



**6th UNDERGRADUATE  
SEMINAR ON BUILT  
ENVIRONMENT  
AND TECHNOLOGY  
(USBET) 2023**

**SUSTAINABLE BUILT  
ENVIRONMENT**

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# e-Proceeding

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# A STUDY ON ENERGY SAVING PRACTICES IN UNIVERSITY TECHNOLOGY MARA (UITM) OF SERI ISKANDAR CAMPUS IN PERAK

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## ABSTRACT

*This study aimed to investigate the strategies employed for energy management and efficiency on a university campus, particularly focusing on UiTM Seri Iskandar, Perak. The increasing energy consumption in Malaysian universities has raised national concerns. The objectives were to identify such practices, assess their effectiveness in reducing energy consumption, and provide recommendations for enhancing energy efficiency at the university. The research entailed a mixed-method approach involving questionnaire surveys and on-site observations conducted within the campus. The data analysis revealed that the implemented general energy-saving practices successfully contributed to lowering energy consumption. By implementing the study's recommendations, significant energy and cost savings can be achieved. The findings from this study provide valuable insights for UiTM Seri Iskandar and other educational institutions aiming to enhance energy efficiency and promote environmental sustainability. By embracing these recommendations, universities can make significant strides in energy conservation efforts, ultimately contributing to a greener and more sustainable future.*

**Keywords:** energy saving practices in university, energy efficient

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## **INTRODUCTION**

Malaysian universities face energy waste due to inefficient energy use and building occupants' lack of awareness (Yen & Wai, 2010). Energy waste at public universities in Malaysia is a major problem caused by a lack of awareness among students and staff, and there are limited specific management guidelines available to address the issue (Dzulkefli, 2020). With 20 public and 56 registered private universities in Malaysia, the country's rapid economic expansion has led to increased electricity usage in the state (Tinggi, 2023). This issue affects the institutions' annual energy costs and constrains their spending plans. Energy saving practices are crucial in buildings, particularly in institutional buildings, as they help achieving sustainable development objectives such as eradicating poverty, reducing global warming, protecting ecosystems, developing infrastructure, and fostering innovation in resilient cities (Forum, 2022). Internationally, energy savings are increasingly important as it is considered the fastest, most efficient, and cost-effective way to reduce carbon dioxide emissions and climate change effects. The key to saving energy in institutional buildings is to provide related building services, suitable design, technology, or any related equipment when, where, and in the quantity that is required. The objectives of this research is to identify and assess the effectiveness of current energy saving practices in University Technology Mara Perak Tengah, and to develop recommendations for improving energy efficiency at the university.

## **LITERATURE REVIEW**

Energy is a physical system's ability to carry out operations. According to Suruhanjaya Tenaga Malaysia, 38% of the electricity produced in Malaysia was utilized by the state's universities (Hassan, Zin, Abd Majid, Balubaid, & Hainin, 2014). Additionally, it is anticipated that the energy consumption in these structures would rise by 5% annually in the near future, which will make it necessary for these colleges to make improvements to their energy efficiency (A F Latif et al., 2019). The university's energy use is influenced by energy saving awareness and other factors, which makes it harder to control than other energy-consuming departments but more effective. (Zhao, Song, & Wang, 2019). However, energy saving practices are one of the best approaches that can be implemented in universities in Malaysia, as they mostly depend on the occupants' attitudes and behaviors

### **Energy Saving**

Energy saving potentially can be enhanced by incorporating and applying efficient use of energy or by using electronic appliances that are energy efficient. Energy efficiency is the ability to accomplish the same task with less energy or more work

with the same amount of energy (Julian, 2000). Regulation, technical assistance, and recognition or incentives are three indicators that can be used to promote energy efficiency and encourage people to practise and implement it (Manan, 2010). Moreover, in simpler terms, "practises of energy saving" are any behaviours that help generate an effective outcome in reducing energy consumption or compromising on certain services to save energy (IRENA & C2E2, 2015).

## METHODOLOGY

The study on energy saving practices in Malaysian universities, specifically at UiTM Seri Iskandar Perak, went through a mixed method research design that involved conducting a literature review, collecting data through probability sampling from the university's Development and Facility Management Department, and summarizing the data using statistical analysis. The primary data consists of quantitative information gathered through a questionnaire, while the secondary data is qualitative, obtained from articles and journals. The details of electrical bills and a list of appliances used are also included. The data analysis was conducted using Microsoft Excel and Nvivo. Finally, the research findings were summarized, and relevant recommendations were developed based on the research.

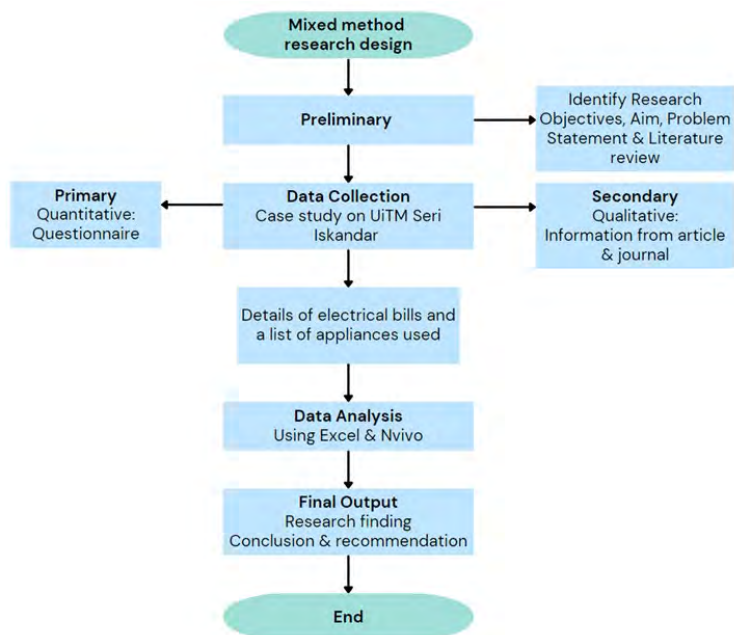
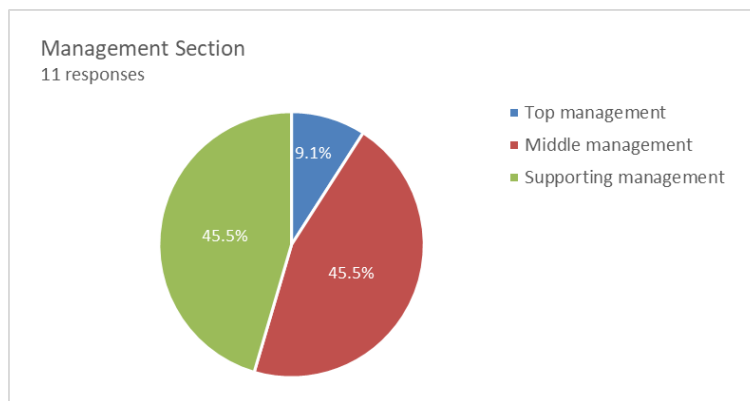


Figure 1: Research Design Flow Chart

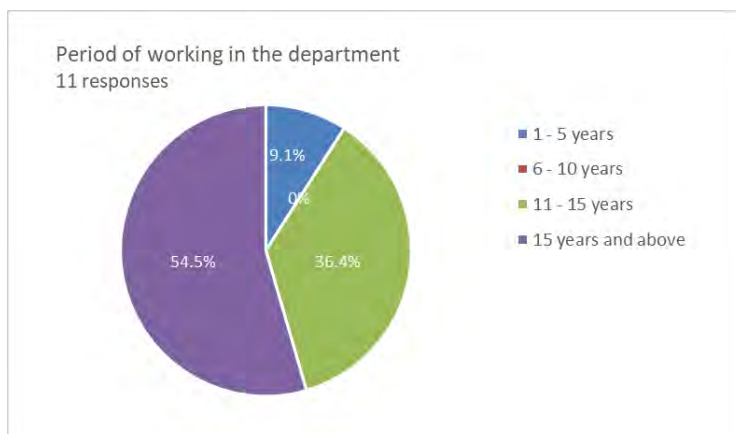
The sampling respondent selects 10% of the Development and Facility Management Department, which consists of a total of 44 staff members. This means that a minimum of five respondents are required to fill out the survey. However, this study managed to collect responses from 11 individuals in the department. Below is Section A: Respondent Profile of the Questionnaire.

The case study surveyed 11 individuals from the Development and Facility Management Department, representing various management sections as presented below.



**Figure 2: Management Section Data Analysis**

The majority of respondents had been working for 15 years or more, with 36.4 % having been working for 11 to 15 years.



**Figure 3: Period of Working in the Department Data Analysis**



## CASE STUDY



**Figure 4: UiTM Seri Iskandar, Perak**

The chosen case study is University Technology Mara Seri Iskandar, Perak. The eighth UiTM campus in Malaysia is established in 1985. It covers 392.36 acres and was opened on April 3, 1995, with the Faculty of Planning and Surveying Architecture Building and dormitory building. The University Teknologi MARA Perak Branch began operations on January 1, 1985, and was officially opened by YAB Tan Sri Dato' Seri Ramli Ngah Talib (Wikipedia, 2022).

This study has some limitations because due to differences of several factors between university types, levels, sizes, and the types of technology and equipment that are used. Future research should focus on a narrower case study in order to quantify logical energy saving practices through surveying. Additionally, questionnaires for the university were used to gather the study's results.

## FINDING AND ANALYSIS

Based on observation or qualitative data, below is the list of general electrical appliances widely used on campus that consist of energy saving features like a five-star rating for energy efficiency endorsed by the Energy Commission of Malaysia.

**Table 1: List of General Electrical Appliances in Campus**

No.	Equipment
1	Ceiling Cassette Air conditioner
2	LED fluorescent lights with mirror louvre fitting
3	LED fluorescent light
4	Ceiling Fan
5	Solar street light
6	LED fluorescent lights with motion sensor detector
7	LED light with motion sensor detector
8	Light timer switch

Below are the supporting energy saving practices that are available on campus.

**Table 2: Supporting Energy Saving Practices in Campus**

Practices	Details
Energy Saving Campaign	The campaign aims to raise awareness and encourage sustainable behaviour on campus through energy-saving tips, practical recommendations, and call to action.
Establishment of green campus committee	The University of Technology MARA Perak Branch established a Green Campus Committee in 2016 to promote eco-friendly practices and promote a sustainable campus environment. The committee has participated in initiatives like adopting green office practices, promoting green health, and promoting sustainable building design.

For the quantitative data, by utilizing a five point Likert scale rating, a score higher than two indicates positive outcomes from the questionnaire.

Analysis of Section B, it was found that each respondent showed a high level of knowledge and awareness regarding the energy-saving practices implemented on campus. They acknowledged the importance of these practices, particularly in institutional buildings, as they contribute to cost reduction. Furthermore, the respondents agreed that the university consistently informs occupants about energy consumption within the buildings.

**Table 3: Section B - Respondent Knowledge And Awareness**

No.	Questions	Mean Score
1	Do you aware of the energy saving practises implemented in your university?	4.73
2	Energy saving practises is crucial in institutional building to help reduce the cost.	4.91
3	Does your university update occupants on energy consumption in the building?	4.91

Concerning the implementation of the university's energy plan and campaign, as highlighted in Section C, it is apparent from the responses provided by the respondent that the campus is actively adopting the practices outlined in the list of supporting energy saving practices on campus. By utilizing the Likert scale, a predominantly high mean score indicates a positive rating scale. This shows the significance of these criteria and supports the conclusion that their implementation is essential for the campus.

**Table 4: Section C - Implementation Of Energy Plan And Campaign At Your Campus**

No.	Questions	Mean Score
1	Does your university implement any energy saving campaign or application like advance technology, lighting element / equipment / product?	4.55
2	Does your university put a limit on the hours of electricity use in each building?	4.46
3	Does your university provide training on energy practices for all the maintenance staff?	4.55
4	How often does your university provide the training?	4.46
5	Does your university have an Energy Management Plan / Policy?	4.73
6	Does your university implement benchmarking / key performance indicator for the energy use in the university?	4.64
7	Do your university have implemented Energy Star score or other relevant rating?	4.37

Finally, in Section D, it can be observed that based on the responses collected, the inclusion of supporting building services elements and technology does indeed

contribute to the implementation of energy-saving practices. The responses provided by the respondents serve as evidence. The respondents' responses indicate that all supporting services and elements play a crucial role in achieving energy-saving practices.

**Table 5: Section D - Supporting Building Services Element Or Technology In Achieving Energy Saving Practices**

No.	Questions	Mean score
1	Does your university use energy efficient appliances (eg. LED lighting, energy saving Air-conditioning system)?	4.64
2	Does your university use motion sensor for lighting and or other electrical appliances?	4.64
3	Does your university use any renewable energy sources?	2.91
4	Does your university have a building automation system with direct digital controls?	2
5	Do you agree that by using energy efficient elements / equipment can help save energy?	4.82
6	Does your university use any energy innovation appliances for energy saving practices in the university?	4.10

## CONCLUSION

The research study examined university energy efficiency and management, revealing challenges and potential improvements. It found that the university has implemented effective practices to reduce energy consumption, but lacks an Energy Management Plan/Policy and benchmarking. The study suggests implementing energy-saving campaigns, exploring renewable energy options, upgrading building automation systems, fostering an energy-efficient culture, and monitoring energy use through data tracking and audits. Continuous monitoring and adaptation are essential for long-term success. The study offers practical recommendations for improving energy management procedures, lowering energy use, and promoting a sustainable campus environment.

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Timbalan Ketua Pustakawan

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*Setuju.*

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