigation objectives. Additionally, with an urban environment, it also promotes equal opportunities, and has the potential to achieve greater social and economic benefits. This is because the community plays an important role in promoting climate-friendly changes.

In the relationship towards the implementation of the LCC program, the urban environment is one of the important determinants as it influences the amount of carbon emission in the city of Shah Alam. Therefore, to mitigate this issue, the Shah Alam City Council had formulated various criteria in the LCC program which includes site selection, urban form, and urban greenery and environmental quality (KASA, 2021).

Urban Transportation

Another factor included in the implementation of the LCC programme is urban transportation. According to Solaymani (2022), urban transportation burns 28.8% of fossil fuels in Malaysia which is higher than the global average of 24.5%. It is in fact the major cause of depletion of fossil fuels and is the fastest growing source of carbon emission. With the rapid urbanization caused by developing countries, it results in a rapid increase of energy consumption and GHG emission. Binder et al. (2020) stated that urban transportation plays a significant and integrated role for the benefits of the community. It is essential to have a comprehensive strategy to reduce carbon emissions. The concept of urban transportation requires a long transitional period which involves different low-carbon transportation measures and institutional reformation (Wimbardana, 2021).

With the enhancement of urban transportation strategies of the LCC program, it increases the accessibility of the community which leads to a better quality of life where people are more independent and have a better social engagement. Additionally, by improving the urban transportation, it leads to a decrease in number of vehicles on the road, thus reducing the occurrence of traffic congestion and traveling time (Gouldson et al., 2016). Ultimately, it results in a low carbon emission in the city.

This subsequently relates back to the implementation of LCC program which requires multiple performance criteria that includes using green transportation, increment of public transportation, and shifting from private to public transport that would enhance the said program in Shah Alam.

Urban Infrastructure

According to K.-W. Li (2017), infrastructure provision has a cumulative and multiplicative impact on developing countries whereby it contributes exponentially towards the development and growth. Therefore, this translates to the improvement of a city's economic capabilities from infrastructure provision while also ensuring its growth and development. According to UNEP (2021), urban infrastructure is responsible for 79% of the world's GHG emissions whereby it mostly comes from buildings, power plants, and transportation which is critical in order to achieve the Paris Agreement and Sustainable Development Goals (SDGs). Therefore, multiple criteria were introduced which includes infrastructure provision, waste, energy, and water in implementing the LCC program.

According to KeTTHA (2017), infrastructure provision is aimed to reduce the land take for infrastructure and utility by the efficient design of main infrastructures. This can be either under or above ground which incorporates the current and future utility requirements. The high percentage of land taken causes multiple negative impacts such as inefficiency of land usage and requires more space which leads to more changes of land usage. Therefore, to mitigate this issue, an efficient land-use planning is needed in the urban infrastructure provision. With proper storm water management such as Urban Storm Water Management and Flood Mitigation, it provides an advantage in which rainwater that has been collected and carried away into the drainage system will have a better flow system and wouldn't have the tendency to overflow along the road surfaces caused by blockage or heavy rainfall (KeTTHA, 2017). Not only that, industrial waste management also important as it can help to minimize the amount of industrial waste produced by industrial activities. Industrial waste management can bring many benefits to the economy and environment (Nizar, 2019). Appropriate industrial waste management will bring many benefits to the hydrological and water quality such as reducing the amount of pollution entering stormwater system while also removing an appropriate amount of any residual pollution further explained that the use of private cars can be reduced when cycling activity is being encouraged (Water, n.d.).

Impacts of LCC program

LCC also has an important role in promoting healthy lifestyle in the community where it promotes active transport such as walking and cycling as an effort to go green. According to Bernama (2021a), as the LCC encourages a healthy lifestyle by promoting outdoor activities such as cycling and walking, the community will be in good shape and thus, resulting in a healthier environment. As transportation contributes to a significant amount of carbon emission, by implementing such strategy, it results in a positive outcome for the community's well-being. In the US, it is proven that all of the 41 areas that had unhealthy levels of carbon monoxide in 1991 now have levels that meet the health-based national air quality standard (EPA, 2021). From a study model in London, the findings concluded that the health benefits were mainly caused by the increase in physical activity of the community while having significant reduction of air pollution.

As a result, with the reduction of air pollution, the community are able to avoid the risk of having serious health effects and even early deaths (Manisalidis, 2020). Furthermore, by practicing a healthy lifestyle that was implemented in the LCC Program, it helps the community to reduce health related issues. Maizlish et al. (2013), stated that walking, cycling, and public transportation has the potential to lower the burden that's linked to exposure of fine particles,

depression, cardiovascular diseases, dementia, and obesity. Additionally, with the impact of increased in active travel, it would over time reduce ischaemic heart disease by 10 to 19%, cerebrovascular disease by 10 to 18%, dementia by 7 to 18%, and breast cancer by 12 to 13%.

It was discovered that LCC does not only have a positive impact towards the community's health but also its economy. There is a direct economic return associated with reduced energy expenditure, transport fares, user fees, and so on. It provides a green economy which improves the wellbeing of the people, while also providing jobs which are crucial for the city and also the country. According to Tan Sri Muhyiddin Yassin, transformation of cities in Malaysia into low-carbon cities will help develop the local green economy, create jobs and attract domestic and international investments (Bernama, 2021b).

According to multiple studies, with a decrease in the air-pollution-related diseases, it translates to a lesser amount of money being spent on medical treatments. Therefore, with an improved environment at home and in the workplace, it results in a decrease in illness rates and subsequently save on health-care costs. This translates to a decrease in illness rate, and number of absences among American employees (EPA, 2021). Furthermore, when the number of employees present at work increases, so does the productivity in the workplace, which also directly boosts the worker efficiency.

It is important to highlight that the investments in low-carbon technology have a significant economic advantage in terms of job creation. For instance, investments in upgrading existing buildings and raising the energy efficiency of new buildings in Organisation for Economic Co-operation and Development (OECD) cities lead to the creation of 2 million net jobs annually in the period to 2050. In addition, it is equivalent to the investments in non-OECD cities that could generate between 2 million and 16 million net jobs annually in the same period. A doubling of urban population density can improve economic productivity by 3%, primarily from agglomeration effects associated with improved access to jobs and services. Investments in expanding public transport and improving vehicle efficiency could lead to the creation of more than 3 million net jobs annually in OECD cities, and between 3 million and 23 million net jobs annually in non-OECD cities, in the period to 2050.

Public transportation has been used in the low-carbon implementation and has proven that it may increase people's accessibility. According to L. Li and Weimin (2022) the usage of fossil fuels and greenhouse gas emissions in cities from the transportation sector is reduced by using innovative technologies and an improved public and non-motorized transportation. Therefore, by enhancing the public transport system, it was discovered that 56% of a European city's population had access to at least 10 departures every hour (Poelman, Dijkstra, & Ackermans, 2020). Furthermore, according to KCATA (n.d.), using public transport in the United States saved 865 million hours of travel time in 2011. Additionally, it improves the accessibility, therefore disproportionately benefits the urban poor (A. Gouldson et al., 2018). According to TTF (n.d.), through public transportation, it enhances the social benefits where it facilitates social inclusions which connects the community together. This will therefore decrease the likelihood of experiencing discrimination and increase the harmony within the society. It can be said that an improved accessibility results in a better quality of life where people can be more independent and have a better social engagement. Thus, when there is an increase in public transport it will increase accessibility in the community and providing a better social cohesion for the diverse demographics in the community.

The impact of public transportation also shown to provide improvements towards the social stress. Ganesh (2019) stated that traffic jams, loud honking, and road rage are amongst the psychological factors which leads to anxiety, frustrations, and also lack of control. These build up to social stresses where people would feel demotivated to meet with friends and families, and even to the extent of not going to work. As a result, the social engagement between individuals would decrease. Therefore, by using public transport, it helps in reducing

traffic congestion as well as reducing stress through positive interactions in the community (EPA, 2021). Moreover, according to Gouldson et al. (2016), public transit reduces travel times, as well as reducing them by more than 50% as compared to private transport.

METHODOLOGY

For this study, a qualitative technique was used as the research method. To carry out this research study, semi-structured interviews were used. This study utilised a purposive sampling technique to choose the sample of participants. The researcher opted to interview three officers from the MBSA to answer the questions in this study. Same set of questions was given to the respondents relating to the research objectives which are the factors that lead to a successful implementation of the LCC program, benefits of Low Carbon City Program to the and actions taken by Local Government. The first respondent was the town planner in MBSA which is in charge of managing the development of the city. Subsequently, the second respondent is an engineer who coordinates the operations in the city. The last respondent oversees the transportation operations in the city. All the respond received been analyse using thematic analysis and the data acquired from their responses was used to draw a conclusion regarding the research issue. In this study, due to the time constraint, there was a limited MBSA personnel available for the interview.

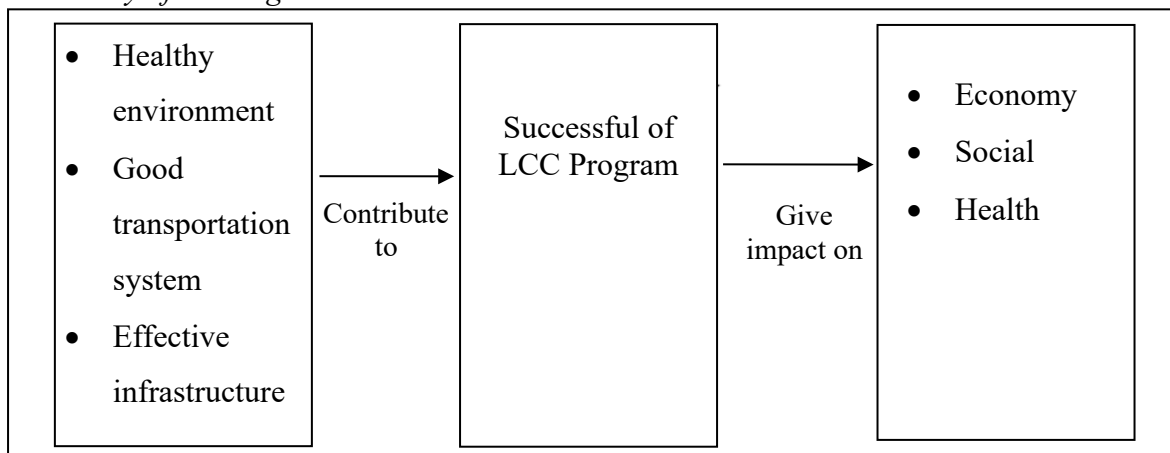
RESULTS & DISCUSSION

Based on the findings, it can be concluded that all parameters which include urban environment, urban transportation, urban infrastructure and building are being used in order to take measures in implementing the LCC program. Since the urban transportation contributes to the overall carbon emission in the city, strategies need to be done to mitigate the problem. A reliable public transport system is critical in ensuring the community to change from utilizing their own vehicle to taking the public transport. Therefore, MBSA has improved their Smart Selangor program by increasing the number of free buses and routes throughout the city said by the respondent 3. This would ultimately attract and increase the number of public transport commuters. According to respondent 1, another factor that's implemented is the waste management which can be a great factor to the economy and environment. As wastes typically goes to landfill and rot, it produces methane, a greenhouse gas which is more potent than carbon dioxide in trapping heat. Thus, with the efforts by MBSA, it does not only reduce the amount of GHG emission, but also the cost for garbage disposal. In fact, the waste disposal is among the highest in MBSA's expenditure. Therefore, through the MBSA's garbage segregation program, the cost can significantly be reduced while the community can enjoy a healthy and good environment added by respondent 1. Additionally, according to the respondent 1, she added that public awareness is very important to ensure that the program is successful. It reflects on the environmental situation of the city. When people are aware of the program, they would take part in it which ultimately would allow them to change their attitude and behaviour. With a successful program, it would also make room for more people to participate. However, this would not be made available if the financial support was not given to MBSA. respondent 2 informed that financial support is really important in the success of a program. He added that they can only plan, but to run the programme would be difficult if there is little funding. Indeed, more projects and programmes can be held when more financial budget is allocated to MBSA. In addition, the MBSA personnel agreed that the benefits of LCC program is directly related to health, social and economy. LCC program promotes the idea of being sustainable, in which gives a big impact towards the community as well as to the next generation. The community will have a better and healthy lifestyle, as well as a living environment. It can be seen from the Car Free Day program, where people in Shah Alam are encouraged to do light exercise, jogging and cycling during that day.

Therefore, when the programme is implemented, the number of vehicles on the road will be reduced, and the community will be able to breathe cleaner air. Respondent 1 and respondent 2 also informed that from the data of the MBSA’s LCC program, they managed to get fund from IGES amounted to 60,000 USD for their next project. It gives benefits to their financial economy as the fund can save their own budget for the future plans. Moreover, green buildings can also attract international companies to invest and it is benefitting our economy. Furthermore, green building such as KEN Rimba in Shah Alam also offers sustainable lifestyle as well as energy efficiency which can save individual utility bills. Respondent 3 added that when the number of public transports is increasing and easily accessible to the people, it will attract more people to use it. Thus, it improved the accessibility in the community as well as better social engagement. Since MBSA have the SMART Selangor program, the community not only been able to reduce their car fuel expenses, but also been able to use buses for free.

SUMMARY OF RESULTS

Figure 1
Summary of Findings



Based on the findings, there are three parameters that are considered to be the factors that contributes to the LCC program in Shah Alam. Among the factors include a healthy environment, good transportation system, and effective infrastructure. When the LCC program is successful, it has a positive impact on the communities’ economy, social and health. In the community, it’s established that as more people are active by taking up healthy activities, it results in a healthier lifestyle and environment. Additionally, with a good transportation system in which encourages the community to take up public transportation or active transport, it is beneficial where it leads to a decrease in number of vehicles on the road which produces significantly low carbon emission and eases the traffic congestion in the city. This also promotes for a healthy way of transport in which people are encouraged to take the public transportation where there are interactions with the community as opposed to be confined in their own vehicles. Also, with an effective public transport system especially in Shah Alam where the local government had introduced the ‘Smart Bus Selangor’, it decreases the risk of health-related diseases while also improve the economic aspect through the shift of consumer spending from private vehicle to public transport. Additionally, with effective infrastructure, it decreases the exposure of health hazards in the community as it reduces the amount of greenhouse gas emissions and health-related hazards. It also provides a positive economic outlook as more as it reduces the energy consumption and is cheaper than the conventional infrastructure which creates for more sustainable jobs.

CONCLUSION

In conclusion, this study had achieved their objectives. From the interview, this study identifies the successful factors in implementing LCC and its benefits towards the community. All the factors play an important role in the success of the program not only in the country but also internationally. The community will get more benefits when the LCC program is successful, and more programmes can be held. People's awareness is very crucial in promoting and ensuring that the program is successful. Therefore, raising awareness and educating the people is needed to enhance the program. Not only that, from the interview, it can be said that support from federal government is limited. Thus, this study provides a suggestion for the federal government to have a townhall or roundtable discussion with all local authorities so that the policies and support are ensured to balance out which would lead to the mission of successfully having a low carbon city. It is hopeful that this study can create more awareness and would allow for more LCC projects and program to be held in the near future.

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Sekian, terima kasih.

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