A Review of the Lighting Performance in Buildings through Energy Efficiency

Syahrul Nizam Kamaruzzaman, and Nursyahida Zulkifli

***Abstract*—** As developing countries including Malaysia, are now moving towards sustainable development is in line with the Ninth Malaysia Plan, 9th MP, the development should be built to meet current and future needs for achieving sustainability of economic development, social and environmental responsibility for the prosperity without compromising the future generations' needs. Over the past five years, there has been a move away from constructing new buildings to refurbishing older and historic ones. Thus, the purpose of this paper is to review and evaluate the approach for the refurbishment of lighting as well as the existing energy efficiency policy and measures in Malaysian historical building for the energy efficiency improvement in the future. The paper takes the form of a review of literature. The main sources of this literature research are based on the articles, journals, and internet search. This study perhaps can add to the breadth of knowledge of lighting performance in the historical building from the perspective of energy efficiency. This study offers new and valuable insights to Malaysia in achieving optimum energy efficiency, saving in financial as well as reducing environmental impact.

***Keywords*—** historical building, energy efficiency, lighting performance, building regulation. Uniform Building by-Law (UBBL), Malaysia

I. Introduction

PATTERNS of energy consumption vary between different industries, buildings and sites. It is because the duration and nature of the period of occupation will affect the energy consumption. Usually, a building that is experienced high usage led to high energy consumption. The energy efficiency measures should be carried out in order to improve overall energy efficiency performance of the buildings. It should be noted that energy saving is not only about cost reduction or concern about the environmental issues or economic growth but also increase the competitiveness for the industry [1] [2].

Electricity is used for running the plant, lighting and other equipment in the building. Lighting consumption depends on the purpose of the building, use of daylight, illumination levels for certain areas and the hours of usage [3].

It means that the energy consumed in the buildings mainly related to cooling, heating and lighting. In Malaysia climate, the air conditioning and lighting are the major energy consumers in the buildings.

Syahrulnizam, Kamaruzzaman is with the Faculty of Built Environment, University of Malaya, 50603, Kuala Lumpur, MALAYSIA (corresponding author's phone:+60379676833; email:syahrulnizam2013@yahoo.com).

Nursyahida, Zulkifli, is with Building Performance and Diagnostic, Centre for Construction Building and Urban Studies (CEBUS), University of Malaya, 50603, Kuala Lumpur, MALAYSIA(e-mail: syahidazulkifli@gmail.com).

Hence, it will incur very high costs if the energy is not managed properly.

The buildings, both residential and commercial, have contributed between 20% and 40% towards energy consumption for developed countries and exceeded the other major sectors: industrial and transportation. The increased of the energy consumptions are due to the population growth, increasing demand for building services and comfort levels, together with the rise in time spent inside buildings, assure the upward trend in energy demand will continue in the future [4]. Moreover, the lighting is one of the potential area to improve the energy saving in the buildings [5].

In fact, the energy use in buildings is reflected by energy consumption in the residential and commercial sectors [4]. For these reasons, energy efficiency in buildings is today a prime objective for energy policy at regional, national and international levels. Thus, this paper presents evaluation of the lighting performance of Malaysian historic building through energy efficiency refurbishment.

II. Historical Buildings in Malaysia

Heritage buildings or historic buildings are also known as old buildings. According to Malaysian practice, Salleh and Ahmad [6] categorized that buildings with the age of 50-year or more could be called as historic buildings. The historic buildings are important assets of a nation's cultural resources. In hot and humid countries, the all year round regime of heavy rains and hot temperatures contributes to the inconsistent fluctuations of indoor climate and it does eventually create changes on the systems used on historic buildings.

The heritage buildings basically represent the most visible aspect of our past history and culture. Like other countries in the world, Malaysia also has a rich legacy of heritage buildings with great craftsmanship and architecture quality. Kamal, Wahab, and Ahmad [7] found that around 39,000 of historic buildings built between 1800 and 1948 throughout the country so-called 'pre-war buildings'. However, there are 20,787 of the 'pre-war urban buildings throughout Malaysia. The highest numbers of historical buildings are in Penang, follow by Perak, Johor, Malacca, Kuala Lumpur and other state.

The heritage buildings have certain characteristics that are remarkable and unique. The older buildings or historic buildings were influenced by the British architecture since Malaysia was under the British rule for many years. For instance, the British historic buildings can be classified into several architectural styles consisting Moorish, Tudor, Neo-Classical and Neo-Gothic [8]. These buildings are forms of impressive historic features and heritage of the past work of

man. Therefore, it is important to conserve and preserve heritage buildings because these buildings provide a sense of identity and continuity in the fast changing world for the future generations [9]. Moreover, Yaacob [10] found that many buildings in Malaysia are under used or wrongly used by the occupants thus encourage these buildings to be dilapidated. The lack of maintenance and attention from the responsible parties and together with the social problems among the society can lead to the vandalism and abuse that increased the rate of wear and tear of buildings.

Most of Malaysia's historic buildings have been demolished in 1970s and large scale of urban development nowadays continues threaten the pre-war buildings and also deteriorating due to age, neglect and higher maintenance costs [7]. In fact, the heritage building conservation in Malaysia is still considered as new and infant [7] [10]. There are various authors or scholars defined heritage building conservation in many ways based on their scope of study and focuses. The conservation refers to the activities to maintain the character of the heritage buildings that include the work of preservation, restoration, reconstruction and adaption.

According to Harun [11], the conservation is a technical activity towards the historical buildings that involved physical action to preseve the fabric and material of the heritage buildings. It means that the conservation is a process the prevent decay and to prolong the life of the heritage buildings. This argument is in line with Bernard [12] mentioned that the conservation is the action taken to prevent decay and it embraces all actions in order to prolong the life of the cultural and national heritage for benefit of the future generations. The definition of the conservation is quiet easy to understand but the conservation is always known as renovation in real life. The wrong perception and misunderstanding on conservation leads to the no changes on the public attitude towards the local building conservation.

III. Energy Use and Energy Efficiency Performance in Building

Energy is a key component in Malaysia's economy, as the development and utilisation of energy resources have contributed, and will continue to the industrialisation of the economy, the socio-economic welfare of the people and exports earnings. The development of the energy efficiency policy of residential and commercial sectors at the national level is the result of increasing energy demand in these sectors. Hence, it is important to indicate the existing energy use and overall energy efficiency performance in the buildings.

A. Building and Energy Use

The Director General of the Ministry of Energy, Telecommunication and Post, Malaysia, stated that energy demand was growing faster than the nation's GDP. Then, the Deputy Minister of Energy, Telecommunication and Posts, Malaysia, announced that the country needed an additional 1000 MW of energy per year, and by the year 2005 the energy requirements would be 16300 MW. Expansion in the manufacturing and transport sectors increased the final consumption of commercial energy, which grew at an average annual rate of 4.7 per cent, from 29,699 ktoe in 2000 to 38,284 ktoe in 2005 [13]. The transport sector was the largest energy consumer, utilizing 40.6 percent of the total final commercial energy demand in 2000, followed by the industrial sector at 38.4 per cent and the residential and commercial sector at 13 per cent.

In the residential sector, the energy used for air conditioning, refrigeration and lighting is 8%, 26% and 25% of the total energy consumption, respectively. Meanwhile, air conditioning and lighting are the major energy consuming operations in the commercial sector with 38-52% and 18-52% of the total consumption respectively [13]. This means that shopping complexes and offices, including converted historical buildings, consume more energy for lighting and air conditioning than any other type of building.

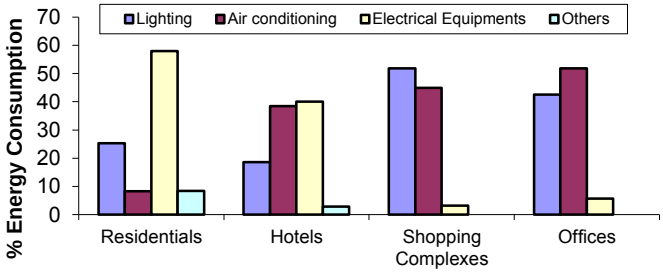

Fig. 1 Breakdown of energy consumption in the building sector (%)

IV. Evaluation Of Existing Building Regulation In Malaysia

To date, there are no regulations or by-laws that govern the use of energy in the building sector. However, in 1989, the Ministry of Energy, Communications, and Multimedia Malaysia (MECM) formerly known as the Ministry of Energy, Telecommunications and Posts (METP), produced Malaysian Guidelines for Energy Efficiency in Buildings. It is not mandatory for builders to adopt the measures in the guidelines. These guidelines were based upon the Singapore guidelines, which in turn were based on ASHRAE 75 standards [14] [15]. The guidelines set out minimum standards in the following areas: minimization losses in electrical power and distribution equipment; design of energy efficient lighting system; design of an efficient air conditioning system; design criteria of the building envelope; and design of a good energy management system.

A. Malaysia uniform building by-laws (UBBL)

The Malaysia Uniform Building By-Laws (UBBL) were produced in 1984 and cover the following areas; submission of plans for approval procedures; space, light and ventilation; temporary works in the building operation; structural requirements and fire prevention requirements. This document is 15 years old and the Department of Electricity and Gas Supply (JBEG), which is under the purview of METP, is planning to include energy efficiency requirements and renewable energy applications in buildings in the UBBL. The department is currently preparing a proposal to the METP to use the Malaysian Guidelines for Energy Efficiency in Building as a reference document. It is worth observing that a

lot of information and research is required regarding all aspects of energy efficiency, and that the use of daylight in buildings to reduce energy consumption for interior lighting is of paramount importance.

B. Energy efficiency regulations

Over numerous years, Malaysia has embarked on many initiatives to respond to the energy challenge. Rahman and Lee [16] stated that Malaysian government has implemented the energy efficiency program for the sustainable economic development. The energy efficiency covers the efficiency of power generation, transmission and distribution of electricity and various end-uses of energy.

In Tenth Malaysian Plan (10^{th} MP), the government also focuses in promoting the energy efficiency to encourage the productive use of energy. The energy efficiency measures will be intensified to harness energy savings potential and reduce Malaysia's carbon emissions and dependence on fossil fuels. Intrinsic barriers to energy efficiency that pose challenges in capturing this opportunity will also be addressed. The National Energy Efficiency Master Plan, 2010 will be a holistic implementation roadmap to drive efficiency measures across sectors with a target to achieve cumulative energy savings of 4,000 kilo tonnes [17].

There are several of initiatives to drive energy efficiency efforts across the sectors such as residential, township, industrial, and building [17].The Energy Efficiency Regulations have yet to be enacted, but efforts to prove that energy efficiency can be achieved cost-effectively are ongoing. This is to convince the public and users who will be affected by the Energy Efficiency Regulations that energy efficiency does not impose a cost penalty on energy users. In fact, it creates wealth over the medium to long-term, through the reduced energy costs of daily business. The Government of Malaysia is committed to the promotion of energy efficiency and renewable energy for a cleaner environment for future generations [18].

V. LIGHTING ENERGY EFFICIENCY

Lighting is a substantial energy consumer and a major component of the services cost. Nevertheless, the use of electricity for lighting is generally inefficient. Consequently, there is potential to improve the energy efficiency of lighting systems throughout the world. The energy consumed by a lighting installation depends upon the power consumption of the luminaries and the length of time for which they are switched on [19]. A reduction on either of this will reduce the energy consumption. There is considerable potential for energy and cost savings in existing buildings, with many examples of savings in the range of 30%-50% having been achieved [20]. Even though lighting is not the largest energy consumption, reduction in lighting would leads to reducing of cooling load as well as global warming and greenhouse effect. With abundant of sunlight, it is an advantage for Malaysia to achieve sufficient illumination for substantial periods in buildings, avoiding the need to use electric lighting in which of course would have significant on energy consumption. Therefore, there is every need to try to limit and if appropriate reduce the amount of energy used by lighting in buildings.

A very energy efficient lighting system will not be a good advertisement for energy saving if people do not like it. On the other hand, an increasing level of environmental awareness in society may result in people disliking energy wasteful systems. A compromising approach would need to be adopted, which balance the needs of energy efficiency and aesthetics.

A. Energy Efficiency Techniques

Lighting is an important issue as it directly affects the wellbeing, productivity and satisfaction of the occupants. It is also a major consumer of energy and can generate high maintenance and running costs. The use of artificial lighting not only consumes energy but dissipates waste heat into the building space, which contributes to heating or cooling (as in the case of Malaysia) load. However, the effective use of daylight can drastically reduce heating, cooling and lighting energy required to condition buildings. Annual operating costs and equipment cost can also be reduced.

1. Daylight

Bodart and De Herde [21] discussed the evaluation of lighting energy savings on global energy consumption in office buildings through an integrated approach combining the daylighting and the thermal aspects. Their results suggest that the potential of energy savings by integrating the daylighting availability in the electric lighting management is high. Furthermore, it is found that daylighting can reduce artificial lighting consumption from 50% to 80. On field study measurements**,** Galasiu, et al. [22] showed that under clear sky and without blinds both lighting control systems reduced the lighting energy consumption on average by 50–60% when compared to lights fully on from 6 AM to 6 PM. These savings, however, dropped by 5–45% for the dimming system, and by 5–80% for the automatic on/off system with the introduction of various static window blind configurations.

However, energy is not saved by daylighting; energy is saved by dimming down or switching off electric lights that are not needed because of daylight. Daylighting often reduces air conditioning energy requirements as well because the internal cooling load from the lights is reduced. This additional cooling load savings benefits buildings with large cooling loads as long as the daylighting apertures have proper sun control to avoid excessive solar heat gain [23].

Many new energy-efficient electric lighting technologies, such as rare-earth fluorescent lamps, high-frequency electronic ballasts, or occupancy sensors, have significantly reduced lighting power requirements. The daylighting can lower electricity demand charges, which can be more expensive that the energy usage cost. Modern building energy management control systems can dim lights to shave peak demand or in response to load shortage signals from the electric utility. Peak load reductions realized through daylighting reduce demand for power when supplies are often met by less environmentally friendly power sources.

Daylight allows people to continue working on some tasks during power outages. This argument for using daylighting is becoming less convincing as offices and businesses increasingly rely on electricity for running computers, copiers, and other office equipment. Nonetheless, if daylighting can remove electric lighting from back-up generators, more power

will be available during power interruptions for critical business machines.

Several daylight evaluation tools are used in building design, including design guides, manual and computer calculation and visual simulation programs, and scale and full-scale models or mockups. These tools can:

(1) Determine the illuminance levels from daylight at specified points for specified sky conditions.

(2) Predict annual daylight energy savings under alternative control strategies.

(3) Analyze light distribution within the space. In some cases, high luminance ratios may be desired for dramatic effects or for establishing architectural hierarchies; in others, more uniform lighting may be the objective.

(4) Predict the location and time of direct sun within a space. These sun/shade studies are useful in evaluating shading devices and planning for visual and thermal comfort and for the preservation of art and materials.

(5) Aesthetically evaluating the interaction of light and the proposed space. Designers use representation to formulate their strategies and to communicate their design intentions to clients.

2. Occupants Perception

Several surveys have documented that people believe that daylight is superior to electric light in its effects on people. The assessment of the occupants' opinion of the building internal environment can be obtained through their responses to the questions asked in the questionnaire. With a increasing awareness of the role of the indoor environment on occupants' productivity and efficiency, there is increased interest in obtaining feedback from occupants and this is often obtained by using a questionnaire [24][24][26]. Besides, Kamaruzzaman et al. [8] mentioned that the outcomes from the questionnaire should assist in identifying particular aspects of the environment that require adjustment and improvement, and aim to provide a better internal environment for the occupants. Cuttle [27] conducted a survey via personally administered questionnaires in England and New Zealand to investigate the perceived attributes of windows. Heerwagen and Heerwagen [28] surveyed occupants of an office building in Seattle, USA, in winter and summer.

B. Lighting Simulation

Building simulation aims to imitate the real physical conditions in a building by creating a mathematical model that (ideally) represents all energy flow paths in a building as well as their interactions. Advances in simulation techniques and computing facilities have led to the development of very advanced building simulation tools.

Hensen and Hand [29] discussed about a gap between sophisticated simulation tools and building design professionals. The performance of the simulation does not depend on sophisticated simulation tools alone but also the user understanding the whole simulation. Hong et al. [30] discussed the state-of-art on the development and application of computer-aided building energy simulation by addressing some crucial questions in the field. MacDonald et al. [31] in his paper discussed the uncertainty in building thermal simulation. The proposed of approaches of analysing the uncertainties, using statistical techniques and error analysis of the fundamental equations methods. Pedrini et al. [32] described a methodology for building energy modelling and calibration in Brazil. The approach included simulation from building design plans and documentation, walk-through and audit, and end-use energy measurements.

VI. Method

This study is only limited to the four historical buildings in Malaysia focusing on British Colonial ones. These buildings have been refurbished and this is presumably being done without considering energy efficiency, especially with respect to lighting. Most of these buildings are owned by the government and the cost of maintaining these buildings is high.

There are several approaches used in collecting the information for this study through various sources such as printed materials and electronic media. The questionnaire survey is used in order to assess the occupant's perceptions of their indoor environment. This questionnaire deals with general occupant details and aspects of the internal environment, as well as occupant comfort level in the buildings while interview with person responsible for lighting in the building are facilitating the empirical study by providing additional information related to the study.

VII. Conclusion

As conclusion, the strategies to measures effective energy savings for the Malaysian historic buildings are essential for the lighting energy efficiency. This study establishes a systematic approach for the refurbishment of lighting in Malaysian historical buildings to increase the energy efficiency. This study may provide useful information to Malaysia for achieving optimum energy efficiency, savings in monetary terms as well as reducing environmental impact.

Acknowledgment

The authors gratefully acknowledge the financial support of the University of Malaya High Impact Research (HIR), grant no. UM.C/625/1/HIR/ASH/013 established at the University of Malaya, Malaysia.

References

[1] A.M. Bassi, J.S. Yudken, and M. Ruth, "Climate policy impacts on the competitiveness of energy-intensive manufacturing sectors," *Energy Policy*, vol.37, no.8, pp. 3052-3060, 2009.

[2] L. Ozolina and M. Rosˇa, "A review of energy efficiency policy and measures for industries in Latvia," *Management of Environmental Quality: An International Journal*, vol.23, no.5,pp. 517-526, 2012. doi:10.1108/14777831211255097

[3] A.R. Musa, N.A.G. Abdullah, A.I. Che-Ani, N.M. Tawil, and M.M. Tahir, "Indoor Environmental Quality for UKM Architecture Studio: An Analysis on Lighting Performance," *Procedia - Social and Behavioral Sciences*, vol.60, pp.318-324, 2012. doi: http://dx.doi.org/10.1016/j.sbspro.2012.09.386

[4] L. Ozolina, & M. Rosˇa, "A review of energy efficiency policy and measures for industries in Latvia," *Management of Environmental Quality: An International Journal*, vol.23, no.5, pp.517-526, 2012. doi:10.1108/14777831211255097

[5] A. Boyano, P. Hernandez, and O. Wolf, "Energy demands and potential savings in European office buildings: Case studies based on EnergyPlus simulations," *Energy and Buildings*, vol.65, pp.19-28, 2013. doi: http://dx.doi.org/10.1016/j.enbuild.2013.05.039

[6] N. H. Salleh, and A. G. Ahmad, "Fire safety management in heritage buildings: the current scenario in Malaysia" in *Proc. 22nd CIPA Symposium*, Kyoto, Japan, 2009.

[7] K. S. Kamal, L. A. Wahab, and A. G. Ahmad,"Pilot survey on the conservation of historical buildings in Malaysia," in *Proc. 2nd. International conference on built environment in developing countries 2008 "sustainable built environment: bridging theory and practice"*, Penang, Malaysia, 2008.

[8] Kamaruzzaman, S. and Edwards, R, "Evaluating Peformance Characteristics of Electricity Use of British Historic Buildings in Malaysia," *Facilities*, vol. *24*, no.3/4, pp.141-152, 2006.

[9] S. A. Mustapa, K. S. Kamal, and M. Z. Zainul, (2005). "Rehabilitation of Heritage Buildings in Malaysia," *in Proc. International Seminar on Modern Urban and Architectural Heritage,* Jakarta, Indonesia, 2005, pp. 126-133.

[10] N. Yaacob, "A study of refurbishment of listed buildings into a new facility", (Unpublished). Universiti Malaysia Pahang, 2010.

[11] S. N. Harun, "Heritage Building Conservation in Malaysia: Experience and Challenges," *Proceedia Engineering*, vol.20, pp.41-53, 2011.

[12] M. Bernard, Conservation of Historical Building: Introduction to Architectural Conservation. Great Britain: St. Edmundsbury Press Ltd., 2003.

[13] MEIH. (2011). Statistics: Malaysia Energy Information Hub. Retrieved 2 January 2013, 2013, from http://meih.st.gov.my/statistics;jsessionid=F68BE3730C50F0709BD8B651F0070B6C

[14] J. F. Nicole and M. A. Humphreys, "Adaptive thermal comfort and sustainable thermal standards for buildings," *Energy and Buildings*, vol.34, no.6, pp.563-572, 2002. doi: http://dx.doi.org/10.1016/S0378-7788(02)00006-3

[15] M. Taleghani, M. Tenpierik, S. Kurvers, and A. van den Dobbelsteen, "A review into thermal comfort in buildings," *Renewable and Sustainable Energy Reviews*, vol.26, pp.201-215, 2013. doi: http://dx.doi.org/10.1016/j.rser.2013.05.050

[16] A. Rahman Mohamed and K. T. Lee, "Energy for sustainable development in Malaysia: Energy policy and alternative energy," *Energy Policy*, vol.34, no.15, pp.2388-2397, 2006. doi: http://dx.doi.org/10.1016/j.enpol.2005.04.003

[17] Malaysia, *Tenth Malaysia Plan 2011-2015*. Prime Minister's Department, Putrajaya, Malaysia, 2010.

[18] A. L. Moggie, [Press release]. Retrieved from http://www.kettha.gov.my/content/national-seminar-low-energy-office-leo-building, 2001.

[19] CIBSE, *Building energy and environmental modeling, Applications Manual AM11*, London, 1998.

[20] DOE, *Energy Efficient Refurbishment of Public Houses-Lighting*, United Kingdom, 1995.

[21] M. Bodart, and A. De Herde, Global Energy Savings in Offices Buildings by the Use of Daylighting, *Energy and Buildings*, vol. 34, no. 5, pp 421-429, June 2002,

[22] A.D. Galasiu, et al., Impact of window blinds on daylight-linked dimming and automatic on/off lighting controls, *Solar Energy*, vol. 76, no.5, pp 523-544, 2004.

[23] M.S. Rea and D. Maniccia. *Lighting controls: a scoping study*, Rensselaer Polytechnic Institute Lighting Research Center, Troy, NY, 1994.

[24] L. Huang, Y. Zhu, Q. Ouyang, and B. Cao, "A study on the effects of thermal, luminous, and acoustic environments on indoor environmental comfort in offices," *Building and Environment,*vol. 49, pp.304-309, 2012. doi: 10.1016/j.buildenv.2011.07.022

[25] J. Kim, R. de Dear, C. Cândido, H. Zhang and E. Arens, "Gender differences in office occupant perception of indoor environmental quality (IEQ)," *Building and Environment*, vol.70, pp.245-256, 2013. doi: 10.1016/j.buildenv.2013.08.022

[26] G. J. Levermore, D. Lowe and J. Ure, "Occupant Feedback Questionnaire Producing a Fingerprint and a Score," *ASHRAE*, 1999 .

[27] C. Cuttle, "People and windows in workplaces," in *Proc. of the People and Physical Environment Research Conference*, New Zealand, 1983, pp. 203–212.

[28] J. Heerwagen and G. Orians, Adaptations to windowlessness: a study of the use of visual décor in windowed and windowless offices, *Environment and Behavior*, vol.18, no.5, pp. 623–639, 1986.

[29] J.L.M. Hensen, and J.W. Hand, *Use of sophisticated building energy simulation tools*, in *3rd European Conference on Architecture "Solar energy in architecture and urban planning,"* Florence, 1993.

[30] T. Hong, S.K. Chou, and T.Y. Bong, "Building simulation: an overview of developments and information sources," *Journal of Building and Environment*, vol.35, p. 347-361, 2000.

[31] A.I. MacDonald, J.A. Clarke, and P.A. Strachan, "Assessing Uncertainty in Building Simulation," in *Proceedings of Building Simulation '99*, vol. 2, pp.683-690, 1999.

[32] A. Pedrini, F.S. Westphal, and R. Lamberts, "A methodology for building energy modelling and calibration in warm climates," *Building and Environment*, vol. 37, no.8-9, p. 903-912, 2002.

Syahrul Nizam Kamaruzzaman (Associate Professor Dr. Sr.) was born in Klang, Selangor and married to a wonderful wife blessed with three children, Amierul Danish, Sarah Nuha and Ahmad Darwish. Syahrul starts his engineering career when completing a Certificate in Building Services Engineering from Polytechnic Jitra, Kedah (POLIMAS) in 1994. Due to high enthusiasm and encouragement for continuing studies, Syahrul have been offered a place at University Science of Malaysia entering BSc. (Hons) Housing, Building & Planning course majoring in Building Technology in 1997. Looking at opportunities and support given by the university, he has continued his studies to the Masters level on Building Technology soon after graduating his first degree in 2000. He has avery great emphasize and interest on research field, Syahrul left his working environment and sailed for United Kingdom to undergo a research on buildings. Syahrul Nizam enrol as a PhD student at UMIST which is now University of Manchester in 2003 and later graduated in 2006 in the field of Building Refurbishment. During his studies, he has actively involved in sports, social activities as well as research arena serving as Housing Bureau, Vice President of Malaysian Research Group, UK to name a few.

Pursuing his career as academia, Dr. Syahrul Nizam joint University of Malaya on the 27th December 2007 and currently attached to the Building Surveying Department, Faculty of Built Environment as a Senior Lecturer. His research interest is in Building Technology, Construction Engineering, Energy Efficiency in Buildings and Facilities Management. Dr. Syahrul is a certified Building Surveyor and also a registered member of the Institution of Surveyors Malaysia (MISM). He is the executive editor of the Journal of Surveying, Construction and Property, editorial board for Journal of Facilities Management, UK (Emerald) and member of the editorial board for several international and local journals. Dr. Syahrul currently holds several publications in ISI (WoS) as well as in reputable international and national journal.