UNIVERSITI TEKNOLOGI MARA
CAWANGAN PULAU PINANG

EVALUATES THE BEST RECOMMENDED ENERGY PERFORMANCE CONTRACTING (EPC) MODEL FOR THE UNIVERSITI TEKNOLOGI MARA (UiTM) CAWANGAN PULAU PINANG

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Energy Performance Contracting (EPC) is a globally adopted method in reducing the energy consumption. Educational buildings, such as universities, often face significant challenges in implementing optimal Energy Conservation Measures (ECMs) due to the high capital expenditure and operational expenditure required for retrofitting and maintaining these facilities. Careful analysis and selection of the most cost-effective ECMs is crucial for the success of an EPC project in an educational setting. The purpose of this study is to evaluate the most optimal EPC model. The method used in this study is Multiple Linear Regression (MLR) and sensitivity analysis. The results show that the baseline model yield R^2 of 0.96, standard error of 20.65, and a P-value of 0, which indicates that the model is a good fit to forecast the energy consumption after the implementation of ECMs. Among the individuals ECMs, ECM 3 contributes the highest energy savings, followed by ECM 1 and ECM 2. However, the combined ECMs model achieves the greatest overall reduction in energy consumption. The findings demonstrate that implementing ECMs not only minimizes baseline energy usage but also reduces sensitivity to external factors such as temperature and occupancy. The sensitivity analysis shows that the quantum sharing ratio of 95% for the ESCO and 5% for UiTM Pulau Pinang is most optimal EPC model as it ensures both parties' benefit from the project. However, the analysis is limited to a single building, BKBA, which constrains the generalizability of findings to other facilities. Future studies should expand to multiple buildings and incorporate additional influencing factors to enhance applicability.

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