Efficient Vol 6 (2) (2023): 210-219 DOI: https://doi.org/10.15294/efficient.v6i2.59421

EFFICIENT

Indonesian Journal of Development Economics

https://journal.unnes.ac.id/sju/index.php/efficient

The Identifying Factors Affecting Energy Transition Efforts in Indonesia

Havidz Aldi Setiawan✉, **Dyah Maya Nihayah**

Development Economic Study Program, Economics Faculty, Universitas Negeri Semarang

Permalink/DOI: https://doi.org/10.15294/efficient.v6i2.59421

Submitted: December 2022; Revised: March 2023; Accepted: June 2023

Abstract

Energy transition towards the use of clean energy is a process that has the goal of reducing the consumption of non-renewable energy towards the consumption of renewable energy that is environmentally friendly. Energy transition efforts are carried out for several reasons, including as a form of implementation of international agreements and overcoming the problem of climate change. This study aims to determine the effect of education, per capita income, foreign direct investment (FDI), and population on the consumption of renewable energy in Indonesia. The data for this research was obtained from the World Bank and Our World in Data. The analysis used in this study is by using the Error Correction Model (ECM) method. The results showed that the variables of education and population had a positive effect in the long term. The results show that in the long term an increase in per capita income has a negative impact. This result also explains the positive impact of FDI which proves the occurrence of FDI Hallo Effect in Indonesia.

Keywords: Poverty, Renewable Energy, Education, Per Capita Income, FDI, Population

How to Cite: Setiawan, H., & Nihayah, D. (2023). The Identifying Factors Affecting Energy Transition Efforts in Indonesia. Efficient: Indonesian Journal of Development Economics, 6(2), 210-219. https://doi.org/10.15294/efficient.v6i2.59421

✉ Correspondence Address :
Address: Gedung L2 Lantai 2 FE Unnes
Kampus Sekaran, Gunungpati, Semarang, 50229
E-mail : havidz.aldi@students.unnes.ac.id

INTRODUCTION

The development carried out by a country and the problem of natural sustainability are two things that are closely related and cannot be separated. Good development is the development that, in the process, pays attention to environmental sustainability (Rosana, 2018). This is in accordance with one of the development concepts, namely sustainable development.

The World Commission on Environmental Development (WCED) defines sustainable development as a development process which in the process considers the consumption needs of future generations. In other words, the development process tries to meet the needs of the present without compromising the ability to meet future needs.

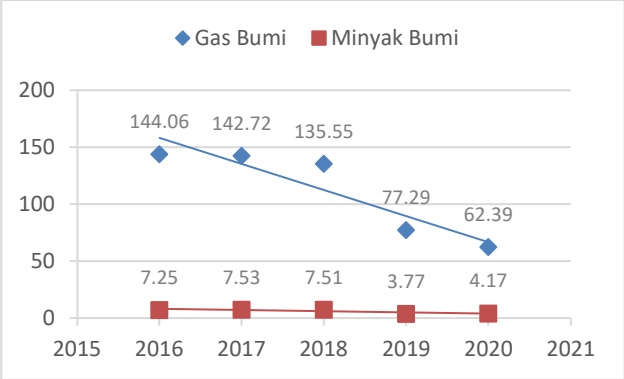

Figure 1. Indonesia's Oil and Gas Reserves (%)
Source: Kementerian ESDM, 2022

This effort is carried out by improving the quality of life, which in the process is done by focusing on maintaining the sustainability and balance of nature. The concept of sustainable development does not only consider environmental sustainability; this concept also pays attention to social and economic aspects.

Climate change and pollution are currently attracting attention and becoming the focus of many countries in the world, including Indonesia. Climate change is defined as a condition in which changes in world climate patterns result in erratic weather phenomena (Hidayati & Suryanto, 2015). Over the last few decades, this issue has attracted the attention of various parties, both policymakers and the public in general.

Many countries are becoming aware of these problems and are starting to make various efforts to fix them. One of the efforts made is by making a transition to energy consumption, in which each country, in this case, is required to reduce CO_2 emissions with various policies, one of which leads to the consumption of clean energy such as new and renewable energy (Alper & Oguz, 2016).

The energy transition in this case is a process that has a goal, namely, to reduce the consumption of non-renewable energy such as fossil energy or other energy that produces emissions and increase the consumption of renewable energy that is environmentally friendly (Ummatin & Partiwi, 2012). The issue of energy transition has also become one of the main topics of discussion at the G20 Presidency event held in Indonesia in 2022.

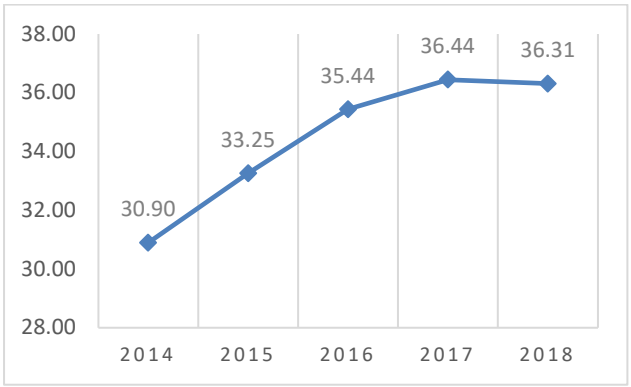

Figure 2. School enrollment, tertiary (%)
Source: World Bank, 2022

Indonesia itself related to energy management issues has been regulated in PP RI No. 79 of 2014 and the Presidential Regulation of the Republic of Indonesia No. 22 of 2017, which optimistically sets a target to increase the mix of renewable energy consumption with fossil energy consumption in 2025 by 23% and 2050 by 31%. This energy transition is important for Indonesia because, in addition to reducing negative impacts on the environment, it will also

have a positive impact on technology development and energy security, and changes in energy consumption will greatly affect social conditions in the country's economy (Yang et al., 2021).

Figure 1 is a graph showing the total proven and potential oil and gas (oil and gas) reserves of Indonesia as quoted by the Indonesian Ministry of Energy and Mineral Resources. Figure 1.1 shows that during the 2016–2020 period, Indonesia's oil and gas reserves experienced a downward trend. For oil itself, during the last five years, the average decline was 9%, while for natural gas it was 17%.

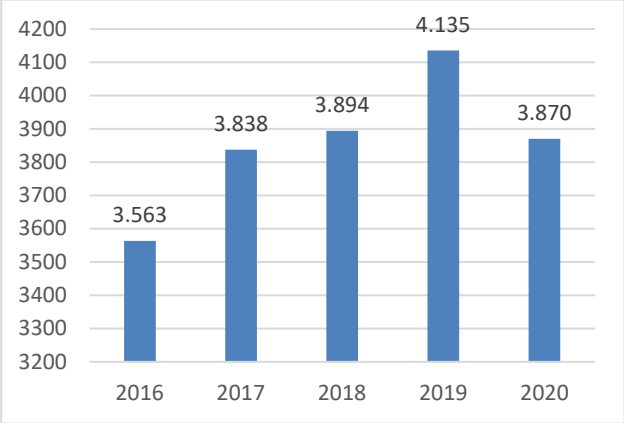

Figure 3. Income Per Capita (Current USD)
Source: World Bank, 2022

This was also expressed by the Indonesian Minister of Energy and Mineral Resources, who in a statement explained that if the availability of oil and gas in Indonesia continues to decline, oil itself will be available for up to 9,5 years, while natural gas reserves will be available for the next 19,9 years, with records having not found new fossil energy sources and their production levels are fixed.

This situation shows the importance of energy efficiency by increasing energy resilience and competitiveness and reducing energy costs, one of which can be achieved by making an energy transition towards increasing production and consumption of new and renewable energy (Alper & Oguz, 2016).

One of the energy transition efforts towards the use of renewable energy can be done by increasing public awareness through equitable access to education. People who are more educated here are considered more concerned about the environment and more willing to support policies related to environmental sustainability than people who have lower levels of formal education (Mayer, 2013).

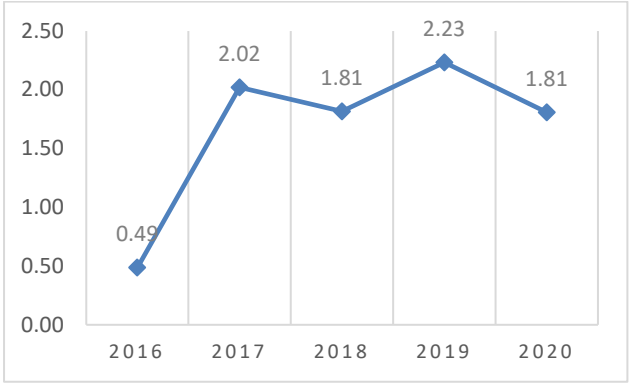

Figure 4. FDI Net Inflows (%)
Source: World Bank, 2022

This is also expressed by Masruri (2015), who in his research explains the importance of education to minimize the development of community elements that become agents of environmental destruction. Figure 2 shows that the trend of people pursuing tertiary education has increased, which during this period increased by 4%. The increase in enrollment rates at the tertiary level shows that the Indonesian people are more involved in the provision of education.

Another factor that affects energy consumption is income per capita. Income per

capita is the average income of people in a region during a certain period, usually one year. Income per capita is calculated by dividing the value of gross regional domestic product by the number of people in a given year.

The results of the calculation of per capita income are used to see the level of progress and welfare of the people in an area (Wahyu Azizah & Kusuma, 2018). As one of the indicators used to measure the level of community prosperity, the value of income per capita here shows the economic activity of the community in an area (Jufrida et al., 2017).

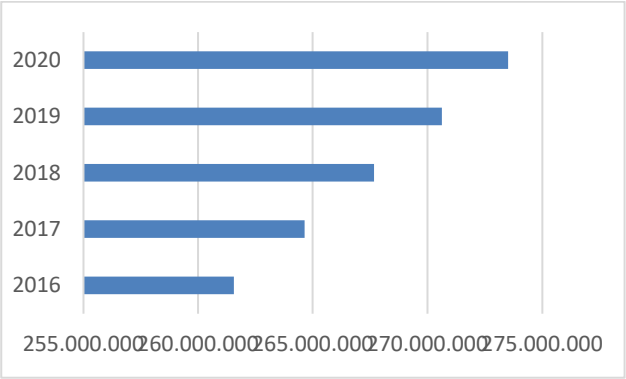

Figure 5. Population (Total)
Source: World Bank, 2022

Figure 3 shows that the trend of the average income of the Indonesian people has increased, which during this period increased by 0.02%. This increase in the average income of the community shows an increase in public consumption, which encourages economic activity such as industrial activity and energy consumption, which can affect environmental sustainability (Apergis & Payne, 2010).

The influence between per capita income and energy consumption, especially renewable energy, is important to study because renewable energy is an energy source that is predicted to be widely used in the future to carry out various economic activities (Alper & Oguz, 2016).

Consumption of new and renewable energy is also influenced by foreign direct investment (FDI). Quoted from UU No. 25 of 2007 concerning Investment, FDI is defined as an investment activity carried out by foreign investors using fully foreign capital or in collaboration with local investors to invest in businesses or industries in the territory of Indonesia. Investment from abroad is closely related to technological developments in countries that receive investment (Azaliah & Hartono, 2020).

Figure 4 shows that the trend of foreign capital entering Indonesia is fluctuating and tends to increase. FDI is a form of direct investment made by companies from one country to invest their investment funds in other countries (Rahayu & Pasaribu, 2017). The effect of FDI on the environment is associated with two hypotheses namely, that the presence of foreign investment can have a positive effect due to the transfer of knowledge from other countries.

The second hypothesis is that foreign investment has a negative effect on the environment. This situation is known as a "Pollution Haven" (Doytch & Narayan, 2016). Another factor that affects energy consumption is the population. What is meant by "residents" are individuals or groups of residents who are domiciled and settled in an area for 6 months or more and those who live for less than 6 months but have a goal of settling in that area. While the population itself is defined as a group of people who occupy an area. The size of the population in an area is influenced by several things, including the level of fertility (births), mortality

(deaths), and community migration (Arymurthy & Purwandari, 2012).

Figure 5 shows that the trend of the Indonesian population has increased, which during this period increased by 1%. An increasing population can affect energy consumption as a result of fuel consumption for vehicles, as well as for building, operating and maintaining infrastructure (Salim & Shafiei, 2014). This is in line with what Afriyanti et al (2020), in their research explained that population growth will encourage the amount of consumption and production of goods or services which will increase energy consumption to carry out these activities.

Renewable energy is defined as alternative energy whose management process utilizes nature, such as solar energy, water, wind, biogas, and sustainable geothermal energy. Renewable energy sources have environmentally friendly properties, so their use can help to reduce CO2 emissions and mitigate global warming (Afriyanti et al., 2020). This study aims to determine what factors affect the consumption of renewable energy. By using the variables of education, income per capita, FDI, and population, this study seeks to explain its effect on clean energy consumption in an effort to make the energy transition in Indonesia.

RESEARCH METHODS

This research is included in the type of quantitative research. Quantitative research is a type of research that in practice performs analysis by collecting and compiling data in the form of numbers. Quantitative research here in this process conducts a systematic and empirical investigation of a phenomenon using statistical and numerical approaches (Sastypratiwi & Nyoto, 2020).

The data processing and analysis technique in this research uses the Error Correction Model (ECM) method of analysis. The Error Correction Model (ECM) is one of the econometric analysis methods used in research, especially research with time series data. The purpose of the research is to see and analyze the short-term and long-term effects of the variables studied.

The use of the ECM method is in accordance with the purpose of the study, namely to analyze the short and long-term effects of research variables. This study uses a statistical analysis program with Eviews 9 software to process research data. The following is a long-term estimation model for the ECM method:

$$REN_t = \beta_0 + \beta_1\ EDUC_t + \beta_2\ LYCAP_t + \beta_3\ FDI_t + \beta_4\ LPOP_t + e_t$$

The short-term Error Correction Model (ECM) estimation model in this study:

$$DREN_t = a_0 + a_1\ DEDUC_t + a_2\ DLYCAP_t + a_3\ DFDI_t + a_4\ DLPOP_t + ECT_{t-1} + e_t$$

Where REN is Renewable Energy; EDUC is Education; YCAP is Per Capita Income; FDI is Foreign Direct Invesment; POP is Population; β_0, - β_4 is Long-Term Coefficient; a_0 - a_4 is Short-Term Coefficient; D is Changes; t is Time Period; ECT is Error Correction Term; and e is Error.

This research uses literature study data collection techniques. This library or library study technique is a data collection technique carried out by collecting, processing, and summarizing data systematically to get answers to research questions using certain methods or techniques (Khatibah, 2011).

This information and data collection is through written documents or electronic documents such as books, journals, and websites. This study uses data in the form of time series in the form of annual data for the period 1972 – 2018 in Indonesia. Data on consumption of new and renewable energy, education in the form of university registration data, population income per capita, foreign direct investment (FDI), and the Indonesian population were obtained from the World Bank Open Data and Our World in Data websites.

The ECM method is an appropriate research method to overcome the problem of spurious regression. A spurious regression is a situation where the results of the regression analysis obtained do not reveal the truth. This condition occurs when the regression is carried out on the independent and dependent variables of the study, which are not in a stationary state. The results of this regression then become incorrect because they do not show the actual conditions in which the variables do not actually influence each other.

This method also has the advantage that it can be used to analyze the short-term and long-term effects of research variables. Analysis using the Error Correction Model (ECM) method has several conditions that must be meet, including that the data used must be non-stationary at the level level and stationery at the first difference level. The data used in this study must also have a long-term effect (cointegration) between the variables studied.

RESULTS AND DISCUSSION

Based on the test results show that the Error Correction Model (ECM) has met the requirements and is free from the problem of classical assumptions. The results of this ECM test can be seen in table 1. The results in the short term show the coefficient value of the education variable is -0.080489 and the probability value is 0.2811. These results explain that in the short term, the education variable has a negative and insignificant influence on its own in influencing the consumption of new and renewable energy.

Table 1. Short Term ECM Test Results

Variable	Coef	t-stats	Probability
C	0.465496	1.558947	0.1269
D(EDUC)	-0.080489	-1.092687	0.2811
D(LYCAP)	-0.725702	-1.976397	0.0550
D(FDI)	0.057579	0.956738	0.3444
D(LPOP)	-18.05402	-1.151434	0.2564
ECT (-1)	-0.616990	-4.517754	0.0001
R-squared		0.443254	
Adjusted R-squared		0.373661	
F-statistic		6.369205	
Prob(F-statistic)		0.000194	

Source: Output Eviews 9, 2022

This insignificant result proves that H_{1a} is rejected. The coefficient value of the results of the study explains that a 1% increase in public participation in education influences decreasing renewable energy consumption by 0.080489% in the short term. These results are in line with research conducted by Mayer (2013), who in his research explains that increased participation in education has an effect on increasing consumption of non-renewable energy.

More or less the same results were revealed by Umaroh (2019), who in his research explained that improvements in education in the short term played a role in increasing CO2 emissions in Indonesia. The negative impact of education on the environment, which in this study is proxied as renewable energy consumption, is caused by several things, one of

which is the level of public awareness about environmental sustainability and technology that has not been so developed. This insignificant result also shows that public participation in education in the short term has not been very effective in increasing the consumption of new and renewable energy.

Table 2. Long Term ECM Test Results

Variable	Coef	t-stats	Probability
C	-83.91299	-3.883699	0.0004
EDUC	0.104055	4.737755	0.0000
LYCAP	-1.740969	-6.112905	0.0000
FDI	0.155344	2.235489	0.0308
LPOP	5.096330	4.239210	0.0001
R-squared		0.729340	
Adjusted R-squared		0.703563	
F-statistic		28.29408	
Prob(F-statistic)		0.000000	

Source: Output Eviews 9, 2022

The results in the short term show the coefficient value of the income per capita variable is -0.725702 and the probability value is 0.0550. These results explain that in the short term, the income per capita variable has a negative and insignificant influence when it comes to influencing the consumption of new and renewable energy. This insignificant result proves that H_{2a} is rejected.

The coefficient value of the research results explains that an increase of 1% in the value of income per capita influences decreasing renewable energy consumption by 0.725702% in the short term. This result is in line with the research conducted by Fan & Hao (2019), which in its research explains that the increase in the average income of the community has a negative effect on renewable energy consumption.

More or less the same result was also revealed by Afriyanti et al. (2020), who in their research explained that the increase in economic activity due to an increase in average income did not affect the consumption of renewable energy. The results of the study in the short term show that the coefficient value of the foreign direct investment (FDI) variable is 0.057579 and the probability value is 0.3444.

These findings explain why, in the short term, FDI has a positive but insignificant influence on the consumption of new and renewable energy. This insignificant result proves that H_{3a} is rejected. The coefficient value of the results of the study explains that an increase of 1% in the value of FDI affects the increase in renewable energy consumption in Indonesia by 0.0575% in the short term. This result is in line with Prasetyawati (2019) research, which in her research explains that the increase in the value of foreign investment has an effect on reducing CO2 emissions.

The use of energy itself is one of the main sources of increasing levels of CO2 emissions in a region. The results of this study explain that the increase in the value of foreign investment has an effect on the decrease in consumption of non-renewable energy sources. The results in the short term show the coefficient value of the population variable is -18.05402 and the probability value is 0.2564.

These results explain that, in the short term, the population variable has a negative and individually insignificant influence on the consumption of new and renewable energy. This insignificant result proves that H_{4a} is rejected. The coefficient value of the research results explains that an increase of 1% of the population has an effect on decreasing renewable energy consumption by 18.05402% in the short term.

This result is in line with research conducted by Afriyanti et al. (2020), which

explains that the increase in the population has no effect on the consumption of new and renewable energy. More or less the same result was also revealed by Da Silva et al. (2018), who in their research explained that an increasing population has a negative impact on renewable energy consumption.

The results in the long term show the coefficient value of the education variable is 0.140055 and the probability is 0.0000. These results explain that in the long term an increase in education has a positive and significant effect on renewable energy consumption. The results of this long-term study prove that H_{1b} is accepted. The coefficient value of the results of the study explains that a 1% increase in public participation in education influences increasing renewable energy consumption by 0.104055% in the long term.

This result is in line with the research of Özçiçek & Ağpak (2017), who in their research explain that increasing public participation in education has an effect on the increasing demand and supply of new and renewable energy. A similar result is also explained by Balaguer & Cantavella (2018), which explains that increasing participation in education will initially worsen the quality of the environment.

This bad impact continues to a certain point where improvements in education raise public awareness to support policies and create technological innovations that lead to environmental sustainability. The results in the long term show the coefficient value of the income per capita variable is -1.740969 and the probability is 0.0000. These results explain that the increase in the value of income per capita has a negative and significant effect on renewable energy. The coefficient value of the results of the study explains that an increase of 1% in the average value of the income of the population in Indonesia affects the decrease in renewable energy consumption by 1.740969% in the long term.

These results are in line with research conducted by Özçiçek & Ağpak (2017), which in their research explains that the increase in the average income of the community in the long term has a negative impact on renewable energy consumption. The results of this study differ from the research of Sadorsky (2009), which explains that an increase in the value of per capita income has a positive effect on renewable energy consumption.

The long-term results show the FDI coefficient value of 0.155344 and the probability of 0.0308. These results explain that the increase in the value of FDI has a positive and significant effect on renewable energy consumption. The results of this long-term research prove that H_{3b} is accepted and the FDI Hallo Effect hypothesis occurs in Indonesia. The coefficient value of the research results explains that a 1% increase in the value of FDI invested in Indonesia has an effect on increasing renewable energy consumption by 0.155344% in the long term.

This result is in line with research conducted by Fan & Hao (2019), which in its research explains that an increase in the value of foreign investment has an effect on increasing knowledge in the form of public awareness and technological developments that utilize new and renewable energy. The results of this study are different from the research conducted by Nihayah et al. (2022), which in their research explains that the increasing value of foreign investment has an effect on increasing activities that increase CO2 emissions in Indonesia.

The results of data processing in the long term show the coefficient value of the

population variable is 5.096330 and the probability is 0.0001. These results explain that, in the long term, the increase in the population has a positive and significant effect on the consumption of new and renewable energy. The results of this long-term research prove that H_{4b} is accepted and the Boserupian theory is proven in Indonesia.

The coefficient value of the results of the study explains that an increase of 1% of the population in Indonesia has an effect on increasing the consumption of renewable energy by 5.0963300% in the long term. This result is in line with research conducted by Salim & Shafiei (2014), which explains that an increase in the population affects two energy sources, namely fossil energy and new renewable energy.

Similar results were also revealed by Umaroh (2019), who in his research revealed that in the long term, the increase in population was accompanied by a decrease in the level of CO2 emissions. This reduced level of CO2 emissions is influenced by several things, one of which is the use of environmentally friendly energy sources.

CONCLUSION

The results showed that all variables had a significant effect in the long term. The variables of education, foreign direct investment (FDI), and population have a positive effect on the increase in the consumption of new and renewable energy in the long term. while the income per capita variable has a negative effect on renewable energy consumption.

The positive results of the impact of education indicate that increased participation in education has an effect on supporting energy transition efforts in Indonesia. Therefore, the government, in this case, can use education as an alternative policy to meet the energy mix target. Then, the positive results of the FDI effect show that the FDI Hallo Effect hypothesis is proven in Indonesia.

The Indonesian government here can make efforts to build a good and conducive clean energy investment climate. The positive result of the population shows an increase in the number of people, accompanied by the consumption of renewable energy.

Therefore, the government, in this case, can make its main policy regarding infrastructure development one that utilizes renewable energy. This large scale of renewable energy infrastructure will generate an industrial ecosystem that utilizes renewable energy as well as allow for the discovery and development of renewable energy technologies.

REFERENCES

Afriyanti, Y., Sasana, H., & Jalunggono, G. (2020). [*Analisis Faktor-Faktor yang Mempengaruhi Konsumsi Energi Terbarukan di Indonesia*]. *Directory Journal of Economic, 2*(3), 865–884.

Alper, A., & Oguz, O. (2016). The role of renewable energy consumption in economic growth: Evidence from asymmetric causality. *Renewable and Sustainable Energy Reviews, 60*, 953–959. https://doi.org/10.1016/j.rser.2016.01.123

Apergis, N., & Payne, J. E. (2010). Renewable energy consumption and growth in Eurasia. *Energy Economics, 32*(6), 1392–1397. https://doi.org/10.1016/j.eneco.2010.06.001

Arymurthy, A. M., & Purwandari, E. P. (2012). [*Analisis Topologi dan Populasi Penduduk Pemukiman Miskin Menggunakan Teknologi Remote Sensing*]. *Jurnal Sistem Informasi, 6*(1), 20. https://doi.org/10.21609/jsi.v6i1.275

Azaliah, R., & Hartono, D. (2020). [*Determinan Intensitas Energi di Indonesia: Analisis Data Panel*]. *Jurnal Ekonomi Dan Pembangunan, 28*, 192–214.

Balaguer, J., & Cantavella, M. (2018). The role of education in the Environmental Kuznets Curve. Evidence from Australian data. *Energy Economics, 70*, 289–296. https://doi.org/10.1016/j.eneco.2018.01.021

Da Silva, P. P., Cerqueira, P. A., & Ogbe, W. (2018). Determinants of renewable energy growth in Sub-Saharan Africa: Evidence from panel ARDL. Energy, 156, 45–54. https://doi.org/10.1016/j.energy.2018.05.068

Doytch, N., & Narayan, S. (2016). Does FDI influence renewable energy consumption? An analysis of sectoral FDI impact on renewable and non-renewable industrial energy consumption. *Energy Economics, 54*, 291–301. https://doi.org/10.1016/j.eneco.2015.12.010

Fan, W., & Hao, Y. (2019). An empirical research on the relationship amongst renewable energy consumption, economic growth and foreign direct investment in China. *Renewable Energy, 146*, 598–609. https://doi.org/10.1016/j.renene.2019.06.170

Hidayati, I. N., & Suryanto, S. (2015). [*Pengaruh Perubahan Iklim Terhadap Produksi Pertanian Dan Strategi Adaptasi Pada Lahan Rawan Kekeringan*]. *Jurnal Ekonomi & Studi Pembangunan., 16*(1), 42–52. https://doi.org/10.18196/jesp.16.1.1217

Jufrida, F., Syechalad, M. N., & Nasir, M. (2017). [*Analisis Pengaruh Investasi Asing Langsung (FDI) Dan Investasi Dalam Negeri Terhadap Pertumbuhan Ekonomi Indonesia*]. *Jurnal Perspektif Ekonomi Darussalam, 2*(1), 54–68. https://doi.org/10.24815/jped.v2i1.6652

Khatibah. (2011). [*Penelitian Kepustakaan*]. *Iqra, 05*(01), 36–39.

Masruri, B. (2015). [*Pengaruh Pendidikan Kependudukan dan Lingkungan Hidup Terhadap Perilaku Peduli Lingkungan*]. *SOCIA: Jurnal Ilmu-Ilmu Sosial, 11*(1), 16–32. https://doi.org/10.21831/socia.v11i1.5285

Mayer, A. (2013). Education and the environment: An international study. *International Journal of Sustainable Development and World Ecology, 20*(6), 512–519. https://doi.org/10.1080/13504509.2013.830994

Nihayah, D. M., Mafruhah, I., Hakim, L., & Suryanto, S. (2022). CO2 Emissions in Indonesia: The Role of Urbanization and Economic Activities towards Net Zero Carbon. *Economies, 10*(4), 72. https://doi.org/10.3390/economies10040072

Özçiçek, Ö., & Ağpak, F. (2017). The Role of Education on Renewable Energy Use: Evidence from Poisson Pseudo Maximum Likelihood Estimations. *Journal of Business & Economic Policy, 4*(4), 49–61. www.jbepnet.com

[*Peraturan Pemerintah Republik Indonesia Nomor 79 Tahun 2014 Tentang Kebijakan Energi Nasional*]

[*Peraturan Presiden Republik Indonesia Nomor 22 Tahun 2017 Tentang Rencana Umum Energi Nasional*]

Prasetyawati, M. (2019). How Foreign Direct Investment And Urbanization Affect The Environment Of Indonesia. *Jurnal Litbang Provinsi Jawa Tengah, 17*(2), 55.

Rahayu, I. T., & Pasaribu, E. (2017). [*Faktor-Faktor yang Memengaruhi Foerign Direct Investment (FDI) di Enam Koridor Ekonomi Indonesia: Market Seeking atau Resource Seeking?*]. *Jurnal Aplikasi Statistika & Komputasi Statistik, 9*(1), 10. https://doi.org/10.34123/jurnalasks.v9i1.92

Rosana, M. (2018). [*Kebijakan Pembangunan Berkelanjutan Yang Berwawasan Lingkungan di Indonesia*]. *KELOLA Jurnal Ilmu Sosial, 1*(1), 148–163.

Sadorsky, P. (2009). Renewable energy consumption and income in emerging economies. *Energy Policy, 37*(10), 4021–4028. https://doi.org/10.1016/j.enpol.2009.05.003

Salim, R. A., & Shafiei, S. (2014). Urbanization and renewable and non-renewable energy consumption in OECD countries: An empirical analysis. *Economic Modelling, 38*, 581–591. https://doi.org/10.1016/j.econmod.2014.02.008

Sastypratiwi, H., & Nyoto, R. D. (2020). [*Analisis Data Artikel Sistem Pakar Menggunakan Metode Systematic Review*]. *Jurnal Edukasi Dan Penelitian Informatika (JEPIN), 6*(2), 250. https://doi.org/10.26418/jp.v6i2.40914

Umaroh, R. (2019). Does Education Reduce CO2 Emmisions? Empirical Evidence of The Environmental Kuznets Curve in Indonesia. *Journal of Reviews on Global Economics, 8*, 662–671. https://doi.org/10.6000/1929-7092.2019.08.57

[*Undang-Undang Nomor 25 Tahun 2007 Tentang Penanaman Modal*]

Wahyu Azizah, E., & Kusuma, H. (2018). [*Pengaruh Pendidikan, Pendapatan Perkapita Dan Jumlah Penduduk Terhadap Kemiskinan Di Provinsi Jawa Timur*]. *Jurnal Ilmu Ekonomi, 2*, 167–180.