A Development of Green Building in Malaysia: A Challenge to Sports Center

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DOI: https://doi.org/10.37178/ca-c.21.5.035

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Abstract

Considering the sports center consume much nonrenewable energy, this study focuses on environmentally friendly sports centers or green sports centers. More specifically, this paper focus on green buildings and sports center in Malaysia since Malaysia is still far behind in environmental management compared to developed countries. Thus, this paper sought to identify challenges and obstacles the sports center faces in implementing green practices or facilities. The data were collected through combinations of literature reviews related to green sports center, green building in Malaysia, and benefits and challenges faced by the construction industry, specifically the sports center. Results revealed that multiple challenges prevent sports center from adopting environmentally friendly facilities: higher cost to build, psychological obstacles from citizens, apathy and negative attitudes towards eco-friendly products and practices, lack of financial supports, and insufficient experts and human power. This paper suggests that to successfully building a green sports center, these challenges and obstacles need to be resolved. Besides that, this paper also discussed the benefits of the green sports center.

Keywords: Green Building, Sports center, Malaysia, Green practices, Environmental management

An Overview of Malaysian Green Buildings

Nowadays, environmental issues and sustainability are among the biggest challenges faced by society in the world. Sustainability has its origins from the concept of sustainable development as proposed by the World Commission on Environment & Development (WCED) in 1987. It aims to achieve sustainability and balance human welfare between physical development and environmental conservation [1]. According to statistics report 2010-2040 of Malaysian Population Projection (revised) by the

Department of Statistics Malaysia, Malaysia's population is projected to increase to 41.5 million people by 2040, compared to 28.6 million in 2010[2]. As the population grows, more energy will be used in the future as supported by[3] in their study, indicates the human population will cause environmental disturbances.

The terms 'Green Building' and 'Sustainable Development' are defined as determinations to improve the built environment to minimize environmental impact [3]. Green building is also defined by [4] as the result of a design that focuses on increasing efficiency in the use of resources, water, and materials, while at the same time reducing the impact of buildings on human health and the environment. Meanwhile, sustainability is defined as a holistic approach to protecting the environment by combining design practices and materials that use the most energy-efficient[5]. In other words, green buildings are designed to reduce the overall impact of the construction environment on human health and the natural environment by using energy, water, and other resources more efficiently, reduce waste, pollution and reduce environmental damage [6].

In general, changes to the concept of green buildings have indirectly changed the construction sector's landscape. To ensure the concept of environmental stability for tomorrow can be realized, the construction industry is introduced with green practices to maintain environmentally friendly construction buildings and care for consumers who are concerned about the environment. However, in Malaysia, environmental management in construction still receives opposition from organizations that consider it costly and challenging to implement. However, in collaboration with the private sector and the Construction Industry Development Board Malaysia (CIDB), various initiatives and methods have been studied to meet the demands of the local construction market in order to raise standards and to be on par with developed countries, which are tested and adopted with the latest management tools and advanced valuation methods, it is thus to ensure the sustainability of this industry is in line with the changes we want to achieve. However, Malaysia is still lagging behind in developing green buildings compared with other Asian countries such as Australia, Japan, and Singapore. Malaysia has begun to apply the concept of green buildings with energy-efficient buildings such as the Securities Commission Building, the office of the Malaysia Energy Center (ZEO) in Bandar Baru Bangi, and Low Energy Office (LEO) in Ministry of Energy, Water and Communications. Currently, the first green-certified building in the country, which is in progress, is the construction of Tower G, Kuala Lumpur. As for the sports center, the Penang State Sports Center was awarded an environmentally friendly sports center in 2017.

A building is considered to have implemented a green building concept when it successfully went through an evaluation process to obtain green building certification. The criteria for evaluation used are the Rating System (Rating System). A rating system is a tool that contains the evaluated aspect elements called ratings, and each rating element has a point value. When a building that is ready and can be occupied performs the rating element, then it will get value from the rating. If the sum of all points collected by the rated building reaches a specified amount, the building can be certified at a specific green building certification level. The Rating System is designed and developed by the Green Building Council from different countries, which monitors the practices of registered green buildings. Each country has its rating system. For example, the USA has a LEED Rating (Leadership Efficiency Environmental Design), Malaysia has a Green Building Index, Singapore has GreenMark, and Australia has GreenStar [7].

In Malaysia, the existing rating system is the Green Building Index (GBI), GBI has been drafted by the Association of Architects Malaysia (PAM) and The Association of Consulting Engineers Malaysia (ACEM), which aims to rate buildings that are built sustainably. The following are the characteristics of a building that is recognized as a green building:

a. Buildings that have high energy efficiency (energy efficient) - can be achieved through solar energy or renewable energy, home office connectivity, and the building must have a sustainable maintenance system.

b. Indoor air quality - considering the air quality, lighting, visuals, and acoustic comfort in the building. Sustainable site planning and management, which among others, included the stormwater management system.

c. Sources of material use - considering the types of materials used, which encourage the use of recycled materials and how construction implements construction waste management;

d. Efficient water use - promoting rainwater (rainwater harvesting), the reuse of water (water recycling) in building systems and water use in landscaping work, and others.

e. Innovation in design and environmentally friendly initiatives that are used in the design of buildings.

Figure 2.1 shows the key features that GBI has set to achieve sustainable building levels.

Figure 2.1: Characteristics of Green Buildings

Sports and Environment

Sports centers and stadiums are among the buildings that use much nonrenewable energy, making it a big challenge for those responsible for overcoming it and investing in environmentally friendly facilities [8]. Recent articles in urban planning and sports management have identified that the increasingly popular option to equip new sports facilities is to include environmentally sensitive features. They believe the facility will be more effective in the long run[9].

Nowadays, the sports industry is already aware of its impact on the natural environment, and they have come up with strategies to address this problem. This concern has triggered two environmental initiatives by the industry, namely reducing the ecological footprint and using sports as a tool to increase audience awareness of the importance of caring for the environment [9]. Sports arenas, or stadiums that use much nonrenewable energy, are a challenge trying to be addressed by investing in an environmentally friendly sports facility. Recognition of the importance of the relationship between sports and the natural environment began from the 1994 Winter Olympics in Lillehammer, Norway. For the first time, the ground's negative impact was addressed by carefully planning facilities' construction[10]. The organizing committee embarked on more than 20 continuity projects to ensure that the world's largest sporting event is environmentally friendly [10]. The 1994 Olympic Games had a long-term impact and was widely regarded as the first Green Games. Since then, the sports

industry has been committed to taking action and developing strategies to reduce the environmental impact of sports facilities. This concern for the sustainable management of sports has sparked two types of environmental initiatives to reduce sports' ecological footprint and to use sports to raise ecological awareness.

Meanwhile, from an academic perspective, articles and research results related to sports and the environment continue to grow over the past 15 years. [11] became the first individual to study the relationship between sports and the environment. [12] have concluded that sports have become increasingly sensitive to the ground. However, there are still concerns about the negative environmental impact of sports activities such as habitat destruction in sports facilities construction and fuel consumption in motorsports. Significant growth in facility construction is the formation of Leadership in Energy and Environmental Design (LEED), founded by the US Green Building Council. This recognized brand provides a framework for implementing green design. The results of a study of 16 major North American sports facilities concluded that sports facilities managers had to deal with environmental sustainability [13]. Many facilities have implemented formal and informal ecological systems to address this new focus, with most ecological performance advances revolving around electricity savings and recycling.

In this country, Penang Sports Center, located in Relau, is the first recognized green sports center in Malaysia. The sports center, which has an Olympic-sized swimming pool, ten badminton courts, and two gymnasiums, has been built according to the Green Building Index (GBI) Malaysia specifications. This two-story building has cost RM21.4 million and was made based on the state government's vision of a cleaner, greener, healthier and safer Penang. Apart from the Olympic-sized swimming pool, badminton court, and gymnasium, the building also features a sports shop and a cafeteria. Meanwhile, there are also 96 parking spaces and 35 bicycle parking spaces to encourage cycling to the sports center.

The main structure of this building is designed using a recyclable steel frame with insulated metal upholstery. Meanwhile, the main roof structure is built from recycled lightweight steel sheets that are recyclable and coated with a light cream color to minimize heat absorption. Besides, roof insulation consists of rock wool as thick as 100 millimeters 40 kilograms per cubic meter (kg/m^3) and one layer of hot reflective foil. The building's lining is designed to minimize the increase in heat caused by the heat from the sun entering the building.

The complex has a pronounced north-south orientation for all openings and windows, and its design has been meticulous in reducing the ratio of glass to solid spandrel to reduce heat through the glass. Also, rainwater harvesting tanks located on the canopy-shaped roof are stored in the ground's parking area. This rainwater is collected in the roof drainage channel and channeled to the rainwater harvesting tank, filtered and reused to irrigate the landscape and rinse the toilet. Meanwhile, all plumbing fixtures and sanitary ware have been equipped with water-saving and reduction valves.

Apart from that, this sports center's building materials are also environmentally friendly such as low-volatile organic compound (VOC) paint and recycled. Environmentally friendly materials are used in all the indoor and outdoor spaces of this building. The project also features other green approaches and elements such as charger parking for electric vehicles, solar tubes, bicycle lanes, accessible community facilities, extensive daytime natural lighting strategies, material selection, energy efficiency approaches, ventilation natural, indoor air quality, and others. A large number of building materials and products for this sports center are also extracted from and made in the country to support the country's natural resources and reduce the environmental impact due to the transportation of these building materials and products.

Benefits of Green Sports Center

Although sports centers and stadiums are stated to consume massive amounts of construction materials, nonrenewable energy, and water, this building's unique infrastructure of this building aids the sports team and fans provide opportunities for adopting the concept of sustainability and environmental. In general, the benefits gained from the implementation of green sports center are: (a) Sports center could reduce energy consumption, at the same time reduce the energy cost by changing to environmental lighting and air-conditioner systems; b2) Eco-friendly food production management and the food donations could reduce food waste and help the local community; (c) Recovery through the use of recycled materials and reuse during the match can reduce the amount of waste disposal; and (s) Constructions material can also contain recycled materials. These activities could reduce the adverse effects of sports on the environment. Other benefits of adopting green sports center are:

Improve the quality of the environment

The sports center's effort to meet specific environmental standards will encourage smart site selection, water and energy use more efficiently, usage of local, recycled materials and resources, smart indoor environmental quality, and overall innovative design[14]. Simultaneously, working towards receiving this certification will also require sports center to overcome adverse environmental effects and work with their partners to develop better recycling procedures. Besides, installing stormwater recycling systems, allowing facilities, specifically those with grass, to capture stormwater and recycle it, could also reduce the highwater consumption in a green sports center. Finally, by implementing the green design, the bathroom will be equipped with low-flow toilets, hand dryers, and sinks that automatically stop water flow when not in use. All these efforts will reduce the demand for natural resources and then improve the quality of the environment.

Infrastructure Improvements

By upgrading sports facilities to more environmental-friendly is also claimed to improve a city's infrastructure in ways that conventional sports center can't offer [14]. It is stated that green sports facilities can improve the condition of the sidewalks surrounding the facilities by laying previous, recycled rubber asphalt; reduce the demand on existing sewer pipes by increasing green areas and developing stormwater storage and recycling systems; control traffic by encouraging public transportation; and improve air quality through reduction of carbon dioxide emissions [15].

Create new job opportunities

Building green sports centers could also create job opportunities related to green jobs, encouraging regional and local growth[16]. When there are green construction projects, the green industry's demand will also increase through an increase of awareness, thus creating more job and services specialization that can be traded with other countries or regions.

Tax reduction and revenue increases

The implementation of green technologies can create tax incentives and a deduction for a sports center. Although green technologies are expensive, it is proven that these green facilities could improve the city's infrastructure, create new job opportunities, and shows the local community that they are concern with the

environment and the local community, thus increase the attendance of the local community to the sports center which then could increase revenues.

Long-term cost savings to a sports center

According to [17], the energy-efficient buildings can save ten to twenty percent in operating costs, including the cost of electricity, waste disposal and management, water, and building maintenance [17]. These cost savings can also be achieved by existing sports centers that undergo energy-efficiency renovations[18]. They will be experienced at least twenty to thirty percent in energy costs saving after the renovations is complete.

Increase sponsors and fan supports

Pursuing environmental leadership will also show that teams are concerned about their adverse effects on the environment and improve their practices [14]. These efforts will attract sponsors and other corporate partners to become environmentally friendly and provide financial assistance [14]. At the same time, this will also show fans that their team is concerned about its effect on the environment, thus develop an emotional connection with its fans [14].

Challenges and Barriers to Become Green Sports Center

Although previous research had agreed on the benefits of green buildings, there are still some perceptions that green buildings are relatively difficult to manage and maintain existing buildings, including the sports center. Policymakers, business owners, and the local community may face challenges when attempting to implement pro-environmental or green strategies since it is considered a new concept. As a new concept, contractors and developers may also face difficulties, especially in the financial aspect. The cost to build the green building is 30 percent higher compared to building four conventional buildings. The best solution to overcome this obstacle or challenge needs to be further explored to encourage green building development[19]. [20] also stated that the first issue that always worries about green building development is the higher cost compared to a conventional building.

Similarly, [21] also emphasized that green building will create an extra cost. The differences between the cost of these two buildings are associate with the use of green technology and elements, which has a significant impact on the cost. Due to the lack of eco-friendly technologies and products in Malaysia, the contractors and developers need to import it from other countries, which creates extra cost and more expensive.

Besides that, psychological obstacles may also occur from the suspicion of citizens in their government and decision-makers and the citizens themselves lack of attachment to the natural environment[22]. Meanwhile, for government and policymakers, apathetic and negative attitudes toward eco-friendly initiatives' effectiveness are among the most significant challenges they have to overcome. According to [23], feelings of apathy and despair exist when individuals feel that their actions will not positively impact the environment. This feeling is more evident by small communities where its people think that their green environmental efforts will not be successful due to their small number and the massive emission of carbon dioxide by developed and developing countries[24]. Thus, local communities may be less interested in supporting this pro-environmental strategy or concept of sustainability if they think that large-scale problems such as climate change are unlikely to be solved by small-town initiatives. Finally, from an organizational perspective, certain internal obstacles can also hinder an organization’s ability to implement eco-friendly practices or green practices. These may include lack of financial resources, low levels of

employee engagement, the absence of green experts in the organization, lack of leadership skills, and lack of time to implement the green practices [25-27]

Conclusion

Environmental issues are among the problems that are given significant emphasis in Malaysia recently. This is because the construction effects that have been done extensively lately cause natural resources such as forests have been extensively explored. If not controlled, this activity can cause serious environmental problems where ecosystem disruption will occur. Therefore, this issue, if not handled wisely, will make the situation worse in the future. This will hamper our country's efforts towards a developed country that is advanced in all aspects, including environmental management aspects. In general, Malaysia is still far behind in environmental management than developed countries, although various efforts and awareness campaigns have been made to ensure the environment is maintained. Thus, this study had identified various challenges and obstacles to implementing green buildings face by the sports center. It is suggested that future research could identify ways to overcome these challenges and obstacles.

Acknowledgments

The authors wish to thank the Centre for Testing, Measurement and Appraisal (CeTMA), Universiti Utara Malaysia (UUM) for funding and supporting this research under Geran Penyelidikan Pembangunan dan Ekosistem (DEcoR) with S/O code 14571.

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