



Research Article

Indonesia Renewable Energy Power Plant Pricing Policy Comparison

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Abstract

The use of renewable energy in Indonesia has been started since 2004 through green energy policy. But until now the increase of renewable energy in energy mix has not shown a significant increase. Renewable energy pricing scheme are indicated to be one of the causes of the problem. High renewable energy price and the frequent policy revisions rapidly make stakeholders worry about investing. This study aims to analyze the renewable energy pricing policies for electricity generation based on policy stability, policy adequacy and contextual framework using the post positivism approach. Primary data by in-depth interview and secondary data were taken through journal related and official report. This research was taken in the period September 2018 until August 2019. This research found that the absence of stability of renewable energy pricing policy has significant consequences on investor choices to invest or not. The absence of renewable energy law and low return on investment are the others consideration of stakeholder to investing in the renewable energy sector. There is no similarity in point of view principle of justice in renewable energy price concept make stakeholder feel their interest have not been accommodated in the policies formulated by the government.

Keywords: Renewable Energy Pricing Policy, Stability, Adequacy, Contextual Framework

Introduction

Currently, almost all human activities use electricity to support their productivity. Electricity is also a driving force for people's economic activities. Along with the increase in population, an increase in the economy and the addition of transportation development, electricity demand has increased (BPPT, 2014). In terms of economy, electricity is used to offset economic growth, where in 2015-2019 Indonesia's economic growth target is 6-8%. Electricity is also a focus in improving the human development index (HDI) as research conducted in the Journal of the Asia Pacific Economic in 2011 found that in this research on the island of Java, it was found that if there was a 1% increase in households using electricity, the HDI could increase 0.2%. This increase is higher than the increase in HDI from water infrastructure development by 0.03% and road infrastructure by 0.01%.

Ironically in Indonesia, not all levels of society can enjoy electricity in this century. In fact, according to sustainable development goals, guarantee for affordable and sustainable energy access is one of the goals in the SDGS in 2030. The demand for electricity in Indonesia is experiencing an average growth of 10.1% per year. In the national electricity general plan for 2020, electrification ratio in 2011 was 72.95% and in 2015 it was 88.30%. This figure shows the growth of electricity consumption per capita where in 2011 it was 0.74 megawatts while in 2015 it was 0.91 megawatts (MEMR, 2015). Although there has been an increase in the electrification ratio, Indonesia's ranking is still below Malaysia and Singapore. Data from the Ministry of Energy and Mineral Resources show that the electrification ratio until the end of 2017 is 95.35%. (DJK Productivity Report, 2017).

Indonesia as a country that is rich in potential renewable energy sources has great opportunities in increasing the electrification ratio using renewable energy sources for areas that are not accessible by PLN. But unfortunately the large potential of renewable energy has not been used as the

backbone in the development of national energy, especially in the use of energy as raw material for electricity.

The government through the National Energy Policy as outlined in Presidential Regulation number 79 year 2014 targets a renewable energy mix of 23% in 2025 and a reduction of 26% of greenhouse gas emissions by 2020. Share the efforts made by the government to achieve these targets, one of which is the policy of using renewable energy as a power plant through the sale and purchase scheme. The Tarrif Feed-in (FiT) policy in Indonesia began to be implemented since 2009, which was originally intended for small-scale power generation. In 2011 and 2012, the Ministry of Energy and Mineral Resources required the National Electricity Company (PLN) to purchase electricity from renewable energy sources that began with the obligation to purchase geothermal resources at a price of USD 0.97 / kWh. PLN is a state-owned business agency that has authority in providing electricity for the public. A year after that the obligation to purchase biomass energy sources was issued to facilitate price negotiations and attract investment. FiT aims to provide support to renewable energy developers in obtaining fair prices for power plants, especially electricity sourced from renewable energy. The affirmation of the target of the renewable energy mix is outlined in the National Energy General Plan (RUEN) set out in Presidential Regulation number 22 year 2017.

Coal still dominates the share of electricity generation in Indonesia until now. Based on the performance report of the Directorate General of Electricity the portion of coal in power plants in 2016 amounted to 57.70%. This figure shows an increase compared to the previous years where in 2010 it reached 38%, in 2012 it was 50.27% and in 2015 it was 56%. Whereas for renewable energy sources it was 12.15%. For plants sourced from renewable energy, hydropower contributes 7.88%. For the composition of other energy sources as energy power generation materials in 2016, gas energy was 25.88%, fuel oil and biofuels 6.96% and hydro 7.88%. The use of coal as a power

plant material has a negative effect on the environment because of high emission levels and can cause extreme climate change.

Fugitive emissions from coal has three processes, namely mining, combustion and transformation / conversion which are often also called mining emission and post mining emission to produce methane gas (CH₄) and carbon dioxide (CO₂). (Ministry Of Environment, 2012). In 2016, emission from fuel combustion 585.010 GgCO₂eq and fugitive emission 33.571 GgCO₂eq. (Ministry Of Environment, 2017). Fossil burning in power plant contains particulate matter (PM) that can penetrate into the bloodstream and lungs. PM that exposed human in long period can increase the risk of respiratory diseases, cardiovascular and cerebrovascular. (Greenpeace, 2012).

The low utilization of renewable energy in power plants in Indonesia indicates that the policies offered by the government have not been able to be a solution in accelerating the utilization of renewable energy. The government seems less serious in formulating a renewable energy price scheme for electricity generation. This can be seen from the request for a review of the renewable energy price policy by stakeholders to the government. They even submitted a letter to the Vice President to revise the policy.

In the renewable energy country attractiveness index (RECAI) which contains the attractiveness of renewable energy investments, Indonesia's ranking has dropped to the bottom of the ranking of 40 of the 40 countries assessed. Whereas in the previous year Indonesia was able to rank 36th. This ranking is far below that of neighboring Philippines which is ranked 27th (ey.com, 2019). The unattractive investment climate can also be seen from the small number of renewable energy contracts that continue to the construction phase and the large number of projects that fail contracts. In 2018 out of 70 contracts signed by Independent Power Producer (IPP), only 17 contracts were able to reach the construction phase, while 46 contracts

were deemed to have failed to reach financial close.

Energy pricing is a crucial factor in the development of renewable energy (Burke and Stephens, 2018). The existence of a clear and transparent scheme in accordance with market desires and the ability of the government in economic principles can guarantee the sustainable use of renewable energy. Mallon (2016) suggested that the development of renewable energy in countries in the world is affected by the implementation of relevant government policies.

Conceptual Background

Renewable Energy Pricing

Establishing a renewable energy price scheme is a policy adopted by the government to increase the use of renewable energy. Through this policy, it is expected that renewable energy can be contributed to the benefits of energy, one of which is used as electricity generation. The FiT policy is one of the policies in supporting the development of renewable energy by offering long-term contracts of around 10-25 years through renewable energy electricity purchase agreements for power plants (Hideki and Himsar, 2017). The FiT policy in Europe is claimed to be successful in supporting the development of renewable energy, especially in Germany and Spain, which are becoming countries with high renewable energy capacity and production. Alvarez and Perez in his research said that the use of this scheme in the two countries shows an increase in employment and national income, increased investment and also technological innovation (Alvarez and Perez, 2012). Malaysia and Thailand are also countries in Asia that have also adopted this scheme and are showing increased use of renewable energy in power plants (Hideki and Himsar, 2017). FiT itself has three components to attract investors, namely fixed and sufficient prices for investment returns, guarantees for network connections and long-term contracts (Mendoca, 2007). This policy mechanism is

designed to increase the value of investment in renewable energy technologies and the energy production capacity of renewable energy sources. FiT is a fixed electricity price that is issued to producers for each unit of energy produced and injected into the electricity grid (Couture et. Al. 2010).

The policy Dynamics

Mallon (2016) states that in the renewable energy policy there are several things that have an influence on how successful renewable energy is in a country. Three things that can affect renewable energy policies according to Mallon are Policy Stability, Policy adequacy and Contextual Framework.

- Policy Stability

The renewable energy policy should create a trajectory balance of renewable energy production growth. The importance of stability in supporting the success of a policy can be characterized by market certainty that is able to stimulate investment and support the development of renewable energy projects.

- Policy Adequacy

Adequacy of policy is a condition where a policy is deemed capable of providing a positive influence on the growth of the investment climate that can encourage increased production. The growth of a favorable investment climate is driven by a return on investment that is comparable to the costs of construction and operation of renewable energy plants. Considering that renewable energy has unique characteristics according to potential geographic conditions, it requires large costs and technology.

- Contextual framework

The contextual framework of renewable energy can be characterized by the existence of national policy support that is integrated with other relevant and

complementary policies. Renewable energy policies in regulations from the highest level that are harmonious and cohesive can support the creation of renewable energy growth.

Research Method

This study uses a post-positivism approach through qualitative methods. The locus of this research is the Directorate General of New and Renewable Energy and Energy Conservation (DG EBTKE), the Ministry of Energy and Mineral Resources (ESDM). This research was conducted from September 2018 to July 2019. The results of the analysis were obtained from primary data through interviews with resource persons from the Ministry of Energy and Mineral Resources, renewable energy companies, renewable energy associations and the House of Representatives (DPR) of the Republic of Indonesia. Secondary data are taken from official reports of institutions, and other journals. This research is to answer the research question which is how the dynamics of renewable energy pricing policies for electricity generation is seen from the perspective of policy stability, policy adequacy and contextual framework. The focus of this research is on the analysis of renewable energy pricing policies in relation to electricity generation, especially in the era of President Jokowi's administration in 2014-2019. The analysis used in this study consists of policy stability, policy adequacy and contextual framework (national policy support and highest level of policy consistency).

Result

Looking at the phenomenon of increasing population in Indonesia, it is estimated that in 2024 Indonesia's population will reach 284.8 million. This amount will be accompanied by an increase in the total national electricity demand of around 464.2 TWH with the assumption of economic growth of 6.1-7.1%. The high national electricity demand makes the government need to increase the capacity of power plants by 70,400 MW for equitable access to electricity.

Under President Jokowi's administration, the government is targeting to build 35 thousand megawatts of electricity capacity in the 2015-2019 period. To achieve these objectives, a national electricity development plan is prepared which includes targets for the development of electricity with various energy sources in Indonesia. Noted in the development of national electricity there are 41% of PLTU projects (45 projects), 14% of PLTA projects (15 Projects), 9% of PLTGU projects (10 Projects), 8% of PLTG / MG projects (9 Projects), 15% of PLTGU projects (15 projects), 9% of PLTMG projects (10 projects), 4 PLTP projects, 1 PLTD project, 1 PLTG project, 2 PLTB projects, and 1 steam power project. (BKPM, 2015)

As an effort to develop renewable energy, the government issued a policy on the utilization of renewable energy aimed at increasing the participation of Independent Power Producers (IPP) in developing renewable energy projects. The government's awareness of the importance of IPP's presence in this project is based on the government's limited financial capacity in project development when using the state budget.

Policy Stability

As an effort to increase the use of renewable energy, the government drafted the Minister of Energy and Mineral Resources which regulates the purchase of electricity with the FiT scheme on water and wind energy sources (Regulation of the Minister of Energy and Mineral Resources Number 4 of 2012), biomass energy sources (Regulation of MEMR Number 19 year 2013) and geothermal (Regulation of MEMR Number 17 Year 2014). The FiT scheme is a popular scheme that has been used by more than fifty countries because it is considered capable of accommodating various related aspects such as location, capacity and type of technology used. The implementation of FiT for solar energy sources began with the MEMR Regulation Number 19 year 2016 which regulates the purchase of power in photovoltaic solar plants. However, the FiT Scheme in Indonesia is experiencing a

dynamic development where almost all existing FiTs have lasted for only two years. In addition, in the beginning FiT was calculated using the Rupiah (Rp) currency for water, biomass and biogas energy sources, but in this calculation later changed using the USD currencies. Hideki and Himsar. in his research found that the application of FiT in Indonesia has not provided support for the growth of independent Power Producers (IPP).

At the beginning of the administration of President Jokowi, the Government's commitment in the use of renewable energy was reflected by the President's positive statement that said that renewable energy prices could actually be lower and the need for providing incentives to encourage their utilization. In the 35 thousand megawatts project that was initiated by President Jokowi to electrify remote areas, it has also accounted for 25% of the portion for renewable energy. However, in early 2017 the enactment of several MEMR regulations that suppressed renewable energy prices was smaller compared to the BPP reflecting the direction of the President's support.

The electricity purchase scheme is an economic instrument that can boost the development of renewable energy. However, none of the best instruments applies universally because each instrument has both positive and negative sides. FiT offers stable prices even though renewable energy investments require large funds in unpredictable market conditions. Pricing in FiT is enough with a dilemma if the price is set too high then there will be an increase in electricity rates and be a waste. But if the price is set too low, investor interest will be reduced. FiT is widely adopted by developing countries because it is considered as one of the economic instruments that is more in line with the economic conditions of developing countries because it is cheaper with a low level of risk. However, the implementation of this policy cannot work alone and requires a supportive environment such as certainty and long-term investment climate stability.

Since 2011 when the FiT policy was launched there has been an increase in renewable energy investment, although in practice in the field there are some contradictions to the spread of renewable energy. For example, in the construction of small-scale hydroelectric power plants in West Java, out of 61 licenses, only 6 were able to produce optimally (Mendonca, 2007). This is due to the difficulty of investors in obtaining development location permits from local communities and local governments. This difficulty certainly reduces investor profitability by issuing additional costs in the construction of renewable energy plants. The structure and selling price of renewable energy in the FiT policy that has been imposed by the government is considered more able to accommodate the interests of stakeholders. Investors are more satisfied with this policy, even though the existing FiT policy in Indonesia still has weaknesses. Among them are not yet considering socio-political factors and the still complex structure of contracts such as the slow process of power purchase agreement (PPA), complexity in land acquisition and community acceptance. FiT can be used as a form of incentive given by the government aimed at increasing access to electricity usage (Wahab, 2015).

Changes in the direction of government policy in determining the price of renewable energy from FiT to the Cost of Provision (BPP) with the ratification of the MEMR Regulation Number 12 year 2017 have a number of separate consequences. In this regulation the use of renewable energy uses high-based technology and depends on the potential regional conditions. The purchase of electricity in this policy is based on a benchmark price mechanism or direct election with a minimum total package of 15MW. In addition, there is an obligation for PLN to operate plants that are sourced from renewable energy which have a capacity of up to 10 MW consistently / steadily. The Principal Cost Provision mechanism (BPP) in this policy is determined based on the national plant BPP provisions of 85% of the local BPP. However, if the local BPP is equal to or below the national BPP, BPP determination is the same as the local BPP.

In MEMR regulation number 12 year 2017, electricity purchase mechanism done through auction process for wind power and auction based on capacity quota for solar PV power, reference price (less than 10 MW) or direct selection (more than 10MW) for biomass and biogas power and reference price for municipal waste power and geothermal power. In MEMR regulation number 50 year 2017 electricity purchase mechanism by direct selection for hydro, biomass, biogas, municipal waste, geothermal and tidal power. For Solar PV and wind, direct selection based on capacity. Direct selection mechanism is considered to be the cause of the small-scale power generation project get difficulties in obtaining funding commitments. Therefore, need evaluation whether this scheme can be applied to whole plant electricity project form the small, micro and big scale electricity power plant.

The government believes that the change in the scheme is an indication of the government's optimism that the price of renewable energy offered can compete with fossil energy. However, this policy change received a negative rating from a private electricity producer because it was considered unprofitable. As illustrated in the previous regulation, MEMR regulation Number 19 year 2016 governing the price of electricity from solar sources, the purchase price of PLTS is in the range of 14-25 cents US \$ / kWh based on the business area. But in the new policy where the PLTS electricity price is set at 85% of the BPP in each region, the lowest price can reach 4.8 - 14.39 cents US \$ / kWh. (Panggabean, 2017).

In July 2017, the regulation was revised with the addition of regulating electricity capacity from water sources. A month after the regulation, the government revised the renewable energy price regulation by issuing MEMR Regulation number 50 year 2017 which changed several points in the previous policy. There is a direct selection mechanism and the concept of Built Own Operate (BOOT) cooperation. This change in the pattern of cooperation caused business actors who were only given the opportunity to operate the plant for 20 years and then handed it to the government making it

difficult for them to obtain a loan for development of the plant. Finally, in December 2018, there were additional provisions on the purchase of electricity from biofuels with the issuance of MEMR Regulation number 53 year 2018.

The fluctuation in the renewable energy price policy during the Jokowi administration was responded by entrepreneurs in the wait and see position. They chose to wait for policy certainty through a definite legal umbrella to decide on investment. The government argues that government policy revisions are an adjustment to inflation and exchange rate fluctuations and input from various related parties (Mendoca, 2007).

A survey conducted by Price Waterhouse and Coopers & Lybrand (PwC) and the Indonesian Private Electric Producers Association (APLSI) to more than 100 IPP owners and investors, power developers, PLN, and government agencies at the end of 2017 and early 2018 showed respondents' concerns about policy and regulations applied by the government. It was revealed that the right strategic rules and well-designed rules are very important for companies, and investors in Indonesia. The survey mentioned 94% of respondents believe that regulatory uncertainty is their main obstacle to investing in power generation. This figure is a number that shows the tendency of the survey results.

Policy uncertainty in the presence of regulations that are enforced, amended and revoked actually has a negative impact on the future of renewable energy projects. The developer considers that the existence of these policy revisions does not completely solve the perceived problem and can even create more controversial clauses.

Policy Adequacy

In determining the price of renewable energy, it is important for regulators to involve the interests of energy sector players. This was revealed by private developers that damage to the market structure could occur because of the government's dominance in policy making

so as to create unfair competitiveness. Concerns about the risk of project bankability are also issues in this policy. A survey from PwC and APLSI shows that 71% of respondents stated difficulties in getting bank funding for renewable energy projects. In addition, 90% of respondents said that there is a need for a fair risk assessment in setting renewable energy prices.

This unfavorable investment climate makes the value of renewable energy investment in the period 2015-2018 not experience significant development. In 2015 the investment value of various energies (water, solar, wind) was 0.95 billion rupiah and in 2018 it decreased to 0.2425 billion rupiah. The decline in investment is due to the lack of development companies that submit PLTS construction. In fact, in 2017 there were only seven companies that passed the verification of PLTS investment documents. For geothermal energy sources, the investment value increased slightly by 1.21 billion rupiah in 2018 from the previous 1.152 in 2017. While bioenergy experienced the same thing, the investment value of 0.73 billion rupiah in 2018 from the previous 0.749 billion rupiah in 2017.

In addition, the return on renewable energy investment is also longer when compared to fossil energy because of lower selling prices. Return of intent (ROI) will be accepted from renewable energy is not optimal yet, from the point of view renewable energy development companies. The return on renewable energy investment of 6% is not attractive, given the risks that will be accepted by the developer. This value is also not balanced with the amount of investment invested as in wind energy of around 12 cents US \$ / kWh while in coal energy is only 5-9sen US \$ / kWh.

The renewable energy pricing policy is considered not able to accommodate the interests of the development companies. Although policy making is the authority of the government and the legislative (DPR), the importance of involving the private sector (developers and investors) in the formulation of policies can increase the chances of policy success. This is reinforced

by the results of a survey by PwC which noted that only 89% of respondents said that the existing policies did not take into account the risks and future planning of renewable energy investments. The existence of funding difficulties makes respondents pessimistic that renewable energy investment targets can be achieved. Not only that, the survey results also showed that 96% of respondents thought that the 2017-2026 Electricity Supply Business Plan (RUPTL 2017) was not designed to face and anticipate the challenges of the electricity sector at present or in the future comprehensively.

Renewable energy pricing policies for electricity generation should aim for the long term including encouraging private companies, education, training, and investment in human resources to localize many of the jobs created by the deployment of renewable energy, with cross-sector benefits through high-quality employment creation and contribution to the local knowledge industry. In the GCC countries (such as Saudi Arabia and Oman) in the period 2013-2018, renewable energy succeeded in making a profit with a positive growth of renewable energy which reached 7 GW. The optimism of renewable energy growth in these countries is supported by the global cost reduction for solar photovoltaic (PV). The fertility of the renewable energy market share growth is due to the utility tariff policy and the incentive scheme so that renewable energy construction is possible to be built by local private companies. There is a strong commitment from the government that clearly measured targets and determined deadlines and the provision of a supportive business environment with supporting financing (IRENA, 2019).

Contextual Framework

National policy support in setting renewable energy prices is the foundation in increasing renewable energy utilization. Energy Act number 30 year 2007 which mandates the obligation to use renewable energy which is lowered into the national energy policy (Presidential Regulation Number 22 Year 2017) makes renewable

energy a national development priority by considering the national economy. Even so, at the national level, renewable energy does not yet have specific laws governing the use of blended energy from upstream to downstream (except for geothermal sources). This condition is different from other energy sources that have more complete legal instruments from the law level to the implementing regulations.

The absence of this law according to the sources is a crippling regulation in the implementation of renewable energy policies. Determination of the price of renewable energy that refers to the energy law is also considered not to reflect the concept of justice. In the pricing policy for renewable energy, many parties declare injustice in determining the price of renewable energy. Based on interviews, it was found that fossil energy pricing should take into account the external costs incurred by fossil energy. Impacts such as air pollution that affect public health and environmental damage have been borne by the community itself. This should be included as a price component in fossil energy. This is in contradiction with renewable energy which has relatively no negative impact on the environment.

The concept of a just economy stated in the energy law brings various perceptions in terms of calculating the price of renewable energy to be able to compete with fossil energy. Policy consistency at the level of the law is considered to be in accordance with the national juridical foundation, namely the 1945 constitution. However, at the ministerial level the concept of justice is fair for various parties directly involved with the intended policy process.

PwC in its survey found that 61% of respondents stated that the current renewable energy regulatory and legal framework does not support increased private investment. Only 39% of respondents feel that current policy regulations are capable of meeting private needs. The regulatory and legal framework in Indonesia supports private investment. This is consistent with the results of the interview which stated that the absence of

weak legal instruments made the accelerated use of renewable energy crippled. The changes from overnment policies in renewable energy pricing schemes that do not accommodate the interests of developers can be its own obstacles.

Conclusion

The dynamics of the policy for determining renewable energy for electricity generation in Indonesia is characterized by changes in regulations made by the government in response to market fluctuations and stakeholder interests' accommodation. Although the efforts to revise the regulation are aimed at accelerating the fulfillment of national electricity needs, these efforts have not been able to drive the achievement of the targeted investment value. The stability of the renewable energy policy as revealed by Mallon (2016) is seen to affect the perception of the developer company in investing in power plant construction. In terms of policy adequacy, the development company considers that the current policy has not been able to meet the ROI requirements desired by IPP because of a change in the scheme that causes funding difficulties. In contextual factors there is an inconsistency of the concept of justice which is realized in the form of regulations where in the ministerial regulations / implementing regulations are considered to be less representative of the concept of justice contained in the law.

The Government needs to be consistent with policies made by not making frequent revisions or changes in regulations. Through policy consistency, market stability will increase and the sustainability of renewable energy projects guaranteed. Stakeholders need to be actively involved in all policy processes, especially renewable energy pricing policies ranging from planning to supervision, so that the resulting policies are able to represent the aspirations of various parties and anticipate and predict future threats. In addition, the need for a complete and coherent regulatory framework starts at the highest level (the law) until the implementing

regulations so that they are able to run in harmony.

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