



# Development of Electricity Program, Electrification Ratio with Human Development Index in West Java Province, Indonesia

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## ABSTRACT

This research analyzes the development of rural electricity program, electrification ratio with human development index (HDI) in West Java Province. The method used in this analysis is analytical descriptive with the aim of developer of rural electric program in an effort to increase the achievement of electrification ratio and HDI. Acceleration of the achievement of electrification ratio in West Java Province can exceed the national electrification ratio after the issuance of Regulation No. 21 year 2014, on the implementation of electricity. The components of the HDI are formed from life expectancy, average length of schooling, school life expectancy, and per capita expenditure. HDI, shows an increasing value although still below the average index of national human development (Indonesia). The results of the electrification ratio have a positive and significant effect on HDI.

**Keywords:** Rural Electricity Program, Electrification Ratio, Human Development Index, West Java Province

**JEL Classifications:** O15, Q4

## 1. INTRODUCTION

Jones et al. (2017) stated that energy issues are one of the priorities in sustainable development goals (The SDGs). Energy is an essential need for people after food, water and shelter. Utilization of energy in human life becomes very important along with the improvement of human life quality standards. Starting from simple ways such as wood-burning to generate heat to warm the body and light for lighting, energy use has evolved as technology advances. Now energy is used and exploited in various ways and forms in everyday life (Gunardi et al., 2016; Rokhmawati et al., 2017).

In modern society, electrical energy has become a basic need that has an important role in economic and social development. In the context of social development, Niu et al., 2013 states that electrical energy is indispensable for the improvement of welfare which includes improving health, education, comfort, improving the quality of the environment. Electricity development aims to ensure the availability of sufficient quantity of electricity, good quality, and reasonable price in order to improve the welfare and prosperity of the people fairly and equitably and to realize sustainable development (Law

No. 30 of 2009, Article 2, Paragraph 2, function and purpose of electricity).

Indicators of success of the electricity program in raising the most common and common standards of public welfare can be measured using the per capita gross domestic per capita gross domestic product (GDP) per national level, or regional per capita gross regional domestic product district/city). GDP represents the value of all final goods and services produced or produced by a country in a given period of time, usually within a period of 1 year. A more advanced indicator for measuring the level of community welfare is to calculate the human development index (HDI). HDI is formed by three basic dimensions, namely longevity and healthy life (a long and healthy life), knowledge (knowledge), and decent standard of living (decent standard of living). Longevity and healthy life are described by life expectancy at birth (AHH), which is the number of years expected by newborns to live, assuming that the pattern of death rates by age at birth is the same throughout the age of the infant. Knowledge is measured through the average indicator of school duration and old school expectations. Average school length (RLS) is the average length (years) of population aged 25 years and over in formal education. School old expectancy

(HLS) is defined as the duration (year) of the formal school that is expected to be felt by the child at a certain age in the future. A decent standard of living is illustrated by per capita expenditure adjusted, determined from the per capita expenditure value and purchasing power parity.

The results of Martinez and Ebenhack, 2008 study, through his study of per capita energy consumption with HDI in 120 countries, suggest that there is a very strong relationship between HDI and energy consumption. It is also mentioned that for poor countries, increased access to energy will greatly increase human development. Pereira et al., 2010 through his study of rural electrification and energy poverty in Brazil concluded that there was a change in the profile of energy and electricity consumption on energy poverty reduction. Through his study of energy consumption, human welfare and economic development in several countries in Eastern Europe, Jorgenson et al., 2014 states that the relationship between energy intensity, human wellbeing and economic growth is complex and changes dramatically over time. And in the last few years the study time span, showing an ongoing increase in the relationship between the intensity of human welfare energy and economic development. The results of the study Made and Dwi, 2014, that electricity consumption and electrification ratio in Indonesia have a strong relationship with the indicators of human development. The industrial sector has the greatest life expectancy, followed by commercial and household sectors. Associated with HDI, total electricity consumption and electrification ratio more influence the value of literacy indicator compared with life expectancy indicator. Similarly, the results of the study of Maqin and Sidharta (2017), the relationship of economic growth with human development and electricity consumption in Indonesia, that low HDI in Indonesia is not only the influence of low income per capita, but from life expectancy and average-the average length of school is still low. The low of these two indicators is not only due to low spending capacity in the education and health sectors, and also due to low government budget for education and health. There is a positive relationship between economic growth, human development and electricity consumption in Indonesia. When the average economic growth or per capita income increases, HDI and electricity consumption also increases.

## 2. ELECTRICAL PROGRAM IN RURAL AND ELECTRIFICATION RATIO

The increasing demand for electrical energy to sustain economic growth is mainly the access of electricity in rural areas to all of us. UU No. 3 years 2009, becomes the legal basis of the rural electricity program that “the government’s policy in the electricity sector is directed to the extension of access to electricity in areas not yet reached power distribution network in rural areas” with the purpose of electricity development to ensure the availability of sufficient power, good, and reasonable price in order to improve the welfare and prosperity of the people fairly and equitably and realize sustainable development. The direct impacts of rural electrification programs, which are perceived by the community: (a) Encourage agricultural development in rural areas, especially

if there are other service elements, such as rural credit facilities; (b) become a driving force for agro-industry activities and trading activities; and further increasing the need for electric power; (c) improve the welfare of rural communities, especially to enjoy lighting, TV and radio; (d) improving the rural community’s ability to read so as to reduce illiteracy and improve education; and (e) increasing employment opportunities, reducing urbanization.

The government has launched the rural electrification program since the 1960s, with the initial aim of the rural electricity program being the granting and discharging of electricity in villages to raise the productivity of villages in agriculture and industry (crafts) (Augustine, 2012). With this aim the existence of electricity into the village program, rural communities not only enjoy and feel the electric light, but also trying to improve the living standards of rural communities. At the end of Repelita V (1994), the number of villages that have received electricity flow is estimated at 31,689 villages or 51.1% serving 8,916,716 households in all villages in Indonesia (Augustine, 2012). Target in RPJMN (Plan National Medium Term Development) that the national electrification ratio in 2012 is 73.60%, its realization exceeds what has been targeted, reaching 76.56%. (Director General of Electricity, KESDM, ESDM for People’s Welfare, Jakarta 20 June 2013).

The rural electrification program became the concern of West Java Provincial Government started in 2003, more seriously after the issuance of West Java Provincial Regulation No. 21 of 2014 on electricity implementation, in which the ratio of electrification achievement in West Java Province, before the issuance of the regulation always below the average national electrification ratio, for example in 2011 alone the electrification achievement ratio in West Java only reached 71.71%, while for the national average of 72.95%, in 2012 West Java electricity electrification ratio is 76.03% while national reach 76.56%. Although the national average of electrification achievement ratio of West Java is not too far from the average of national electrification. However, from the equity side, there are still many rural areas in West Java Province that have not received electricity yet. The reason is that access is difficult to reach resulting in the distribution of a number of electrical installation materials such as concrete piles, cable reels and electrical transformers to be inhibited and take longer.

In 2010 actually, the electrification ratio of West Java has been above the average national electrification, i.e., 69.89%, while for the national itself is equal to 67.20%. In 2014, the electrification ratio of West Java Province can exceed the national electrification average. Graph 1.

In 2014, the electrification ratio of West Java is 86.04%, while the national electrification ratio is 84.35%. For the year 2015, the electrification ratio of West Java increased again to 92.14%, for the national average equal to 88.30%. For the year 2016 the achievement of West Java electrification ratio of 96.8%, while for the national average of 91.1%. The achievement of West Java’s electrification ratio for 7 years is 81.71, while for Indonesia it is 80.15. The achievement of electrification ratio of West Java is always above the average achievement of national electrification cannot be separated from the participation of all elements of

West Java community, in support of the program “Jabar Caang (burning).”

### 3. HDI AND ELECTRIFICATION RATIO

The success parameter of the development of a country/region is not only seen from the elements of income per capita or real national income that increase only, but must be seen from other elements, such as social, culture, education and health. One of the parameters often used to measure the success rate of a country/region development is the HDI. The achievement of human development is measured by taking into account three essential aspects of longevity and healthy living, knowledge, and decent living standards. Therefore, the improvement of HDI achievement cannot be separated from the improvement of each component.

The achievements of human development in an area at a given time can be grouped into four groups (HDI 2015 and 2016, BPS Official Statistics News of West Java Province No. 38/07/32/Th.XVIII, 1 July 2016; 21/4/32/Th XIX, April 17, 2017).

1. Group “very high”: HDI ≥80.
2. “High” group: 70 ≤HDI <80.
3. The “moderate” group: 60≤ HDI <70.
4. “Low” group: HDI <60.

Along with the increase in HDI figures, the index of each component of HDI also shows the increase from year to year. During the period 2010 to 2016, West Java has managed to increase Life expectancy rate by an average growth of 0.88%. In 2010, life expectancy at birth in West Java is only 71.29 years, and in 2016 has reached 72.44 years.

The school expectation component (HLS), during the period 2010 to 2016, grew by an average of 2.61% per year. The increasing expectations of old schools become a positive signal that more and more people are in school. In 2016, the old school hope in West Java has reached 12.30, meaning that 7-year-old have the opportunity to finish their education until high school or D1.

Meanwhile, the average length of school (RLS) in West Java grew 2.44% per year during the period 2010-2016 This positive growth is an important capital in building a better quality of West Java human beings. Until 2016, the average population of West Java age 25 years and over have received education up to Grade VIII (SMP Class II).

The last dimension that represents the quality of human life is a decent standard of living represented by per capita expenditure (constant 2012 prices). In 2016, West Java per capita expenditure reaches Rp 10,035 million per year. Over the past 6 years, community-adjusted per capita spending has increased by 1.65% per year Table 1 and Graph 2.

Value of West Java HDI during the period 2010-2016 showed an increase, where the value of HDI in 2010 amounted to 66.15 and in 2016 of 70.05, on average for 7 years grew by 68.1. The range of achievements of the HDI value, the rank range between 60 s.d.

70, belonging to the moderate group. The growth of HDI values shows that the quality of West Java community is getting better/prosperous. Although compared to the value of HDI Indonesia from 2010 to 2016 is still lower, where the value of Indonesian HDI in 2010 amounted to 66.53 and in 2017 of 70.18.

The result shows that electrification ratio has positive and significant effect on HDI with regression coefficient value of 0.139933, this means that if the electrification ratio increases by 1%, the HDI will increase by 13.99%, other factors are considered permanent. These results along with previous researchers, Kanagawa and Nakata, 2008, states that the socio-economic, increased access to modern energy in the form of electrical energy will improve the quality of life drastically.

### 4. CONCLUSIONS AND RECOMMENDATIONS

The results of this study can be concluded that, rural electrification program can accelerate the electrification ratio. The ratio of

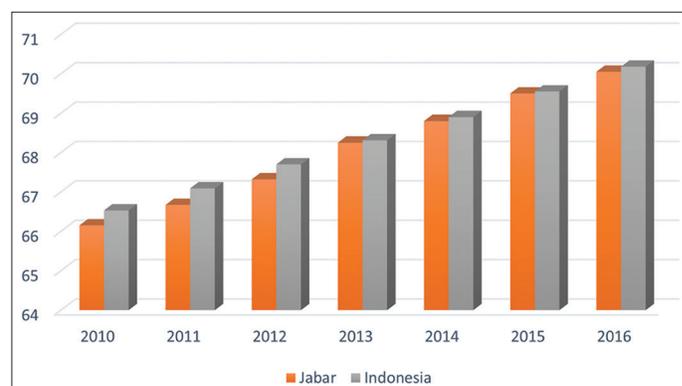
Graph 1: Electrification ratio of West Java and Indonesia year 2010-2016



	2010	2011	2012	2013	2014	2015	2016
West Java	69.89	71.71	76.03	79.43	86.04	92.14	96.8
Indonesia	67.2	72.95	76.56	80.51	84.35	88.3	91.15

Source: Statistic of Electricity year 2015, 2016, Directorate General of Electricity of Ministry of Energy and Mineral Resources, Electrification Ratio of West Java. (2006-2015), Word Data News and Research. Available from: <http://www.databoks.katadata.co.id>

Graph 2. Human Development Index of West Java and Indonesia Year 2010 - 2016



**Table 1: Human Development Index of West Java and Indonesia Year 2010 - 2016**

Tahun	2010	2011	2012	2013	2014	2015	2016
Components of HDI							
Life Expectancy at Birth (AHH)	71.92	71.56	71.82	72.09	72.23	72.41	72.44
School old expectancy (HLS)	10.69	10.91	11.24	11.81	12.08	12.15	12.30
Average school length (RLS)	7.40	7.46	7.52	7.58	7.71	7.86	7.95
Per capita expenditure adjusted (000)	9.174	9.249	9.325	9.421	9.447	9.778	10.035
HDI West Java (Jabar)	66.15	66.67	67.32	68.25	68.8	69.5	70.05
HDI Indonesia	66.53	67.09	67.7	68.31	68.9	69.55	70.18

Source: Human Development Index, 2015, and 2016, official news statistics BPS West Java Province No. 38/07/32/Th. XVIII, July 1, 2016, and No. 21/4/32/Th XIX, April 17.  
HDI: Human development index

electrification achievement during the period of study shows a positive development, and is one of the provinces with the highest level of electrification achievement in Indonesia. The achievement of high electrification ratio can influence the value of HDI. The result of the study shows that the electrification ratio has a positive and significant effect on HDI in West Java Province.

Given the different condition of West Java Province, especially in rural areas of western and western Java, in the access to the destination is difficult to reach, the policy of rural electricity program must consider the time element (not on the rainy season), and the means of transportation to bring electrical materials must be tailored to the need to get to the destination.

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