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ANALYSIS OF GOVERNMENT EXPENDITURE, NATIONAL INCOME LEVEL AND HOUSEHOLD ELECTRICITY PRICES ON ENERGY POVERTY IN INDONESIA

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Abstract

The purpose of this study is to determine the Influence of government spending, national income level and household electricity prices on energy poverty in Indonesia. The study uses Time Series data from 1970-2023. The study uses the Autoregressive Distributed Lag (ARDL) method.The results of the short-term and long term study show that the of government spending have a negative and significant effect on energy poverty in Indonesia, national income levels have a positive and significant effect on energy poverty in Indonesia, and the household electricity prices have a negative and significant effect on energy poverty in Indonesia. In the long term, the household electricity prices have a negative and significant effect on energy poverty in Indonesia.

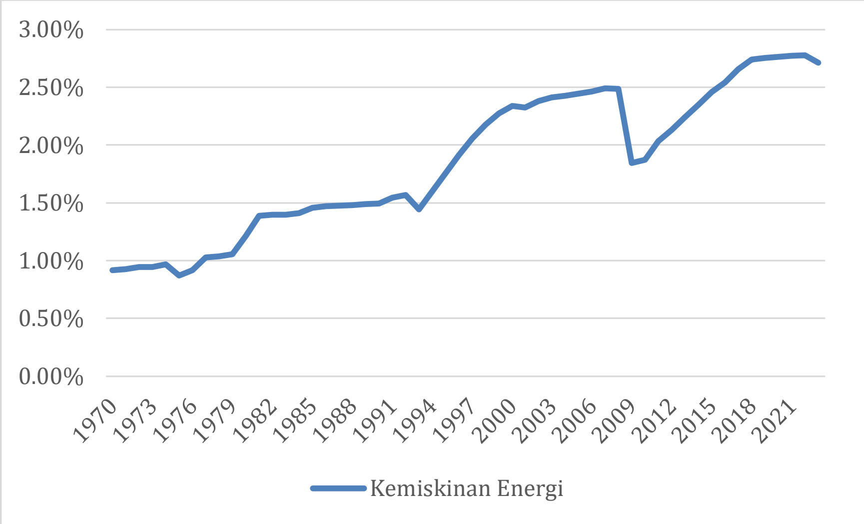
Keywords: ***Government Spending, National Income Level, Household Electricity Prices, Energy Poverty, Autoregressive Distributed Lag***

INTRODUCTION

Poverty has limited people's opportunities to obtain their rights as human beings to gain access to the necessities of life such as food, clothing and shelter. Poverty can be defined as someone finding it difficult to meet their daily living needs because of the low level of income they earn. The increase in poverty levels is caused by various factors, namely investment levels that are still below standard, slow economic growth rates, and unemployment rates that are still quite high (Wahyani & Yuliarmi, 2018).

Poverty is a multidimensional phenomenon caused by various human needs which are seen from various aspects which include primary aspects, namely lack of capital, skills and knowledge, and secondary aspects including social relationships (Hanifah & Saleh, 2020). Energy poverty is one of the main problems in developing countries. Various approaches, methodologies and steps to reduce demand have been carried out both directly and indirectly at the environmental and community levels (Ratih et al., 2017).

Energy poverty refers to a situation where individuals or communities do not have adequate or affordable access to energy sources necessary to meet their basic needs, such as cooking, heating, lighting, and transportation. Research conducted by Doukas & Marinakis (2020) states that energy poverty is widely understood as the inability of households to maintain adequate levels of energy services at affordable costs. Higher energy poverty means that more people do not have access to electricity and energy for their needs, which affects the lives and work of one of the most vulnerable groups in low-income society (Herrero, 2017).



Data Source: Ministry of Economic and Mineral Resources (ESDM), 2023

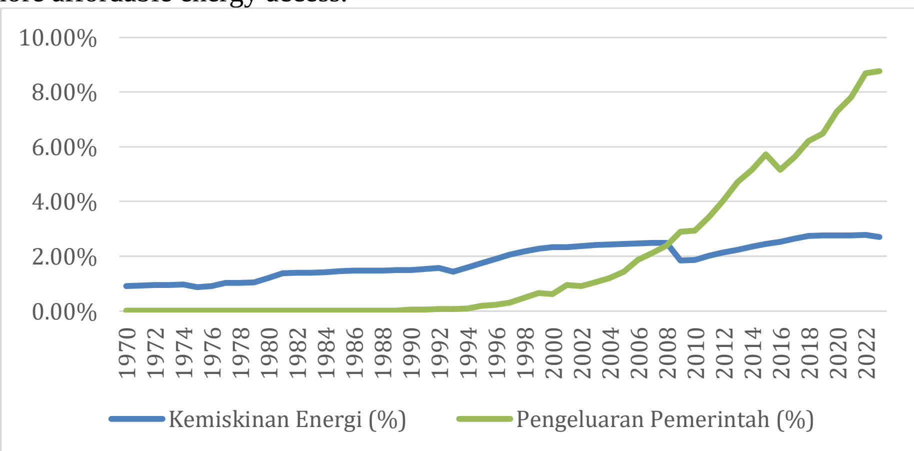
Image 1: Energy Poverty in Indonesia

Based on data obtained from the Ministry of Economy and Mineral Resources (ESDM), it can be concluded that Energy poverty in Indonesia from 1970 to 2023 continues to fluctuate experiences tend to increase due to various factors, and changes in social, economic or environmental conditions that can influence energy poverty. 2010-2022 will cause energy poverty to increase because high fuel prices make it difficult for people to access modern energy. In 2023, energy poverty will decrease due to government policies that maintain stable domestic energy selling prices.

Addressing energy poverty requires a holistic approach that includes investments in infrastructure, inclusive energy policies, education about energy efficiency, and better access to affordable and clean energy sources and government spending.

The type of energy poverty can vary depending on factors such as geographic location, economic level, energy infrastructure, and government policies. Energy poverty is a type of energy poverty that studies the low affordability of energy including fuel, electricity and heating (Liet al., 2014). Energy poverty based on accessibility is related to the distribution of energy services, depending on the geography where the household and the economy are located, while energy poverty due to accessibility occurs in households that spend 10% or more of their income on petrol, electricity and liquefied petroleum gas (LPG) (Liet., 2014).

Government spending can play a role in reducing energy poverty by allocating funds for the development of affordable and environmentally friendly energy infrastructure, as well as subsidy programs for low-income communities for more affordable energy access.

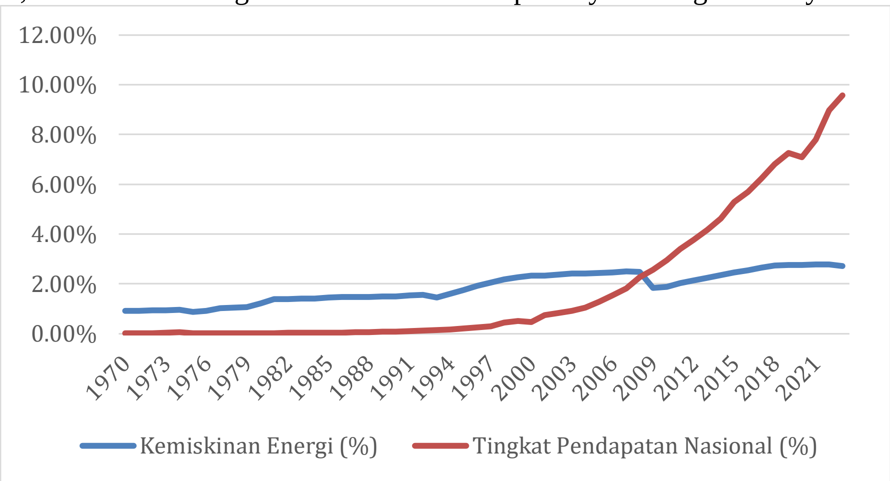


Data Source: Ministry of Energy and Resources and Central Statistics Agency, 2024

Image 2: Government Spending and Energy Poverty In Indonesia

Government spending in Indonesia in 1970-2023 tends to increase. In 1970-2007, government spending increased due to economic growth, the government was often faced with the need to expand and improve infrastructure and public services to support economic development. In 2009, government spending increased due to the country experiencing the global financial crisis that started in 2008, while energy poverty decreased due to improvements in energy infrastructure, one of which was the country and efforts to improve energy infrastructure and expand energy access to the public. Government spending and energy poverty have a close relationship in the Indonesian economy. High government spending can trigger inflation, which can cause increases in the prices of goods and services, including energy. If household incomes do not increase with inflation, this could exacerbate the problem of energy poverty.

Government spending plays an important role in overcoming energy poverty. Indonesia has created various policies to overcome energy poverty, such as utilizing local energy potential, improving energy infrastructure, socializing the use of energy services, removing energy subsidies, and empowering the local economy. Research conducted by Mahanani (2023) shows that of the types of government expenditure studied, only capital expenditure for roads, networks and irrigation is able to reduce poverty rates significantly.

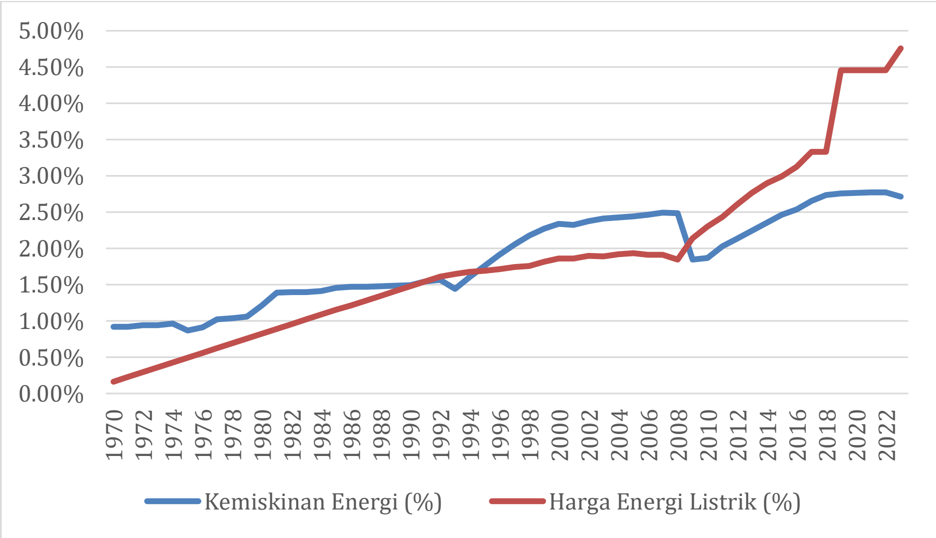


Data Source: Ministry of Energy and Resources and Central Statistics Agency, 2024

Image 3: National Income Level and Energy Poverty In Indonesia

The level of national income in Indonesia from 1970 to 2023 tends to increase. In 2008, the level of national income and energy poverty increased, one of which was caused by the global financial crisis which began in 2007 and reached its peak in 2008, triggering a global recession. The crisis led to a sharp decline in income and rising unemployment. Many individuals and families have lost their jobs or faced reduced income, exacerbating the situation of energy poverty. The reason the level of national income in Indonesia decreased in 2020 was due to the Covid 19 pandemic through world travel restrictions, lockdowns, and a decrease in economic activity causing reduced production and consumption which in turn reduced national income. And it will increase again in 2021 to 2023, which will lead to post-pandemic recovery, many countries are starting to experience economic recovery in line with the decline in COVID19 cases, vaccinations and violations of social restrictions. In addition, with mass vaccines and increased consumer confidence, economic activity can recover and increase, which will then contribute to increasing national income.

The level of national income and energy poverty have a very close relationship in the Indonesian economy. When national income levels increase, individual and household incomes usually increase as well. This can increase household purchasing power for energy, thereby reducing energy poverty. Households with higher incomes tend to have a better capacity to pay energy bills and access more reliable energy sources.

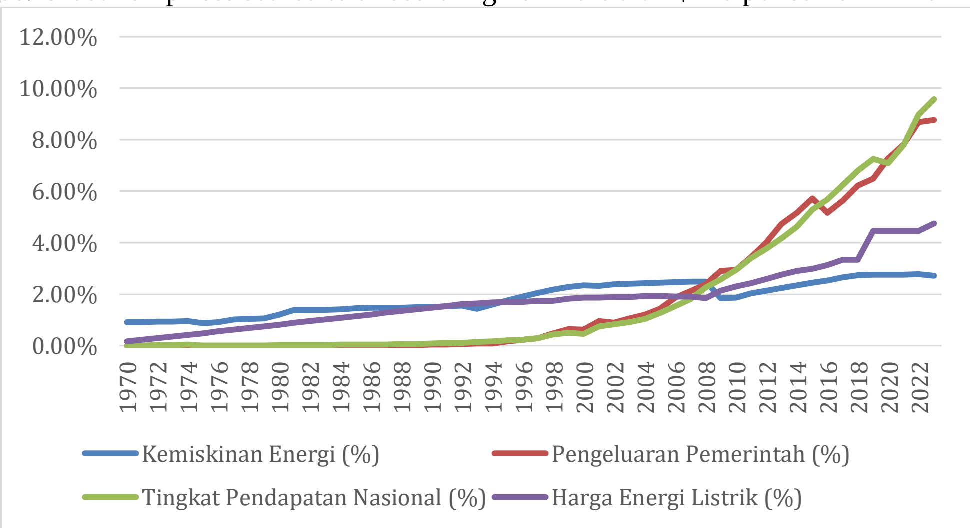


Data Source: Ministry of Economic and Mineral Resources (ESDM) 2023

Image 4: household electricity prices and Energy Poverty In Indonesia

Electrical energy prices in Indonesia from 1970 to 2023 are likely to increase. Electrical energy prices are increasing because the government is still controlling prices in an effort to increase access to electricity for the community. In addition, energy prices are increasing gradually due to increasing demand and operational costs in generating electricity.

In 2009-2017 the price of electrical energy increased due to an increase in fuel costs. During this period there was an increase in the price of the main fuel used in electricity generation, such as the price of coal, natural gas and oil. This increase directly affects the cost of producing electrical energy, which is then reflected in consumer selling prices. While energy poverty in 2008 experienced an increase due to the spike in energy prices, one of the main causes of energy poverty which increased in 2008 was the spike in energy prices, especially crude oil and natural gas. Global oil prices soared to a record high of more than $140 per barrel in mid-2008.



Data Source: Ministry of Energy and Mineral Resources and Central Statistics Agency, 2024

Image 5: Government Spending, National Income Level, Household Electricity Prices and Energy Poverty In Indonesia

Shows that energy poverty in Indonesia is likely to increase from 1970 to 2023. The relationship can be seen between government spending, national income levels and household electricity prices and energy poverty also tends to increase. This could indicate increasing community access to cleaner and more efficient energy sources Christiani et al., (2021). This is due to the increase in government energy subsidies to IDR 551 trillion, which acts as a factor in maintaining poverty rates. This increase could help in dealing with rising energy costs. Meanwhile, the level of national income follows the same trend which tends to increase, when the level of national income tends to increase, energy poverty also tends to increase due to education and public awareness. An increase in national income is often related to increased access to education and public awareness. With better education and increased environmental awareness, society may be better able to adopt sustainable practices in energy use such as energy savings, energy efficiency, and the use of renewable energy technologies.

Based on this background, the author is interested in examining the govenment spending, national income level and household electricty prices to energy poverty so that the background of the author to take the title "Analysis of government spending, national income level and household electricity prices on energy poverty in Indonesia".

LITERATURE REVIEW

Poverty

Poverty is a condition where individuals or groups are unable to fulfill basic needs, such as food, clothing, shelter, education and health. People's difficulties in meeting their daily living needs are due to the low quality of the resources they have, the minimum wage does not match the cost of living, and the increasing population affects competitiveness in various need sectors, especially in getting a job (Sari, 2021). Poverty is the inability to meet a minimum standard of living. The basic needs that must be met include food, clothing, shelter, education and health. Poverty can be differentiated based on income measures, namely absolute poverty and relative poverty.

When viewed based on time patterns, poverty can be divided into four, including (1) persistent poverty, namely poverty that has been chronic or has been decreasing; (2) cyclical poverty, is poverty that follows overall economic cycle patterns; (3) seasonal poverty, which is seasonal poverty which is often found in fishermen and agricultural cases; and (4) accident poverty, namely poverty created due to natural disasters, conflict and violence, or the impact of a particular policy which causes a decrease in the level of welfare of a society (Febrianti et al., 2024). Poverty refers to an individual's inability to obtain the resources necessary to survive, such as food, clothing and income that are below a certain poverty line. This term covers a variety of forms, including absolute and relative poverty, as well as structural and extreme poverty (HEIE, 2022).

Energy Poverty

In general, energy poverty tends to be associated with society's economic inability to procure energy to meet daily living needs (Fabby & Henriette, 2010). Indonesia's energy poverty refers to the inability of a number of residents to access adequate and affordable energy services, which can have a negative impact on people's quality of life and well-being. Even though Indonesia is a country with per capita energy consumption that exceeds the minimum limit for modern energy consumption, in reality energy poverty still occurs in several regions of Indonesia. IESR conducted a literature study and analysis regarding energy poverty in Indonesia (Institute For Essential Service Reform, 2020).

Energy poverty is also said to occur if household or individual energy expenditure is above 10 percent of income that can be spent on transportation fuels not included here Robic et al., (2012). access to modern energy sources and the maximum proportion of energy expenditure in relation to total disposable income or total expenditure. In energy poverty analysis, it is very important to establish the energy poverty line. This line is usually based on how much energy consumption is required to maintain a minimum livelihood for the household Barneset al., (2010).

Goventment Spending

Government spending can also be interpreted as the use of money and resources of a country to finance a state or government activity in order to realize its function in carrying out welfare. Mangkoesoebroto stated that in Ningrum's (2020) research, the theory of macro government spending was put forward by three different economists, namely Rostow and Musgrave, Adolf Wegner, and Peacock and Wiseman. Rostow and Musgrave relate the development of government spending to the stages of economic development, namely the initial stage, middle stage and advanced stage. The development of government spending by Adolf Wagner explains that as per capita income in an economy increases, government spending will relatively increase. So the curve of increasing government spending is exponential. Wagner's famous law is "The Law of Expanding State Expenditure" where government spending continues to increase due to the government's increasing role in managing all activities related to society, law, education, recreation and culture. According to Mangkoesoebroto (1993), in Ningrum's (2020) research, government expenditure is the value of expenditure made by the government which is used for the benefit of society. Government spending reflects government policy. If the government has established a policy to purchase goods and services, government expenditure reflects the costs that must be incurred by the government to implement the policy. According to Alfiat (2015), in Soleh's (2021) research, according to the type of expenditure, government expenditure is classified into two, namely non-discretionary expenditure and discretionary expenditure.

National Income Level

National income is the total income received by all economic actors in a country during one year. The purpose of national income is to assess the level of economic growth of a country, determine the value of goods and services produced by the people within one year, and create a concept for a long-term development program. The level of national income is an important factor influencing energy poverty, because a high national income can increase a country's ability to provide better energy access for its citizens. According to Suleman (2020), national income is the amount of money a country produces in a certain year.

National Income is the sum of the income of production factors used to produce goods and services by a country in a certain year. National Income can be divided into two, namely Gross Domestic Income (National Income) and Gross National Income (PNB). Gross domestic income is the value of goods and services produced within the country in a particular year. Meanwhile, gross National Income is the value of all finished goods and services produced by domestic production factors in the country in a certain period. Aggregative National Income shows a country's ability to generate income/remuneration for production factors that participate in the regional production process. In other words, National Income shows a picture of Production Organized.

Prices

Price is the amount of money charged for a product or service, or the amount of value that consumers exchange for the benefits of owning or using the product or service (Kotler et al., 2012). Price is also something that cannot be determined. The price only occurs in the contract, namely something that is agreed to in the contract, whether it is less, greater, or equal to the value of the goods agreed to by both parties to the contract. It can also be called tsaman (price as the amount of money that must be paid for the merchandise).

Energy Prices

Energy prices are the amount of rupiah that consumers must pay to obtain energy, both electricity and fuel. The price of electrical energy is determined by the government based on various factors, including the basic cost of providing energy (BPP), the economic and social conditions of the community, as well as government policy Natsir et al., (2018). Elecrlcity Prices According to the Minister of Energy and Mineral Resources Regulation Number 28 of 2016 concerning Electricity Tariffs, the price of electricity is the amount of rupiah set by the Government for each unit of electrical energy consumed by customers Ramadani et al., (2020).

RESEARCH METHODS

Object of Research

Research Object The object of this research is energy poverty as the dependent variable, while government spending, national income levels and electricity prices are the independent variables. The location in this research is in Indonesia.

Data Types and Sources

This study uses a quantitative method because the research data is in the form of numerical data. This study uses secondary data from 1970 to 2023. The author took the data from the Ministry of Energy and Mineral Resources (KESDM) and Badan Pusat Statistik (BPS).

Method of Collecting Data

The method of data collection in this study is using the documentation method. Data and information collection is carried out by obtaining it from the Ministry of Energy and Mineral Resources (KESDM), journals and articles. Then the data will be tested with a statistical tool, namely eviews 10.

Data Analysis Method

The data analysis method used in this study if it meets the requirements for using the ARDL model, then the author will process the data using the ARDL model. This research uses quantitative analysis methods, namely time series data. By using quantitative data analysis ARDL method in processing data, it can find out how the independent variable (independent variable) can affect the dependent variable (dependent variable). This analysis method is used to determine the effect of the dependent variable and the independent variable in the long or short term. This ARDL model was chosen because this model can overcome research variables/data that have different stationary levels (Siti Afifatul Farichah, 2022).

ARDL is considered effective in determining short-term and long-term relationships between variables that do not have the same integration order where the variables are stationary at level I(0), First Difference I(1) simultaneously.

In general, the steps that will be taken for econometric analysis using this method are as follows: Testing the stationarity of variable data in the research model, both at the level and first difference levels, Classical assumption test, Optimum lag determination test, Cointegration test, ARDL model estimation in the long term and short term, and ARDL Model Stability Test.

Stationery Test

Stationarity is one of the important requirements that must be met. A data is said to be stationary if the mean and variance of the data are constant or do not change systematically over time. One of the formal procedures for stationarity testing is the unit root test. This test was developed by David Dickey and Wayne Fuller and is called the Augmented Dickey-Fuller (ADF) Test. If a time series data is not stationary at the level (zero order, I(0)), then the stationarity of the data can be sought through the next order, namely the first order or I(1) (first difference), or the second order I(2) (second difference). Since this study uses the ARDL method, all variables must be stationary at the level (I(0)) or first order (I(1)).

Classical Assumption Test

Classical assumption tests look for problems in the data collected in this study to determine that it is normally distributed and worthy of further investigation. Classical hypothesis testing is seen based on the normality test, autocorrelation test and heteroscedasticity test.

Normality Test

The normality test is carried out with the aim of testing whether the model to be regressed is normally distributed or not. This study uses the Jarque-Bera (JB) test method to determine whether the regression model is normal or not. By comparing the calculated JB value with an alpha level of 0.05 (5%). If the Jarque Bera (JB) probability value is greater than 5% (0.05), then the data is normally distributed.

Autocorrelation Test

According to Gujarati & Porter (2012) autocorrelation is defined as the correlation between members of a series of observations organized by time (time series data) and by space (cross-section data). Gujarati (2015) to test the presence or absence of aultocorrelation uses two ways, the Dorbin-Watson Test and the Breusch-Godfrey Test. In this study, the Breusch-Godfrey Serial Correlation LM Test method was used. With conditions if:

1. Probability> from $\alpha = 5\%$, it means there is no autocorrelation, and vice versa if
2. The probability value < than $\alpha = 5\%$, means there is autocorrelation.

Heteroskedasticity Test

Heteroscedasticity is a condition where the variation of residuals is not constant. A good regression model is homoscedasticity or no heteroscedasticity. The heteroscedasticity test used in this study is the Breusch-Pagan-Godfrey test. How to detect the Breuschpagan-Godfrey test method by looking at the 0bs * R-squared and Chi-Squares values with conditions if:

1. Obs*R-squared value> Chi Squares value, The probability of the Chi Squares value> 0.05 indicates that there is no heteroscedasticity in the model.
2. If the Obs*R-squared value < Chi Squares value and the probability of the Chi Squares value < 0.05 indicates heteroscedasticity in the model.

Determination of Optimum Lag

Determining the optimal lag is very important in order to obtain the dynamics of the system to be modeled. If the lag is too long, it will result in more parameters that must be estimated so that it can reduce the ability to reject H0 because too many additional parameters will reduce the degree of freedom. Determining the optimal lag length can utilize some information, namely by using the Akaike Information Criterion (AIC). AIC penalizes additional variables (including lag variables) that reduce the degree of freedom. Therefore, the lag will be found in the model specification that gives the minimum AIC value.

Cointegration Bound Test

The cointegration test is a test of whether there is a long-term relationship between the independent and dependent variables, this test is a continuation of the unit root test and the integration test. Cointegration testing is done using the bound test. The decision-making requirement in the cointegration test using the bound test compares the F-statistic value with the critical value of the lower and upwer bounds. If the Fstatistic value is higher than the critical value of the upwer bound then Ha is accepted (Ha = there is cointegration between variables), and if the F-statistic value is smaller than the critical value then Ho is accepted (Ho = there is no cointegration between variables).

Autogressive Distributed Lag Model

The Autogressive Distributed Lag (ARDL) model represents the interaction between X and Y variables over time, including the impact of past values of Y variables on the current value of Y. The Autogressive Distributed Lag (ARDL) model is used in this investigation. In general, the ARDL model equation can be written as follows:

$$\Delta Yt = \beta_0 + \sum_{i=1}^{n} \beta_1 \Delta Y_{t-1} + \sum_{i=1}^{n} \delta_1 \Delta X_{t-1} + \varphi_1 Y_{t-1} + \varphi_2 Y_{t-1} + \mu t$$

Description:
β_1, δ_1 : Short-term coefficient
φ1, φ2 : Long run coefficient
μt : Disturbance error (whitenoise)
The following is the general model of ARDL:

$$\Delta KE_t = \beta_0 + \sum_{i=0}^{n} \beta_1 \Delta KE_{t-1} + \sum_{i=0}^{n} \delta_1 \Delta PP_{t-1} + \sum_{i=0}^{n} \delta_2 \Delta TPN_{t-1} + \sum_{i=0}^{n} \delta_3 \Delta HEL_{t-1} + \varphi_1 KE_{t-1} + \varphi_2 PP_{t-1} + \varphi_3 TPN_{t-1} + \varphi_4 HEL_{t-1} + \mu_t$$

Description:
β_1, δ_1 = Short-term coefficient
φ1, φ2 = Long run ARDL coefficients
KE = Energy Poverty
PP = Government Spending
TPN = Natioanl IncomeLevel
HEL = Household Electricity Prices
μt = Disturbance error (whitenoise)

The estimation method used is the Autoregressive Distributed Lag (ARDL) approach. The ARDL model was chosen because using ARDL will be able to see the effect of Y and X over time, as well as the effect of past Y variables on present Y.

Model Stability

Test The ARDL model stability test in this study uses the cusum test where the cusum test is carried out by looking at the 95% confidence level. The Cusum test results for the ARDL model in this study are determined by the position of the blue Cusum line between the two red 5% significance lines. For the ARDL model, the Cusum line is between the significance lines which proves that the ARDL model is stable.

RESULTS AND DISCUSSION

Data Stationery Test

To determine the stationarity of the data, the Augmented Dicky-Fuller (ADF) Test or the PhillipsPerron (PP) Test is used (Faudzi & Asmara, 2023). Stationary or not will be seen from the probability value (Critical Value) which is compared at the alpha level (1%, 5%, or 10%).

Table 1
Stationarity Test Using Augmented Dickey-Fuller (ADF)

Variabel	Unit Root	ADF t-Statistik	Critical Value (5%)	Prob.ADF	Keterangan
KE	Level	-0,794448	-2,91765	0,8124	Tidak Stasioner
	1st Difference	-5,800617	-2,918778	0,0000	Stasioner
LNPP	Level	-2,765553	-2,91765	0,0701	Tidak Stasioner
	1st Difference	-10,14633	-2,918778	0,0000	Stasioner
LNTPN	Level	-0,245153	-2,91765	0,9256	Tidak Stasioner
	1st Difference	-8,098308	-2,918778	0,0000	Stasioner
LNHEL	Level	-6,150026	-2,91765	0,0000	Stasioner

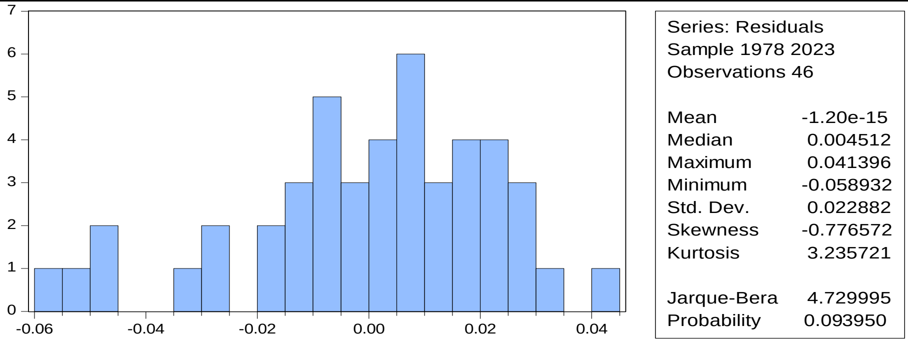
Source: Processed data, eviews10 output results (2024)

Based on table 1, it can be seen that the results of the stationarity test with Augmented Dickey-Fuller (ADF) on the electrical energy price variable are significant or are said to be stationary at the level with α: 5%. Meanwhile, the variables energy poverty, government expenditure and national income levels are not stationary at their level. Therefore, it is necessary to carry out a differentiation process at the 1st difference to find out whether the other variables are stationary or not. Based on table 1, it can be seen that the energy supply, energy demand and final energy variables are significant or stationary at a difference of 1 with α: 5%. From the stationarity test results, the Auto Regressive Distributed Lag (ARDL) model is a suitable method to use in this research.

Classical Assumption Test

The classical assumption test looks for confounding issues in the data collected for this study to determine that it is normally distributed and worthy of further investigation. Multicollinearity test, autocorrelation test and heteroscedasticity test are some examples of traditional assumptions in this subject. The findings of the study's classical assumption tests are as follows:

Normality Test Result



Source: Data processed from Eviews output (2024)

Image 6 Normality Test Result

Based on Image 6 shows the results of the normality test using the Jarque Bera (JB-Test) method. The test results resulted in a probability value of 0.093950 > 0.05. Based on these results, it can be concluded that the data is normally distributed.

Autocorrelation Test Result

Table 2
Autocorrelation Test Results

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.756786	Prob. F(2,30)	0.4779
Obs*R-squared	2.353431	Prob. Chi-Square(2)	0.3083

Source: Data processed from Eviews output (2024)

Based on Table 2 shows the results of the autocorrelation test, the value of Prob. Chi-Square (2) which is the p value of the Breusch-Godfrey Serial Correlation LM test of 0.03083. The Prob value. ChiSquare (2) is greater than the 5% or 0.05 significant level so it can be concluded that there is no autocorrelation problem.

Heteroskedasticity Test Result

Table 3
Heteroscedasticity Test Results

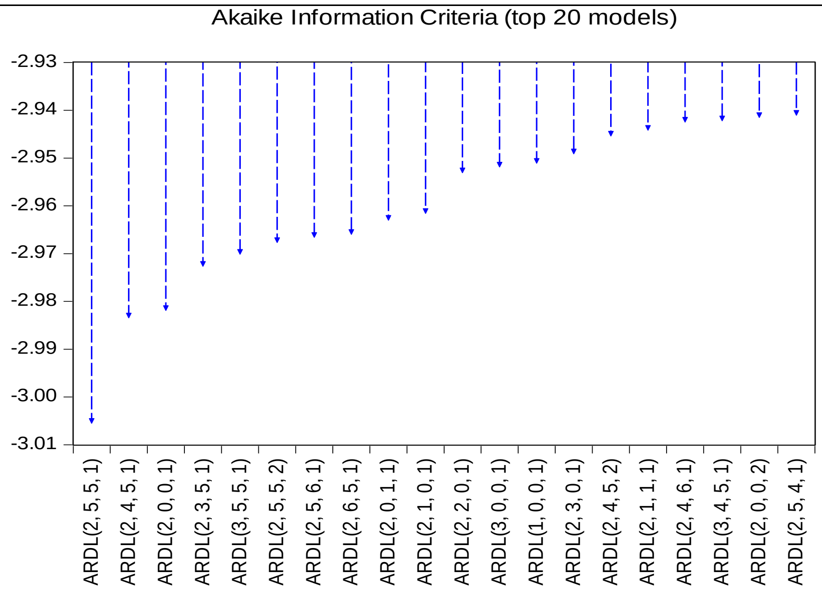
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.212124	Prob. F(16,32)	0.3113
Obs*R-squared	18.49059	Prob. Chi-Square(16)	0.2960
Scaled explained SS	35.48164	Prob. Chi-Square(16)	0.0034

Source: Data processed from Eviews output (2024)

Based on Table 3 shows the results of the heteroscedasticity test, the p value is indicated by the Prob value. Chi-Square has a value greater than the 5% or 0.05 significant level (0.2960 > 0.05). It can be concluded that there is no heteroscedasticity problem.

Optimum Lag Determination Test Result



Source: Processed data, eviews10 output results (2024)

Image 7 Akaike Information Criteria

Based on the image shows the estimation results of lag selection criteria by looking at the smallest Akaike Information Criteria (AIC) value of the 20 best models. The best criterion is ARDL (2,5,4,1) which means that Y or Energy demand is 2 lags, X1 or Energy Supply is 6 lags, X2 or Energy Demand is 5 lags, and X3 or Final Energy is 3 lags.

Bound Test Cointegration Result

Table 4
Bound Test Cointegration Results

Test Statistic	Value	K
F-statistic	6.588006	3
Signifikan	I(0)	I(1)
10%	2.538	3.398
5%	3.048	4.002
1%	4.188	5.328

Source: Data processed from Eviews output (2024)

Based on the table, the cointegration test results based on the Bound Test Technique show that the F-statistic value of 6.588006 is higherthan the bound value of I0. F-statistic > I0 Bound is considered positive at 10%, 5%, 2.5%, or 1% confidence level. Therefore, the tested model has cointegrating variables, resulting in a balance between the long-run and short-run.

ARDL Model Estimation

The data is further checked for cointegration using ARDL analysis following the stationarity test. There are two types of processing viz: short-run processing and long-run processing.

Short-Term Test Results of ARDL Model

Table 5
Short-Term Coefficient Estimation Results of ARDL

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(LPOVE(-1))	0.316347	0.117843	2.684484	0.0114
D(LGEXP)	-0.024335	0.011486	-2.118583	0.0420
D(LGEXP(-1))	0.061446	0.017686	3.474315	0.0015
D(LGEXP(-2))	0.043053	0.015910	2.705980	0.0108
D(LGEXP(-3))	0.023802	0.013879	1.714949	0.0960
D(LGEXP(-4))	0.020121	0.012185	1.651368	0.1084
D(LNI)	0.190076	0.028556	6.656160	0.0000
D(LNI(-1))	0.038543	0.021782	1.769463	0.0863
D(LNI(-2))	0.030146	0.020367	1.480162	0.1486
D(LNI(-3))	0.046815	0.019559	2.393469	0.0227
D(LNI(-4))	0.045314	0.019831	2.285067	0.0291
D(LPE)	-0.500477	0.133442	-3.750520	0.0007
CointEq(-1)*	-0.583090	0.095785	-6.0874q90	0.0000
R-squared	0.594391	Mean dependent var		0.021036
Adjusted R-squared	0.459188	S.D. dependent var		0.064702

* p-value incompatible with t-Bounds distribution.

Source: Data processed from Eviews output (2024)

Based on Table 5 above, short-term test results can be formulated as follows:

$$\Delta KE_t = 0.316347\Delta KE_t(1) - 0.024335\Delta LNPP_t + 0.061446\Delta LNPP_t(1) + 0.043053\Delta LNPP_t(-2) + 0.023802\Delta LNPP_t(-3) + 0.020121\Delta LNPP_t(-4) + 0.190076\Delta LNTPN_t - 0.038543\Delta LNTPN_t(-1) + 0.030146\Delta LNTPN_t(-2) + 0.046815\Delta LNTPN_t(-3) + 0.045314 LNHEL_t(-4) - 0.500477 LNHEL_t - 0.583090 Ect_t$$

Based on the results of the short-term model estimation output, results were obtained where the CointEq variable or what is called error correction represents an error in the previous period which had a negative and significant sign. So the ARDL model in this research is valid and indicates the existence of cointegration between variables.

The energy poverty variable (-1) in the current year has a coefficient value of 0.31, which means that energy poverty in the previous year was positive and significant at the 5% level. This means that energy poverty has a positive and significant effect on energy poverty with a probability of 0.0114 < 0.05. The government expenditure variable in the current year has a coefficient value of -0.02, which means that government expenditure in the current year is negative and significant at the 5% level. This means that government spending has a negative and significant effect on energy poverty with a probability of 0.0420 < 0.05.

The government expenditure variable (-1) of 0.06 is that government expenditure in the previous year was positive and significant at the 1% level. This means that government spending in the previous year had a positive and significant effect on the current year with a probability of 0.0015 < 0.05.

The government expenditure variable (-2) of 0.04 is that government expenditure in the previous year was positive and significant at the 5% level. This means that government spending in the previous year had a positive and significant effect on the current year with a probability of 0.0108 < 0.05.

The government expenditure variable (-3) of 0.023 is that government expenditure in the previous year was positive and significant at the 5% level. This means that government spending in the previous year had a positive and significant effect on the current year with a probability of 0.0960 < 0.05.

The government expenditure variable (-4) of 0.02 is that government expenditure in the previous year was positive and significant at the 5% level. This means that government spending in the previous year had a positive and insignificant effect on the current year with a probability of 0.1084 > 0.05.

The variable national income level in the current year has a coefficient value of 0.19, which means that the national income level in the current year is negative and not significant at the 5% level. This means that the level of national income has a negative and insignificant influence on energy poverty with a probability of 0.0000 < 0.05.

The variable national income level (-1) of 0.038 is government spending in the previous year which is positive and significant at the 5% level. This means that government spending in the previous year had a positive and significant effect on the current year with a probability of 0.0863 > 0.05.

The variable national income level (-2) of 0.030 is government spending in the previous year which is positive and significant at the 5% level. This means that government spending in the previous year had a positive and significant effect on the current year with a probability of 0.1486 > 0.05.

The variable national income level (-3) of 0.046 is government spending in the previous year which is positive and significant at the 5% level. This means that government spending in the previous year had a positive and significant effect on the current year with a probability of 0.0227 < 0.05.

The variable national income level (-4) of 0.045 is government spending in the previous year which is positive and significant at the 5% level. This means that government spending in the previous year had a positive and significant effect on the current year with a probability of 0.0291 < 0.05.

The variable price of electrical energy in the current year has a coefficient value of -0.500, which means that the price of electrical energy in the current year is negative and significant at the 5% level. This means that the price of electrical energy has a negative and insignificant effect on energy poverty with a probability of 0.0007 > 0.05.

Long-Term Test Results of ARDL Model

Table 6
Estimation Results of Long-Term Coefficient of ARDL Model

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGEXP	-0.160323	0.031849	-5.033879	0.0000
LNI	0.192604	0.027092	7.109311	0.0000
LPE	-0.103162	0.091704	-1.124946	0.2690
C	4.439810	0.517427	8.580556	0.0000

EC = LPOVE - (-0.1603*LGEXP + 0.1926*LNI -0.1032*LPE + 4.4398)

Source: Data processed from Eviews output (2024)

Based on table 6 above, the long-term test of the ARDL model can be formulated as follows:

$$\Delta PKE_t = 4.439810 - 0.160323 \Delta LPP + 0.192604 \Delta LTPN - 0.103162 \Delta LHEL$$

A constant value of 4.43 means that if government expenditure, the level of national income and the price of household electricity are constant (fixed) in the long term, then energy poverty is also constant at 13.3 and this result is significant with a probability of 0.0000 > 0.05.

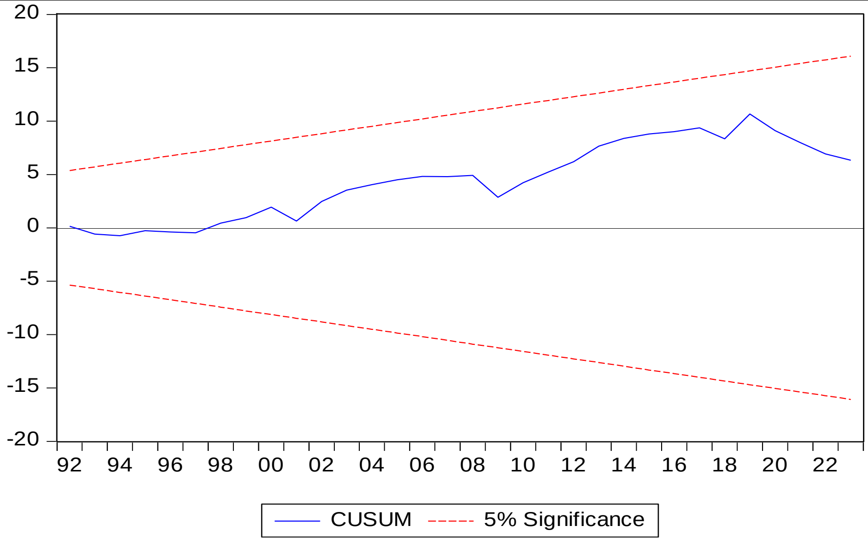
The government expenditure coefficient value is -0.16, meaning that government expenditure in the long term is significant and positive at the 5% level. This means that the government expenditure variable is negative and significant for energy poverty at the 5% level with a probability of 0.0000 < 0.05.

The coefficient value for the national income level is 0.19, meaning that the national income level in the long term is significant and positive at the 5% level. This means that the national income level variable has a positive and significant effect on energy poverty at the 5% level with a probability of 0.0000 < 0.05.

The coefficient value for household electricity prices is -0.10, meaning that the price of household electricity energy in the long term is significant and positive at the 5% level. This means that the household electricity price variable is negative and not significant to energy poverty at the 5% level with a probability of 0.2690 > 0.05.

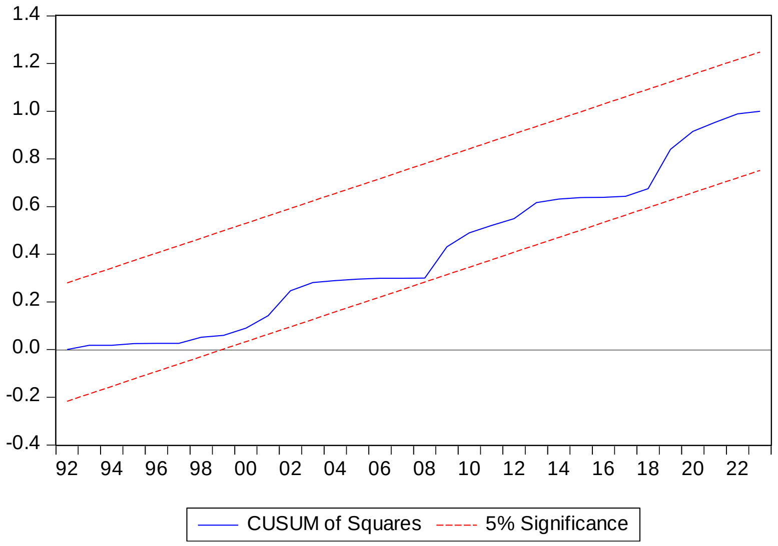
ARDL Model Stability Test (CUSUM)

Model stability testing can be divided into two, namely the CUSUM (Cumulative Sum of Recursive Resedual) and CUSUM Q (Cumulative Sum Of Square Of Recursive Resedual) tests. The CUSUM test is as follows:



Source: Data processed from Eviews output (2024)

Image 8 Cusum Test



Source: Data processed from Eviews output (2024)

Image 9 Cusum Q

Based on Image 8 and 9, the results of the CUSUM model stability show that the model is in a stable situation and is suitable for use as a reference in determining the long-term relationship between variables. The model stability test results are shown through the CUSUM line (blue) which is still on the 5% significant line (red). The CUSUM Q test results show the same result. This means that the ARDL is declared stable/passes the CUSUM test and all variables are verified.

The Influence of Governmrnt Expenditures on Energy Poverty

Based on the results of the tests that have been carried out, it can be concluded that the results of government expenditure variables in the short and long term have a negative and significant effect on energy poverty in Indonesia. This means that any increase in government spending in the long term and short term will not affect energy poverty in Indonesia. Government spending has a negative and significant effect on energy poverty in Indonesia, meaning that when the government spends more funds on certain sectors, the impact actually causes a decrease in energy poverty, or vice versa, worsens the condition of energy poverty in a larger context. Energy poverty also refers to a condition where households or individuals are unable to access sufficient and affordable energy for their basic needs, such as electricity or fuel used for daily activities.

The Influence of National Income Level on Energy Poverty

Based on the results of the tests that have been carried out, it can be concluded that the results of the national income level variable in the short and long term have a positive and significant effect on energy poverty in Indonesia. This means that if the level of national income increases, energy poverty also increases, meaning that when Indonesia's national income (or GDP, Gross Domestic Product) increases, energy poverty in that country also increases, and this relationship is quite strong or significant. Government policies that are not effective in increasing national income, policies that are inappropriate or ineffective in allocating resources to overcome energy poverty can cause an increase in the problem of energy poverty. For example, energy subsidy programs that are not well targeted or allocate funds that are inefficient can end up increasing difficulties for poor people in accessing energy.

The Influence of Electrical Energy Prices on Energy Poverty

Based on the results of the tests carried out, it can be concluded that the results show that in the short term it has a negative and significant effect on energy poverty in Indonesia. This means that if the price of household electrical energy increases, energy poverty will decrease. for example, household wellbeing, ability to access energy, or even household expenditure. Rising electricity prices will have a significant negative impact on the economic conditions of households, especially for those who are more financially vulnerable. However, in the long term, household electricity prices have a negative and insignificant effect on energy poverty in Indonesia. This means that if the price of household electrical energy increases, it will not affect energy poverty. Previous research, the concept of the relationship between electricity prices and energy poverty can be found in previous literature. Several studies highlight the impact of electricity prices on people's ability to meet basic needs, such as education, health and housing (Dewi et al., 2022). High electricity prices can be an additional burden for economically vulnerable groups of people, and this can be reflected in poverty levels (Yuliani et al., 2022).

CONCLUSION

Based on the results of the analysis that has been carried out using the analysis method, namely the Autoregressive Distributed Lag (ARDL) model in this study, the following conclusions can be drawn:

1. Long-term and short-term government spending has a negative and significant effect on energy poverty in Indonesia. This means that any increase in government spending in the long term and short term will not affect energy poverty in Indonesia.
2. Short term and long term national income levels have a positive and significant effect on energy poverty in Indonesia. This means that if the level of national income in the short term and long term increases, energy poverty will also increase.
3. Short-term electricity prices have a negative and significant impact on energy poverty in Indonesia. However, in the long term, the price of electrical energy has a negative and insignificant effect on energy poverty in Indonesia. This means that if the price of household electrical energy increases, it will not affect energy poverty.
4. Government spending in the short and long term has a negative and significant effect on energy poverty. Showing that government spending is directed at energy subsidies that are not well targeted, this could worsen energy poverty. Meanwhile, the level of national income has a positive and significant influence in the short and long term on energy poverty in Indonesia. This is even though there is a positive relationship between national income and reducing energy poverty, challenges such as unequal distribution of income, uneven development of energy infrastructure, and poorly targeted energy policies can hinder efforts to effectively reduce energy poverty. On the other hand, the price of electrical energy in the short term has a negative and significant effect on energy poverty, but in the long term the price of electrical energy has a negative and insignificant effect on energy poverty in Indonesia.

REFERENCES

Adebiyi, O. O. (2023). Quantitative Assessment Of The Effect Of Goverment Expenditure On Poverty Incidence In Nigeria. *Journal of Business and Economic Analysis*, *5*(3), 227-239.

Ardi Adji Taufik Hidayat Hendratno Tuhiman Sandra Kurniawati Achmad Maulana. (2020). Pengukuran Garis

Kemiskinandi Indonesia: TinjauanTeoretis dan UsulanPerbaikan. 1–36.

Aris. (2024). Pengertian Kemiskinan: Jenis, Penyebab dan Dampaknya. Gramedia Blocg. https://www.gramedia.com/literasi/kemiskinan/#Pengertian_Kemiskinan

Batubara, B. A., & Batubara, M. (2023). Pendapatan Nasional Perspektif Islam Dan Konvensional . *Jurnal Penelitian Ekonomi Akutansi* , 24-33.

Batubara, M., & Pane, M. M. (2023). Pengaruh Pertanian Terhadap Pendapatan Nasional. *Jurnal Penelitian Ekonomi Akuntasi*, 74-81.

Bryan A. Futunanembun, Ita Pingkan F. Rorong, & Hanly F. Dj. Siwu. (2023). Pengaruh Pengeluapengaruh Pengeluaran Pemerintah di Sektor Pendidikan Dan Kesehatan Terhadap Kemiskinan di Provinsi Jawa Barat. *Jurnal Berkah Ilmiah Efisiensi*, 217-288.

Barnes, D., S.R. Khandker, And H.A. Samad (2010), 'Energy Access, Efficiency and Poverty: How Many Households Are Energy Poor in Bangladesh', World Bank Policy Research Working Paper No. 5332, World Bank, Washington, DC

Christiani, N. V., & Nainupu, A. E. (2021). Pengaruh Akses Terhadap Internet, Listrik dan PDRB Per Kapita Terhadap Tingkat Kemiskinan di Nusa Tenggara Timur Tahun 2015-2019. Jurnal *Statistika Terapan* (ISSN 2807-6214), 1(1), 37–52.

Dina elshahawany, R. e. (2023). Government Spending and Regional Poverty Alleviation:Evidence From Egypt. Asia Pacific Jounal of Regional Science, 111-135.

Dewi, A. K., Pujianto, P., & Tri, R. G. (2022). Pelatihan Manajemen Energi dan Konservasi Energi di Sektor Rumah Tangga Bagi Masyarakat Cepu. *Jurnal ESDM*, *11*(1), 28–36. https://doi.org/10.53026/jesdm.v11i1.1005

ESDM. (2022). Energi Sumber Daya Mineral. http://www. Esdm.go.id

Fabby, T., & Henriette, I. (2010). *Kemiskinan Energi*. Jakarta: Instite for Essentieal Services Reform (IESR).

Fardilla , S., & Masbar, R. (2020). Analisis Pengaruh Infrastruktur Jalan, Listrik, Sekolah, dan PDRB Terhadap Kemiskinan di Aceh. *Jurnal Ilmiah Mahasiswa, 5*(3), 175-183.

Fazaryani, F. I., & Juanda, R. (2022). Pengaruh Investasi, Tenaga Kerja, Dan Pengeluaran Pemerintah Terhadap Kemiskinan Di Sumatra Utara Pada Tahun 2006-2020. *Jurnal Ekonomika Indonesia* , 30-37.

Farichah, S. A. (2022). Analisis Inflasi Di Indonesia: Pendekatan Autoregressive Distributed Lag (ARDL). Jurnal *Cakrawala Ilmiah*, 1(10), 2467–2484.

Fidelis O. , O., & Uche, M. (2015). Analysis Of Energy Poverty And Its Implicationns For Sustainable Develoment In Negerial. *Environment And Develompment Economic*, 273-290.

Fry, J., Farrell, L., & Temple, J. (2023). Energy Poverty And Food Insecurity Is There An Energy Or Food Trade Off Among Low Income Australians. *Journal Energy Economics*, 1-15.

Febrianti, N., Pulungan, S. B., Ginting, R. A. B., Mutia, S., & Adelia, T. D. (2024). Analisis Dampak Indeks Pembangunan Manusia (IPM) Terhadap Tingkat Kemiskinan Di Provinsi Sumatera Utara (2017-2022). Jurnal *Multidisiplin Sosial Dan Humaniora*, 1(1), 23–30.

Gujarati, D. (2003). Ekonometrika Dasar. Jakarta: Erlangga.

Gujarati, P. (2012). Dasar-Dasar Ekonometrika. Edisi Lima: Selemba Empat

Hasan, A., Harahap, A. S., Az- Zahra, M. T., & Rahmawati. (2023). Pendapatan Nasional Dalam Perspektif Ekonomi Islam . *Jurnal Ilmiah Ekonomi Dan Keuangan Syariah* , 2-34.

Hilma Oktaviani, & Djoni Hartono. (2022). Energy Poverty And Education Empiris Evidence From Indonesia. *Economics Development Analysis Journal*, 2 211- 223.

Hutabarat , E., & D. Sriyono. (2015). Pengaruh Desentralisasi Fiskal, Pengeluaran Pemerintah, dan Pertumbuhan Ekonomi Terhadap Kemiskinan. *Jurnal Ekonomi Pembangunan*, *1*(2), 1-10.

HEIE, H. (2022). Poverty in the United States. Evangelicals on Public Policy Issues, September, 171 69–76.

Irhamni . (2015). Pengaruh Jumlah Penduduk, Pengangguran, Dan Pengeleuaran Pemerintah Terhadap Kemiskinan Di Indonesia. *Jurnal Pendidikan Dan Ekonomi*, 7(1),88-97.

Irhamni. (2018). Pengaruh Jumlah Penduduk, Pengangguran, Dan Pengeluaran Pemerintah Terhadap Kemiskinan Indonesia Tahun 1986-2025 . *Pendidikan Dan Ekonomi*, 7(1), 88-97.

Khamilah, H. (2018). Pengaruh Pengeluaran Pemerintah, Pengangguran dan Pertumbuhan Ekonomi Terhadap Tingkat Kemiskinan Di Provinsi Kalimantan Selatan. *Jurnal Ilmu Ekonomi dan Pembangunan, 1*(2), 314-324.

Lita, S. N., & Bakar, J. A. (2023). Analysis Of Energy Poverty Across Sectors In Indonesia. *International Proceeding Journal on Finance, Economics, and Management, 1*(1), 1-10.

Macias, J. S., Valenzuela, A. L., Ramirez, A. A., Escobedo, P. R., & Puente, A. R. (2023). Reduction Of Energy Poverty In Mexico By Applying An Optimization Model To Residential Energy Tariffs. *Jurnal Energy Poverty* , 3431-3439.

Mandjarreki, S. (2021). Analisis Sosial Fenomena Kemiskinan (Perspektif Sosiologi). *Jurnal Mimbar Kesejahteraan Sosial*, 4(1), 2655– 7320.

Mohammad Soleh, & Nunung Wahyuni. (2021). Pengaruh IPM,PDRB Dan Pengeluaran Pemerintah Terhadap Kemiskinan Di Jawa Tengah Dengan Zakat Sebagai Moderating. *Journal Of Islamic Economics And Business*, 6(2), 86-106.

Maulidan, M. I., Badruzzaman, F. H., & Harahap, E. (2020). Analisis Harga Keseimbangan Pasar Pada Titik Koordinat. Matematika*: Jurnal Teori Dan Terapan Matematika*, 19(2), 1–6.

Marlina, & Usman, U. (2020). Pengaruh PDRB dan Pengeluaran Pemerintah Provinsi Papua Terhadap Kemiskinan di Papua. Ekonomi Ragional Unimal, 15-22.

Nasir , M. A., & Nguyen, C. P. (2014). An Inquiry Into The Nexus Between Energy Poverty And Income Inequality In The Light Of Global Evidence . *Jurnal Departement Of Accountancy Finance And Economics Huddersfield Business School*, 1-39.

Nunez, S. C., Camarena, G. M., Limones, R. H., Valecia, M. H., & Jimenez , A. M. (2024). The Importance Of Citizen Participation In Improving Comfort And Health In Obsolete Neighbourhoods Affected Bg Energy Poverty. *Journal Energy Poverty*, 1-3.

Nurhanuddin, & Andriyani, D. (2020). Autoregressive Distributed Lag Kurvs Dan Ekspor Karet Remah Terhadap Pertumbuhan Ekonomi Indonesia. *Jurnal Ekonomika Reginal Unimal*, 3(2), 47-59.

Rizaldi Kaharuddin,A. G. (2019). Pengaruh Penegeluaran Pemerintah Terhadap Kemiskinan . *Jurnal Berkah Ilmiah Efisiensi* , 13-23.

Rosadi, M., & Amar B, S. (2019). Faktor Faktor Yang Mempengaruhi Konsumsi Listrik Di Indonesia . *Jurnal Ilmu Ekonomi*, 1(2), 273-286.

Ross Kities Andadari, Peter Mulder , & Piet Rietveld. (2014). Energy Poverty Reduction By Fuel Switchig. Impact Evaluation Of The LPG Conversion Program In Indonesia. *Energy Polocy*, 436-449.

Sebastian Renner, Jann Lay, & And Michael Schleicher. (2019). The Effecty Of Energy Price Changes Heterogeneous Welfare Impacts And Energy Poverty In Indonesia. *Enviroment And Develoment Economis*, 180-200.

Siburian , R. Y., & Murtala. (2019). Pengaruh Jumlah Uang Beredar Dan Jumlah Penduduk Terhadap Pertumbuhan Ekonomi Di Indonesia. *Jurnal Ekonomi Regional*, 2(2), 88-97.

Simamora, P. (2019). Kebijakan Tariflistrik Di Indonesia.

Soraya, N., & Afiantno, B. E. (2021). Elastisitas Harga Dan Elastisitas Pendapatan Permintaan Energi Listrik Pada Rumah Tangga Di Indonesia. *Jurnal Sains Sosio Humaniora*, 5(2), 1046-1060.

Sari, Y. A. (2021). Pengaruh Upah Minimum Tingkat Pengangguran Terbuka Dan Jumlah Penduduk Terhadap Kemiskinan Di Provinsi Jawa Tengah. Equilibrium : Jurnal Ilmiah Ekonomi, Manajemen Dan Akuntansi, 10(2), 121–130.

Tumiwa, F., & Imelda, H. (2011). Kemiskinan Energi. Jakarta: Institute For Essential Services Reform (IESR) .

Wardani, T., Sani, S. R., & Bakar, J. A. (2023). Analysis Of Fuel Oil Production And Fuel Prices On Poverty In Indonesia. *Internation Proceeding Journal On Finance, Economics, And Management*,1(1), 36-43.

Yaqin , M., Mu'min, M. S., & Wardhono, A. (2023). Harga Energi Dan Tingkat Kemiskinan Di Indonesia. *Jurnal Ekonomi Indonesia,12(3)*, 221-236.

Yuliani, E. D., & Arini, E. (2022). Pengabdian Masyarakat Di Desa Pulau Panggung Kecamatan Padang Guci Hilir Kabupaten Kaur. *Jurnal IlmiahMahasiswa Kuliah Kerja Nyata (JIMAKUKERTA)*, *2*(1), 190–195. https://doi.org/10.36085/jimakukerta.v2i1.2988

Zaakirah Ismail, & Patrick Khembo. (2015). Determinasi Of Energy Poverty In South Africal. *Journal Of Economics And Sustainable Developmen*, 66-78.

Zetara , & Djoni Hartono. (2023). Energy Poverty And Subjective Wellbeing Empirical Analysis I, 2(2).