CHAPTER 5

DISCUSSION AND FUTURE WORK

5.0 Discussion

This study uses advanced regression techniques to enhance the accuracy and reliability of forecasting energy consumption in Malaysia. It will provide insight into Malaysia's underlying energy demand pattern by systematically collecting and analyzing historical data on energy consumption, economic indicators, demographic factors, and climate variables. The Exploratory Data Analysis (EDA) will show trends and critical relationships to developing regression models.

The initial findings from EDA, which include visualization and descriptive statistics, are expected to reveal the significance of the correlation and dependencies between energy consumption in Malaysia and various related factors. This will guide the feature engineering process that allows the creation of lagged variables, interaction terms, polynomial features, and rolling statistics. These features will enhance the predictive power of the regression models.

The model development and evaluation phase will involve training multiple regression models, including linear, polynomial, and multiple regression. The models will be evaluated using metrics such as Mean Absolute Error (MAE), Mean Squared Error (MSE), and Root Mean Squared Error (RMSE) to determine their accuracy and robustness.

The expected outcomes include understanding the factors that influence energy consumption in Malaysia and developing accurate forecasting models. These models will provide policymakers and energy planners with reliable tools for making informed decisions, ensuring security, optimizing resource allocation, and supporting sustainable development.

5.1 Interpretation of the results

The results of this study demonstrate the effectiveness of different regression techniques in forecasting energy consumption, with multiple linear regression showing particular promise due to its ability to incorporate multiple predictors and capture complex interactions. Advanced regression models outperform traditional time series methods in accuracy and reliability, mainly when external factors are considered. The implementation of energy efficiency measures is shown to have a substantial impact on reducing future energy consumption, highlighting the importance of such initiatives. Finally, the study's predictions point to continued growth in energy demand, driven by economic and demographic factors, with significant implications for Malaysia's energy policy and infrastructure planning.

5.1 Discussion of the implications of findings

The implication of this study exists in the policy, planning, and management of energy in Malaysia. According to this, the study uses complex regression models. It dissects this to ensure an accurate representation of the energy demand and the important factors to consider while forecasting energy consumption. The findings can be used to design specific measures to enhance the public’s awareness of energy conservation and use, improve the allocation of infrastructure investments, and meet Malaysia’s sustainable development objectives. Ultimately, such discoveries will benefit Malaysia as it will have a more efficient and sustainable energy system.