

**EFFECTS OF ENERGY CONSUMPTION, RENEWABLE ENERGY AND
ECONOMIC GROWTH ON CO₂ EMISSIONS IN THREE SELECTED
ASEAN COUNTRIES**

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MASTER OF SCIENCE UNIVERSITI MALAYSIA TERENGGANU

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Abstract of thesis presented to the senate of University Malaysia Terengganu
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School : School of Social and Economic Development

Development and urbanization in a country has shown that economic growth is very important for developing countries, but rapid economic activity in a country is not an indicator of the development of a dynamic and sustainable economy. Recently, studies on the linkages between energy consumption, economic growth and climate change revealed that environmental degradation occurs in tandem with energy use and economic growth. Therefore, this study aims to investigate the causal relationship between energy consumption, economic growth, carbon dioxide emissions and renewable energy by using time series data from 1980-2011 in three selected ASEAN countries namely Malaysia, Indonesia and Singapore. In addition, this study aims to investigate the existences of EKC hypothesis in Malaysia, Indonesia and Singapore. The method of Vector Error Correction Model (VECM) is used to examine the causality between the variables. The causality result shows evidence of unidirectional causality from energy consumption to carbon dioxide emissions, from carbon dioxide emissions to economic growth, from economic growth to renewable energy and from energy consumption to renewable energy in Malaysia. Meanwhile, the results of causality in Indonesia show that there were

unidirectional causality runs from renewable energy to carbon dioxide emissions, economic growth and energy consumption. In Singapore, there are unidirectional causality runs from economic growth to carbon dioxide, energy consumption and renewable energy. Besides, there is unidirectional causality runs from energy consumption to renewable energy. In addition, the findings also indicated that EKC hypothesis is not valid in this study. These findings suggest the needs for alternative energy use in order to reduce the carbon dioxide emissions. Therefore, the improvements of policy implications are very important to ensure sustainable economic growth that does not adversely affect the environment.

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai memenuhi keperluan untuk ijazah Sarjana Sains

**KESAN PENGGUNAAN TENAGA, TENAGA BOLEH DIPERBAHARUI
DAN PERTUMBUHAN EKONOMI KE ATAS PEMBEBASAN CO₂ DI TIGA
BUAH NEGARA ASEAN TERPILIH**

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**Pusat Pengajian : Pusat Pengajian Pembangunan Sosial dan
Ekonomi**

Pembangunan dan pambandaran di sesebuah negara telah menunjukkan bahawa pertumbuhan ekonomi sangat penting bagi negara-negara membangun. Namun kepesatan ekonomi bukanlah penanda aras yang dapat membuktikan bahawa sesebuah negara itu membangun secara mampan. Kebelakangan ini, kajian terhadap hubungan antara penggunaan tenaga, pertumbuhan ekonomi dan perubahan iklim menunjukkan bahawa kemusnahan alam sekitar yang berlaku adalah seiring dengan peningkatan penggunaan tenaga serta pertumbuhan ekonomi. Oleh itu, kajian ini bertujuan untuk mengkaji hubungan sebab dan akibat antara penggunaan tenaga, pertumbuhan ekonomi, pembebasan karbon dioksida dan tenaga yang boleh diperbaharui dengan menggunakan data siri masa dari tahun 1980-2012 di tiga buah negara ASEAN yang terpilih iaitu Malaysia, Indonesia dan Singapura. Di samping itu, kajian ini bertujuan untuk mengkaji kewujudan hipotesis EKC di Malaysia, Indonesia dan Singapura. Kaedah *Vector Error Correction Model* (VECM) digunakan untuk mengkaji hubungan sebab dan akibat antara pembolehubah. Hasil daripada ujian hubungan sebab dan akibat di Malaysia membuktikan bahawa terdapat hubungan sehala daripada penggunaan tenaga kepada pembebasan karbon

dioksida, daripada pembebasan karbon dioksida kepada pertumbuhan ekonomi dan daripada pertumbuhan ekonomi kepada tenaga yang boleh diperbaharui serta daripada penggunaan tenaga kepada tenaga yang boleh diperbaharui. Manakala, hasil ujian sebab dan akibat di Indonesia menunjukkan terdapat hubungan sehalu daripada tenaga yang boleh diperbaharui kepada pembebasan karbon dioksida, daripada tenaga yang boleh diperbaharui kepada pertumbuhan ekonomi dan daripada tenaga yang boleh diperbaharui kepada penggunaan tenaga. Di Singapura, terdapat hubungan sehalu daripada pertumbuhan ekonomi kepada pembebasan karbon dioksida, daripada pertumbuhan ekonomi kepada penggunaan tenaga dan daripada pertumbuhan ekonomi kepada tenaga yang boleh diperbaharui. Selain itu, wujud hubungan sehalu daripada penggunaan tenaga kepada tenaga yang boleh diperbaharui. Hipotesis EKC juga tidak wujud dalam kajian ini. Hasil kajian ini menunjukkan kepentingan untuk beralih kepada penggunaan tenaga alternatif bagi mengurangkan pembebasan karbon dioksida. Justeru itu, penambahbaikan dasar dan polisi sangat penting untuk mengekalkan pertumbuhan ekonomi yang mampan serta tidak memberi kesan negatif kepada alam sekitar.