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# The Influence of Public Infrastructure on Community Welfare in South Buru Regency

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*Electricity Infrastructure, Road Infrastructure, Economic Growth*

***Abstract***
*This study analyzes the influence of public infrastructure—particularly electricity and road infrastructure—on public welfare in South Buru Regency during the period 2010–2024. Using a quantitative time series approach and the Ordinary Least Squares (OLS) method, this study aims to measure the extent to which infrastructure improvements contribute to regional economic growth and improved public welfare. The variables used include electricity infrastructure (X1), road infrastructure (X2), and public welfare (Y), which is proxied by the level of economic growth and per capita income. The results of the analysis indicate that both electricity and road infrastructure have a positive and statistically significant influence on public welfare. This finding is in line with the public capital theory and endogenous growth theory, which state that infrastructure acts as a catalyst for economic activity and long-term welfare improvement. Therefore, it is recommended that the local government prioritize integrated infrastructure development policies between the energy and transportation sectors to encourage inclusive and sustainable economic growth in South Buru Regency*

## INTRODUCTION

Community welfare is an important indicator in assessing the success of regional development because it reflects the real results of inclusive economic growth.(Todaro & Smith, 2009)Public infrastructure plays a strategic role in promoting the efficiency of economic and social activities by increasing the mobility of goods and services, as well as access to basic services. Adequate infrastructure can accelerate productive community activities, while unequal infrastructure development can widen the welfare gap between regions.(Bank, 2021)In the context of South Buru Regency, the geographical location of the archipelago and limited access to transportation, electricity, and communication pose major challenges to equitable infrastructure distribution, which directly impacts the well-being of the population.

Infrastructure development in island regions like South Buru requires a contextual and adaptive policy approach. Inequality of access between regions leads to uneven economic productivity growth, despite abundant natural resource potential.(Gasper, 2022)Good road access, electricity availability, and maritime transportation networks are key factors in strengthening regional economic connectivity. Quality infrastructure serves not only as a physical facility but also as a link between economic resources and improved social welfare.(Sen, 1999) (Aschauer, 1989). Therefore, it is important to empirically examine the extent to which public infrastructure development contributes to the welfare of the people in this region.

From a policy perspective, infrastructure development in South Buru must be directed towards supporting equitable development outcomes and strengthening regional competitiveness. A development approach oriented toward local needs will ensure that the infrastructure built truly provides economic and social benefits.(Sen, 1999)The government needs to involve communities in the planning and oversight process so that development focuses not only on physical projects but also on social and economic sustainability. Synergy between local governments, communities, and the private sector is crucial in ensuring the success of inclusive infrastructure development.(Hussain et al., 2022).

Community engagement and transparent development governance will strengthen the economic impact of public infrastructure. When basic services like transportation, electricity, and clean water function optimally, production costs decrease and economic opportunities increase. Beyond economic benefits, public infrastructure also provides positive social effects by improving access to education and healthcare, which in turn strengthens community social resilience.(Kanbur et al., 2018)Thus, participatory, transparent, and equitable public infrastructure development is a crucial prerequisite for achieving sustainable prosperity in South Buru Regency.

Electricity infrastructure is a vital element in regional economic development because it is a prerequisite for productive community activities. Reliable access to electricity enables the use of technology, supports micro-enterprises, and increases household productivity (Meeks et al., in Electricity Infrastructure in Low- and Middle-Income Countries). However, the literature also confirms that simply providing electricity connections without ensuring continuity and quality of supply does not always significantly increase incomes.(Lee et al., 2020)In the context of Buru Regency, which faces an unstable electricity supply, research linking electrification to community income is crucial for measuring real impacts locally. This approach will help understand the relationship between electricity availability and economic well-being at the household and regional levels.

Several empirical studies in Indonesia show that electrification has a positive impact on economic growth, but its effects on income distribution are still varied.Ningsih and Syalikha (2024)found that increasing the electrification ratio drives economic growth in 31 provinces, but also has the potential to widen inequality if distribution is uneven. This phenomenon is relevant for areas like Buru Regency, where geographic differences affect access to electricity. Therefore, research needs to consider spatial distribution and social factors to ensure a more holistic analysis of the impact of electricity on income. This approach emphasizes that electricity is not merely a technical issue, but also an economic and social issue that requires policies based on equal access.(World Bank, 2021)

Theoretically, the relationship between public infrastructure and welfare is complex and not always linear.Gibson and Rioja (2020)explains that infrastructure investment can improve welfare through productivity and reduced economic costs, but its effects depend on heterogeneous household characteristics. Households with higher capital, skills, and education tend to be more able to utilize electricity to increase income (Sen, 1999). Therefore, research in Buru Regency needs to include supporting variables such as education, human capital, and access to capital to enhance the validity of the analysis. Thus, an approach that considers the heterogeneity of electricity's effects will provide a more accurate picture of electrification's contribution to community welfare.

Finally, the literature shows that the effect of electricity on income is often indirect, mediated by regional economic growth.(Puteri et al., 2024)Electricity can stimulate local industrial activity and trade, which in turn increases household incomes. However, these benefits are only optimal if accompanied by supporting infrastructure such as transportation, markets, and financial facilities.(Lee et al., 2020)Considering these findings, research in Buru Regency needs to design an empirical model that examines the direct and indirect effects of electricity on income, while also accounting for contextual and distributional factors. This approach will yield a more comprehensive and relevant analysis for formulating inclusive and equitable electricity infrastructure development policies.

Previous research on the role of electricity infrastructure in economic development has consistently demonstrated the importance of electrification for improving welfare. Lee, Miguel, and Wolfram (2020) in *Does Household Electrification Supercharge Economic Development?* (American Economic Journal: Applied Economics) found that electricity access has a positive effect on household productivity, but its impact on income is not always significant without the support of complementary infrastructure. Meanwhile,Chakrabarti (2024)in Electricity Infrastructure in Low- and Middle-Income Countries (Duke University Energy Access Program) emphasizes that the quality and continuity of electricity are key factors for electrification to have a significant impact on local economic growth. Khandker,Barnes and Samad (2018)The Energy Journal study, "Welfare Impacts of Rural Electrification in Bangladesh," proved that electrification increased household income by 21 percent and expanded informal sector employment opportunities. Similar findings were expressed byDinkelman (2011)In The Effects of Rural Electrification on Employment: Evidence from South Africa (American Economic Review), which showed a significant increase in women's labor participation after access to electricity. These findings suggest that the impact of electricity on well-being is highly dependent on the social and economic context and the utilization capacity of the beneficiary community.

In the Indonesian context, several studies have confirmed the link between electricity infrastructure and regional income. Jayanthi (2021) in the Indonesian Journal of Economics and Development found that increasing the electrification ratio between provinces has a positive effect on economic growth, but can widen income inequality if access is not optimally distributed. Research by Firmansyah and Sari (2020) in the Journal of Economics and Public Policy also supports this finding by showing that economic growth resulting from electrification tends to be concentrated in urban areas. Meanwhile, Sari and Suharyono (2019) in the Journal of Indonesian Applied Economics showed that rural electrification plays a role in reducing poverty levels by increasing MSME activity and increasing production cost efficiency. Research by Rahmawati and Yusuf (2022) in the Journal of Development Economics at Airlangga University found that increasing the ratio of electrified households is positively associated with increasing average income in Eastern Indonesia. On the other hand, a study by Mutaqin and Adinugroho (2023) in the Economics Development Analysis Journal (EDAJ) highlighted the importance of electricity supply quality, as disruptions and blackouts actually reduce productivity in the agricultural and trade sectors. These results demonstrate that the Indonesian context presents a dual challenge: equitable electrification and increased reliability to significantly impact welfare.

Cross-national studies provide a broader understanding of how electricity infrastructure affects income and well-being. Wolde-Rufael (2006) in Energy Economics revealed a long-term relationship between electricity consumption and economic growth in 17 African countries, emphasizing the role of electricity as a strategic production input. Furthermore, Mahadevan and Asafu-Adjaye (2007) in Energy Policy emphasized a two-way causal relationship between energy consumption and economic growth in developing Asian countries, including Indonesia. Meanwhile, Kanagawa and Nakata (2008) in Energy Policy found that increased electrification in South Asia improves the Human Development Index (HDI) indicator through income and education. Research by Barnes et al. (2014) in Energy for Sustainable Development also showed that an electrification project in Laos increased household per capita income by up to 25 percent after five years of implementation. Overall, these studies reinforce the view that electricity infrastructure development not only has direct economic impacts but also improves quality of life through social dimensions. Therefore, research in Buru Regency needs to place these previous results as an empirical basis for assessing the effectiveness of electrification in the context of Indonesia's islands and remote areas.

## METHODS

This study uses a quantitative approach with a time series analysis design to examine the influence of public infrastructure—particularly electricity and road infrastructure—on economic growth in South Buru Regency during the period 2010 to 2024. The purpose of this study is to determine the extent to which infrastructure development contributes to changes in the level of regional economic growth over time. The functional relationship between variables is described through the following linear regression equation derived from the following production function:

$$Y_t = A_t \, K_t^{a} \, (L_t)^{1-a-\beta} (G_t)^{\beta} \qquad \alpha \, \mathcal{E}(0,1), \beta \geq 0$$

With G being the infrastructure, from the theoretical model above, the specifications of the model used can be written as follows:

$$Yt = \alpha + \beta 1X1t + \beta 2X2t + \varepsilon it$$

Where:

- Yt = Economic Growth
- X1t = Electricity Infrastructure
- X2t = Road infrastructure
- α = Constant
- β1, β2 = Regression coefficients
- εt = Error term

The analysis method used is multiple linear regression with the Ordinary Least Squares (OLS) method to estimate the coefficient values β1 and β2 which indicate the direction and magnitude of the influence of each infrastructure variable on economic growth. Prior to estimation, a series of classical assumption tests were conducted including normality, multicollinearity, heteroscedasticity, and autocorrelation tests to ensure the validity of the regression model. If violations of the assumptions were found, adjustments were made such as logarithmic transformation, differencing, or Generalized Least Squares (GLS) estimation. The feasibility of the model was tested using the coefficient of determination ($R^2$), while the t-test was used to test the partial effect and the F-test to test the simultaneous effect of both variables on economic growth. The coefficients were interpreted econometrically, where β1>0 indicates that improvements in electricity infrastructure have a positive effect on economic growth, and β2>0 indicates that improvements in road infrastructure can increase productivity and community welfare

## RESULTS AND DISCUSSION

*Data Distribution*

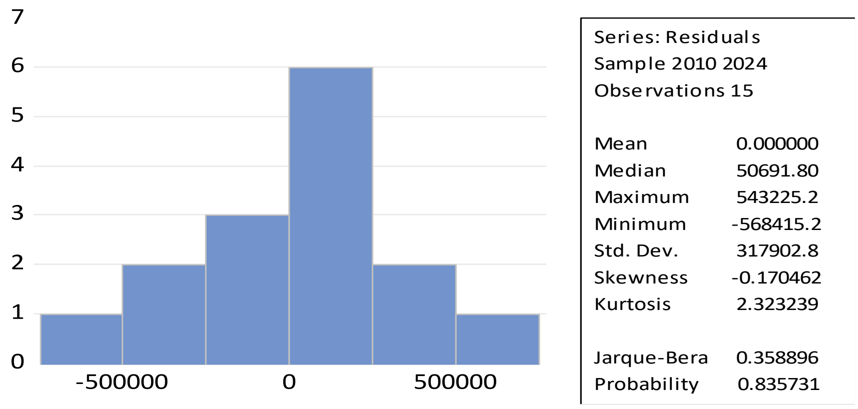


**Figure 1.**Normality test

The residual distribution in the graph shows a pattern close to normal, with a mean of 0 and a relatively balanced median (approximately 50,691.8). The skewness (-0.17) and kurtosis (2.32) values indicate a slight left skew and a nearly mesokurtic distribution. The Jarque-Bera test results (p-value 0.8357 > 0.05) confirm that the residuals are normally distributed, so the regression model used meets the assumption of residual normality.

*4.2 Heteroscedasticity Test*

**Table 1.**Heteroskedasticity Test: Breusch-Pagan-Godfrey

| | | | |
|---|---|---|---|
| F-statistic | 0.728865 | Prob. F(2,12) | 0.5026 |
| Obs*R-squared | 1.624788 | Chi-Square Prob.(2) | 0.4438 |
| Scaled explained SS | 1.466159 | Chi-Square Prob.(2) | 0.4804 |

[a]EViews processed

The results of the Breusch-Pagan-Godfrey heteroscedasticity test show that the Chi-Square Prob. value (0.4438) is greater than 0.05. This means there is no heteroscedasticity in the model, so the residual variance is constant (homoscedastic). Thus, the regression model used meets the classical assumptions regarding homoscedasticity and the estimation results can be considered reliable.

*4.3 Autocorrelation Test*

**Table 2.**Breusch-Godfrey Serial Correlation LM Test

| | | | |
|---|---|---|---|
| F-statistic | 0.031758 | Prob. F(2,10) | 0.9688 |
| Obs*R-squared | 0.094672 | Chi-Square Prob.(2) | 0.9538 |

[a]EViews processed

The results of the autocorrelation test using the Breusch-Godfrey Serial Correlation LM Test show that the Chi-Square Prob. value (0.9538) is much greater than 0.05. This indicates that there is no autocorrelation in the regression model up to the 2nd lag. Thus, the residuals are independent between periods, so the regression model meets the classical assumption of being autocorrelation-free.

*4.4 Multicollinearity Test*

**Table 3.** Variance Inflation Factors

| Variable | Coefficient Variance | Uncentered VIF | Centered VIF |
|---|---|---|---|
| X1 | 4.04E-12 | 53.74585 | 4.575927 |
| X2 | 1.21E-07 | 145.7482 | 4.575927 |
| C | 20.89687 | 44.03997 | NA |

[a]EViews processed

The results of the multicollinearity test show that the Centered VIF value for variables X1 and X2 is 4.575927, which is below the general limit of 10. This means that there is no serious multicollinearity problem between the independent variables in the regression model. Thus, variables X1 and X2 can be used simultaneously without causing distortion to the results of the regression coefficient estimation.

*4.5 Regression*

**Table 4.** Multiple Linear Regression

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| X1 | 3.46E-06 | 2.01E-06 | 1.720228 | 0.0410 |
| X2 | 0.000313 | 0.000347 | 0.901994 | 0.0848 |
| C | 39.15723 | 4.571310 | 8.565867 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.713036 | Mean dependent var | 54.84867 |
| Adjusted R-squared | 0.665209 | SD dependent var | 4.610795 |
| SE of regression | 2.667858 | Akaike info criterion | 4.977286 |
| Sum squared residual | 85.40962 | Schwarz criterion | 5.118896 |
| Log likelihood | -34.32964 | Hannan-Quinn criter. | 4.975777 |
| F-statistic | 74.90856 | Durbin-Watson stat | 1.684382 |
| Prob(F-statistic) | 0.000558 | | |

[a]EViews processed

The results of multiple linear regression show that the variables of electricity infrastructure (X1) and road infrastructure (X2) have a positive effect on economic growth (Y). The coefficient of determination ($R^2 = 0.7130$) indicates that approximately 71.3% of the variation in economic growth can be explained by these two variables, while the remaining 28.7% is influenced by other factors outside the model. Partially, electricity infrastructure has a significant effect on economic growth with a Prob value of 0.0410 <0.05, while road infrastructure has a positive but not yet significant effect with Prob = 0.0848 > 0.05. Simultaneously, the F test shows a Prob (F-statistic) value of 0.000558 <0.05, which means that both variables together have a significant effect on economic growth. The Durbin-Watson value of 1.68 indicates the absence of autocorrelation, so this regression model can be considered good and suitable for use in analyzing the relationship between infrastructure development and economic growth.

4.6 Discussion

Economically, these findings suggest that improving the quality/capacity of electricity infrastructure is a key driver of economic growth, as reliable energy availability lowers production costs, increases industrial capacity utilization, expands MSME activity and digital services, and attracts new investment (crowding-in). Road infrastructure also drives growth through reduced logistics costs and market integration, but its insignificant effect suggests the possibility of other bottlenecks—such as maintenance quality, connectivity to ports/industrial hubs, or lag effects before benefits are realized—and the need for coordination with spatial planning and trade policies. With 71.3% of the variation in growth explained by these two variables, policies that prioritize electricity reliability (grid reliability, expanded access, supply efficiency) while targeting strategic roads (last-mile to production/agricultural areas) have the potential to provide a larger multiplier effect; at the same time, the government needs to manage other factors outside the model (human capital, business climate, macro stability) and be aware of the possibility of endogeneity and regional disparities to ensure equitable distribution of infrastructure benefits.

## CONCLUSION

Infrastructure improvements, particularly electricity and roads, play a crucial role in driving economic growth. Electricity infrastructure has been shown to significantly contribute to increased economic activity by supporting industrial productivity, energy efficiency, and investment. Meanwhile, road infrastructure also shows a positive, albeit not yet significant, impact, indicating the need to optimize transportation networks to ensure more equitable benefits and support interregional connectivity. Overall, these findings confirm that strengthening physical infrastructure is a key strategy for accelerating sustainable economic growth.

The policy implications of this study suggest that the government should prioritize investment in electricity and road infrastructure as strategic instruments to accelerate national and regional economic growth. Increasing electricity capacity and reliability should be directed not only at industrial centers but also to remote areas to achieve equitable development. Furthermore, road development should focus on economic connectivity, linking production areas with markets and ports to reduce logistics costs and strengthen the domestic supply chain. Furthermore, cross-sectoral coordination between ministries, regional governments, and the private sector is necessary to ensure infrastructure investment generates optimal multiplier effects on productivity, employment, and national economic competitiveness

## REFERENCE

Aschauer, D. A. (1989). Is public expenditure productive? Journal of Monetary Economics, 23(2), 177–200.

Banks, W. (2021). World development report 2021: Data for better lives. The World Bank.

Barnes, D.F., & Samad, H. (2018). Measuring the benefits of energy access: A handbook for development practitioners. Inter-American Development Bank.

Chakrabarti, S. (2024). Digital psychiatry in low-and-middle-income countries: new developments and the way forward. World Journal of Psychiatry, 14(3), 350.

Dinkelman, T. (2011). The effects of rural electrification on employment: New evidence from South Africa. American Economic Review, 101(7), 3078–3108.

Gasper, D. (2022). Rethinking Human Development and/as Human Security for the Anthropocene: An analysis of the UNDP trilogy of reports 2020-2022. International Journal on Social Quality, 12(2).

Gibson, J., & Rioja, F. (2020). The welfare effects of infrastructure investment in a heterogeneous agents economy. BE Journal of Macroeconomics, 20(1).

Group, WB (2021). Global Economic Prospects, January 2021. World Bank Publications.

Hussain, M., Ye, C., Ye, C., & Wang, Y. (2022). Impact of financial inclusion and infrastructure on ecological footprint in OECD economies. Environmental Science and Pollution Research, 29(15), 21891–21898.

Kanbur, R., Patel, E., & Stiglitz, J. (2018). Sustainable development goals and measurement of economic and social progress. For Good Measure: Advancing Research on Well-Being Metrics beyond GDP, 33–48.

Lee, K., Miguel, E., & Wolfram, C. (2020). Does household electrification supercharge economic development? Journal of Economic Perspectives, 34(1), 122–144.

Ningsih, VK, & Syalikha, S. (2024). Implementation of Electricity Subsidies to Encourage the Achievement of SDGs Goal 7. Journal of Economics, Assets, and Evaluation, 1(4).

Puteri, CAM, Nihayah, DM, & Widyawati, RF (2024). Infrastructure Development and Its Influence on Income Disparities: Case Study in Indonesia. 4th International Conference on Social Sciences and Law (ICSSL 2024), 808–827.

Sen, A. (1999). Development as Freedom Oxford University Press Shaw TM & Heard. The Politics of Africa: Dependence and Development.

Todaro, M. P., & Smith, S. C. (2009). Economic development. Pearson education