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**Public-Private Partnerships and Sustainable Development Goals:
A case study of IIUM**

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Abstract

A community with an ageing infrastructure while struggling with maintenance due to limited allocation is becoming more common. This study discusses the International Islamic University Malaysia (IIUM) campus community's initiatives to overcome these challenges through Public-Private Partnerships. Instead of relying solely on the government's budget, IIUM and a private company embarked on a journey to achieve a landmark effort to become energy efficient and consciously create a better environment. Simultaneously, IIUM gets to reduce its carbon footprint, which further strengthens the attainment of its Strategic Direction of Humanizing Education and the Sustainable Development Goals.

Keywords: Public-Private Partnerships; SDG; aging infrastructure; community

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1.0 Introduction

Lack of allocation to maintain or replace ageing and inefficient infrastructure is becoming more common nowadays as the localities or communities have to prioritise their many needs that may affect the well-being of their population. Like these communities and towns, many university campuses are experiencing the same problem as some depend on government agencies, for instance, for their finance, and any reduction in their operational allocation may affect their core teaching and learning activities significantly.

This paper shares the experience of the energy-efficient initiative undertaken by the International Islamic University Malaysia (IIUM) for its Gombak Campus. The initiative resolved the requirement of replacing inefficient and ageing infrastructure systems on campus

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while simultaneously allowing the university to enjoy savings from lower utility bills contributed by the newly installed efficient facilities. More importantly, this approach has no financial implications for IIUM as the project is paid for by itself with zero capital outlay. This was achieved by engaging a company (the Company) specialising in this exercise and considered another example of a successful Public-Private Partnership (PPP). At the same time, IIUM reduces its carbon footprint, further strengthening the realisation of its strategic direction of humanising education, which is aligned with the sustainable development goals (SDG). This paper aims to highlight the success story of a PPP concept and, in this case, how this engagement is closely linked to SDG.

2.0 Literature Review

2.1 Ageing Infrastructure

Any modern communities today are well supported for their daily activities with an infrastructural system such as an electrical network, water supply, and various transportation routes. However, the efficiency of the infrastructure has its limit and may eventually need to be replaced since continuously operating an inefficient system can become unbearable functionally and financially. Problematic infrastructure may also consume energy inefficiently, and this phenomenon can hurt financial operations with a continuous upward trend in energy costs. The issue with underperforming or non-functioning systems is taking place even in the developed parts of the world. Harris (2019) reports that the American Society of Civil Engineers (ASCE) gave the country's infrastructure a dismal grade of D+ in 2017, citing ageing systems, neglected upkeep, and critical systems not meeting public needs or in danger of abrupt failure. Inefficient and unreliable infrastructure may consequently translate to higher service delivery costs, affecting stakeholders and everyone within the community (ASCE, 2016).

Furthermore, Allen et al. (2018) opine that virtually all public drinking water systems in the USA meet regulations and are microbiologically safe. However, the prospect for microbial contamination from decades to century-old water distribution systems is increasing with time. This higher health risk to consumers should be a driving factor in accelerating reinvestment in their ageing water distribution water systems.

Still, on the theme of ageing infrastructure and risk, Little (2012) proposes that excessive age and poor condition were regularly to blame whenever a significant piece of infrastructure failed. This often involves high economic costs or even loss of life. He adds it was pretty normal for requests made for increased expenditures to "restore the infrastructure" after these incidents, but currently, there are no precise algorithms for this purpose, and there is much that can be done to lessen the risk of catastrophic infrastructure failure and the human and economic toll it takes on society.

2.2 Public-Private Partnership (PPP)

PPP is defined by Wang and Ma (2021) as "the public and the private sectors establishing a long-term contractual and cooperative partnership, whilst the public sector transfers the design, finance, building, and operation of the public facilities to the professional sector, in an attempt to achieve optimal long-term objectives." PPP is the best way, as the parties involved can benefit from the partnership provided the agreed terms are thoroughly planned and implemented. Cui et al. (2018) explain that PPP is adopted to improve the economic value of infrastructure outputs and incorporates a broad spectrum of public sector infrastructure.

Meanwhile, Jomo et al. (2016) reiterated that PPP dates back thousands of years when the Roman Empire had concessions that served as legal instruments for road construction, public baths, and the running of markets. Those early periods witnessed the concessionaire exclusively operating, maintaining, and implementing infrastructure development or providing services of general economic interest. Recently, there have been many excellent PPP implementations, with Suhaiza Ismail and Fatimah Azzahra Harris (2014) suggesting that understanding the perceptions of both sectors is essential as successful PPP execution requires commitment from the contracting parties, while Maltin (2019) agrees that each party must be as steadfast to achieving the others' goals as they are to their own goals.

The government agency entrusted with overseeing PPP projects in Malaysia is Unit Kerjasama Awam Swasta (Public Private Partnership Unit) or UKAS which defined PPP as "...a form of cooperation between the public and private sector whereby a stand-alone business is created, funded and managed by the private sector as a package that encompasses construction management, maintenance, and repair works as well as replacement of public amenities comprising buildings, infrastructures, equipment and facilities" (UKAS, n.d.). The practice of PPP in Malaysia has commenced since the 1980s. Suhaiza Ismail and Fatimah Azzahra Harris (2014) advocate that private sector participation in providing public goods and services was made official with the introduction of the Malaysian Incorporated Policy in 1983. This policy encouraged the cooperation or partnership between the public and private sectors to foster the country's economic growth. PPP continued to evolve with introducing the Privatization Master Plan during the Sixth Malaysia Plan in 1991. Subsequently, PPP was officially announced under the Ninth Malaysia Plan in 2006 and introduced by the government as an alternative procurement method emphasising greater private sector involvement in providing public services. PPP in Malaysia has experienced numerous successful projects that have benefitted the public, including the Light Rail Transit, medical facilities, many highways, transport networks, hubs, and terminals.

3.0 IIUM's Energy-Saving Initiative

3.1 Factors Leading to IIUM's Energy-Saving Initiative

IIUM Gombak Campus started its operation in 1996 by commencing classes for the Kulliyyah (Faculty) of Laws for the 1996/1997 academic session. Subsequently, this was followed by the other kulliyyahs, with the Kulliyyah of Information and Communication Technology being the last faculty project to be completed in 2011. In addition to the kulliyyahs, the campus is also provided with academic supporting facilities, including the Library, the Mahallah (hostels), a Masjid, Administration buildings, IIUM Cultural Centre, commercial outlets, and sports and recreational facilities. The Gombak Campus has been designed to accommodate a community of 20,000 students and staff.

After operating for more than 20 years at the Gombak Campus, some facilities have started showing signs of uneconomical characteristics, and spare parts for certain services were scarce or no longer available in the market, while some systems have become obsolete. This calls for higher allocation, with the option of keeping the existing facilities functioning or replacing them altogether if they are not economical. Traditionally, the budget for this purpose comes from the Central Agencies, but these allocations have been drastically reduced as part of the ministry's prudent spending for quite some time. This is further compounded by the approach adopted by Malaysia's Ministry of Higher Education, which had declared that all public universities must start to be financially independent; specifically, these institutions should be able to cover a minimum of 30 per cent of their annual operating expenditures.

Due to these challenges, the university must be innovative to ensure facilities involved in any Teaching and Learning (T&L) activities can continue functioning well to guarantee a good environment and excellent service delivery benefitting the stakeholders. Towards this end, the university adopted the IIUM 2020 Campus Sustainability Roadmap in 2014 by embracing planned energy and water savings, reduced waste, and self-generation of power with on-campus solar energy projects. With the implementation of the Roadmap, IIUM addresses several of the Sustainable Development Goals (SDG), including providing access to reliable energy and improving the world's energy efficiency. The initiative is aligned with SDG by helping create decent working conditions that enable people to have quality jobs that can directly or indirectly further stimulate the economy.

3.2 IIUM and the PPP Approach

Based on the background elaborated above regarding the requirement of ensuring efficient infrastructure in the University and the reduced availability of funding from the Central Agencies for achieving that goal, the management of IIUM elected to use the PPP approach in overcoming the issue. After a series of discussions, on 30th September 2016, IIUM and the Company under their respective leaderships, came together to embark on a journey to achieve a landmark effort to become an energy efficient campus with a conscious determination for a better environment in the future. Based on the agreement, the Company is to provide a better and more efficient infrastructure in the Gombak Campus while IIUM will share the savings from the utility bills enjoyed after the improvement in the system between both contracting parties.

3.3 Mapping of Project with SDG

The implementation of the energy efficient initiative at the IIUM Gombak Campus serves as one of its efforts towards achieving the UN's Sustainable Development Goals mainly SDG No. 7 "Affordable and Clean Energy" which targets at ensuring access to affordable, reliable, sustainable, and modern energy for all.

The energy efficiency project at IIUM also addresses SDG No. 9 which is to build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation, specifically to achieve Target 9.4 "By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities".

During the implementation period, among the methods involved in the energy efficiency project at IIUM Gombak was retrofitting or modifications of the existing equipment to optimise their capabilities, increase the buildings' asset value, solve the building maintenance problems, decrease energy demand, and eventually save money on utility bills. In this regard, Paradis (2016) asserts that energy conservation retrofits using a high-performance building design process will produce a building with less operational cost, increase in value, last longer, and contribute to a better, healthier, more comfortable environment for the building occupants. Furthermore, improving indoor environmental quality by decreasing moisture penetration and reducing mold will result in a better environment for people to work and study.

3.4 Pre-Project Implementation

IIUM's journey towards energy conservation was initiated through the Government's Entry Point Project 9: Energy Efficiency (EPP9) under the Economic Transformation program. Malaysia's Ministry of Energy, Green Technology and Water has invited selected government entities including IIUM to a workshop on EPP9: Government Leading by Example Initiative under New Key Economic Area (NKEA)" organised by Sustainable Energy Development Authority (SEDA) Malaysia as the implementation agency. The workshop, aimed at promoting energy efficiency (EE) programs at 105 Government Buildings as identified by SEDA was held on 20th June 2012 and attended by IIUM's representatives.

In promoting EE in government buildings, the Government has identified Energy Performance Contract (EPC) as an effective mechanism to implement energy-saving measures to promote energy conservation in government buildings by market mechanism-private investments. Under the EPC concept, government buildings are allowed to engage any Energy Saving Companies (ESCOs) to help reduce energy consumption through EE.

Post-workshop, the two main activities for the pre-project implementation were:

Energy audit – the Company conducted a Detailed Investment Grade Audit on Energy Efficiency and Saving Program for the IIUM Gombak Campus. An energy audit is a systematic approach for evaluating the usage of energy consumption of a building and identifying opportunities for energy savings potentials.

Baseline study – through the above energy audit conducted by the Company, the buildings' energy performance was measured to establish a baseline for energy consumption to identify the potential energy savings. In identifying the baseline, the data used were from November 2011 until May 2015 and these include IIUM's electricity bills, monthly electricity usage comprising of average energy consumptions and average maximum demand, and identification of baseline cost per annum at Base TNB Tariff Rate.

3.5 Energy Saving Proposals

Subsequent to the above exercise, the Company presented its audit findings to IIUM on 9th September 2015. The proposal stipulates that a significant amount of savings can be achieved from energy-saving efforts in the following areas of MSB/Transformer, Chiller Plant, Small AC System (2.0 HP and above), and finally the Lighting system. Based on the presentation, IIUM decided to opt for the option involving full chiller replacement with a guaranteed minimum amount of savings and no upfront investment by IIUM (Fig. 1). The full chiller replacement covers 18 out of 20 duty chillers with comprehensive maintenance throughout the contract period of 12 years. Thus, there is an additional saving for comprehensive maintenance and capital investment for new chillers.



Fig. 1: An example of chiller retrofiting under IIUM's energy-saving initiative
(Rustam Khairi Zahari, 2019)

The proposal was presented to the IIUM University Finance Committee (formerly known as the IIUM Standing Finance Committee) on 21st September 2015 and the Committee approved the appointment of the Company to conduct the Energy Efficiency and Saving Programs at the IIUM Gombak Campus.

3.6 Energy Saving Performance Agreement (ESPA)

Following the approval, IIUM and the Company entered into an Energy Saving Performance Agreement (ESPA) on 30th September 2016, covering a Contract duration of 12 years. ESPA is a unique no-cost financing program that helps building owners reduce their carbon footprint and save energy with zero capital outlay. With ESPA, the cost of investment to implement measures for energy efficiency will be provided by the Company, and IIUM as the building owner will pay the Company from the savings in the electricity bills. Fig. 2 and Fig. 3 show the Schematic Representation of the ESPA Model and ESPA Shared Savings Model entered between the Company and IIUM.



Fig. 2: Schematic Representation of the ESPA Model

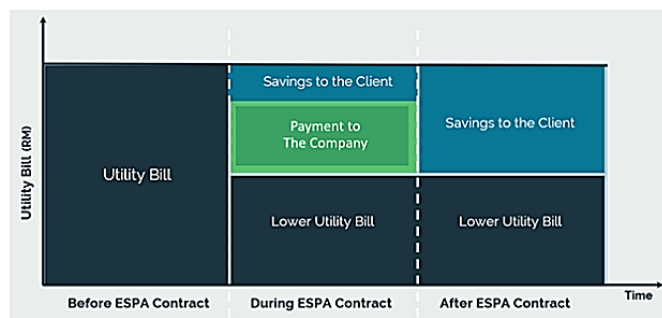


Fig.3: ESPA Shared Savings Model between the Company and IIUM

The savings obtained during the ESPA Contract period will be shared between the Company and IIUM based on the agreed ratio and upon expiry of the ESPA Contract, all the savings will be enjoyed by the IIUM.

4.0 Project Outcomes

The implementation of the energy-saving measures has benefitted IIUM in many ways, with the main impact being the contribution of financial savings to IIUM, the installation of new infrastructure and equipment replacing the old and inefficient ones, as well as the improvement to the environment with the reduction in carbon emissions.

4.1 Electricity Bill Savings and CO2 Emission Reduction

With the completion of the various phases of the project, the University has already started to enjoy the benefits even in the first year of the project implementation. This was evidenced by IIUM's electricity annual bills which were reduced by 23% in 2019, 43% in 2020, and 52% in 2021, respectively against the baseline figures. The biggest savings in the electricity bills came from the usage of the new and efficient chiller plants contributing to about 21 percent of the savings while MSB/Transformer accounted for about nine percent. This aspect of the project will assist the University to be more financially sustainable and prudent in its spending and to realise the directive from the Ministry of Higher Education for all universities to be able to provide about 30 percent of their annual operating allocation.

Another outcome of the IIUM energy savings initiative is total carbon avoidance based on the reduced use of energy as compared to electricity utilisation prior to the project. For 2019, the decrease in power usage resulted in over 11,000 tons of carbon avoidance which is equivalent to planting over 285,000 trees to absorb carbon emissions (see <https://greentechmalaysia.my/carboncalculator/>). The implementation of the IIUM energy savings exercise means that a reduction of over 11,000 tons of carbon is released for generating electricity for 2019 in comparison to IIUM's power usage before the execution of the project. For 2020 and 2021, the project has managed to achieve over 21,000 (535,000 trees) and 26,000 (650,000 trees) tons of carbon avoidance respectively.

4.2 Conducive Teaching and Learning Atmosphere

The execution of this energy savings venture involved the installation of several new infrastructures such as retrofitting chiller plants and adding on new energy management devices that have a hand in not only lessening electricity bills but also creating a more comfortable environment for IIUM's main T&L activities. Few academic facilities have been experiencing a less than favorable atmosphere for quite a duration of time due to frequent break-downs or malfunctioning of the system. The establishment of a better T&L environment has helped the staff in their service delivery and for the students to receive their lessons and other academic/non-academic interactions in a more conducive manner.

4.3 Awareness and Change of Behavior

Nevertheless, the implementation of energy saving into policy formulation and practice among the IIUM community is still deficient. While there are awareness and a good understanding of energy saving within the Islamic perspective, it has not become a habit in their daily working or studying life. A study by Nur Hidayah Abdul Jabar et. al (2015) conclude that this may be due to several factors such as contented lifestyle and lack of enforcement. The authors stated that it is harder to "walk the talk" regarding green energy and sustainable development because there is a mainstream perception that green is expensive and boring. The statement is rather true, as energy-saving practices require people to use pricier LED bulbs and switch off every electrical appliance whenever unused. For certain people, this routine is undeniably a challenging adjustment to make.

In light of the above, another aspect of the energy savings project is the creation of awareness among the IIUM community that they can also play their part in fostering a more sustainable behavior that can be regarded as high-efficiency energy users. These were done through consistent reminders from the university management on the importance of being efficient energy users in meetings or any events. Furthermore, posters and notices on good energy-efficient conducts were placed in strategic locations such as near switches, on notice boards, and in other high-traffic areas. These were also distributed electronically through e-mails from the relevant departments to all staff, students, and other members of the IIUM community while specific campaigns have also been carried out on sustainability lifestyle with energy efficiency being highlighted as one of the conducts that should be embedded in everyone's lifestyle.

4.4 Achievement and Recognition

The success of this PPP project did not go unnoticed when in April 2021 the Ministry of Energy and Natural Resources awarded this project with the Special Award on Energy Performance Contracting for the year 2020 at the National Energy Awards Ceremony. Additionally, IIUM was also awarded a 3-Diamond rating for the 2021 reduction of power consumption while this was further improved with a 4-Diamond rating for 2022 as determined by Malaysia's Sustainable Energy Development Authority (SEDA). These national-level achievements are strong evidence of IIUM's excellent governance and commitment to SDG.

5.0 Conclusion

The energy-efficient initiative undertaken by IIUM Gombak Campus is a step towards sustainability in its operation. The project has managed to accomplish multiple objectives starting with improved infrastructure and services for its core T&L activities while it synchronously gets to appreciate financial savings from lower utility bills contributed by the newly-installed efficient facilities. Using the PPP approach through the involvement of the Company, this initiative requires no financial implications to IIUM as the project paid by itself with zero capital outlay which is very significant with the current financial scenario faced by many communities and organisations including the university. Moreover, the University is currently engaged in more PPP activities with several companies involving projects such as solar renewable energy and water conservation to further enhance IIUM's commitment to sustainable operations and practices. With regards to the project with the Company, IIUM manages to reduce its carbon footprint with the implementation of the energy-saving

initiative while simultaneously strengthening the realisation of its Strategic Direction of Humanizing Education through Sustainable Development Goals.

Paper Contribution to Related Field of Study

This paper could assist similarly affected communities, organisations, and university/college campuses in managing their aging infrastructure; in addition to contributing to the subject of PPP in the built environment disciplines including engineering, architecture, urban planning as well as facility management.

References

- Al-Jayyousi O. R. (2012), *Islam and Sustainable Development: New Worldviews*, Farnham: Gower Publishing Limited, pp. 202.
- Allen, M., Clark, R., Cotruvo, J., and Grigg, N. (2018), *Drinking Water and Public Health in an Era of Aging Distribution Infrastructure*, *Public Works Management & Policy*, Volume 23, Issue 4. (<https://doi.org/10.1177/1087724X18788368>)
- ASCE (2016), *Failure to Act: The Impact of Infrastructure Investment on America's Economic Future*, American Society of Civil Engineers: Reston, Virginia
- Brundtland Commission (1987). *Our Common Future - Report of the World Commission on Environment and Development*. Oxford University Press. Retrieved from <https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>
- Cui, C., Liu, Y., Hope, A. and Wang, J. (2018), Review of studies on the public-private partnerships (PPP) for infrastructure projects, *International Journal of Project Management*, Volume 36, Issue 5: 773-794.
- Harris, L. (2019), *Our Aging Infrastructure: Peril and Opportunity*, *The River*. Retrieved from <https://therivernewsroom.com/2019/05/08/our-aging-infrastructure-peril-and-opportunity/>
- Jomo KS, Chowdhury, A., Sharma, K., and Platz, P. (2016), *Public-Private Partnerships and the 2030 Agenda for Sustainable Development: Fit for Purpose?*, DESA Working Paper No. 148, United Nations. Retrieved from <http://www.un.org/en/development/desa/papers/>
- Little, R. (2012), *Managing the Risk of Aging Infrastructure*, International Risk Governance Council. (https://irgc.org/wp-content/uploads/2018/09/R.-Little_Risk-of-Aging-Infrastructure_revision-Nov2012.pdf)
- Matlin, E. (2019), *What Successful Public-Private Partnerships Do*, Harvard Business Review. Retrieved from <https://hbr.org/2019/01/what-successful-public-private-partnerships-do>.
- Nur Hidayah Abdul Jabar, Zul Ilham, Shaikh Mohd Saifuddeen and Noor Naemah Abdul Rahman (2015), *Green Energy towards Sustainability from the Islamic Perspective*, *International Journal of Sustainable Future for Human Security*, Vol. 3, 2:31-34.
- Richard Paradis (2016), *Retrofitting Existing Building to Improve Sustainability and Energy Performance*, National Institute of Building Sciences. Retrieved on 12th September 2019 from <https://www.wbdg.org/resources/retrofitting-existing-buildings-improve-sustainability-and-energy-performance>.
- SDG Tracker, *Sustainable Development Goals – Affordable and Clean Energy*, Retrieved from <https://sdg-tracker.org/energy>.
- Suhaiza Ismail and Fatimah Azzahra Harris (2014), *Challenges in implementing public-private partnership (PPP) in Malaysia*, *Procedia - Social and Behavioral Sciences* 164:5-10
- Unit Kerjasama Awam Swasta (n.d.). Information from <http://www.ukas.gov.my/en/about-ukas/profile>.
- United Nations (n.d.), *Sustainable Development Goals*. Information from <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>
- Wang, N. and Ma, M. (2021), *Public-private partnership as a tool for sustainable development – What literatures say?* *Sustainable Development*. Vol. 29:243-258. (<https://onlinelibrary.wiley.com/doi/epdf/10.1002/sd.2127>)