



Regulation of the Management Potential of New Renewable Energy Sources in Indonesia

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Abstract-This study aimed to know: Energy is an absolute necessity in human life. The need for energy every day continues to increase. The use of energy so far has only come from fossil energy, resulting in a dwindling amount. Thus, the need for alternative energy as a substitute for fossil energy, namely with new renewable energy. The potential of new and renewable energy in Indonesia needs to be managed properly in order to become an alternative source of energy supply in Indonesia. The purpose of this study is to determine the potential for managing new and renewable energy sources in Indonesia. This research was conducted with a literature study with primary and secondary data sources. The results showed that Indonesia has the potential for new and renewable energy sources that can be managed properly so that it can become an alternative energy to replace fossil energy. The management of new and renewable energy needs to be considered properly, in addition to the challenges and obstacles that exist in the management of new and renewable energy sources also need special attention from the government.

Keywords – Regulation; Management; Fossil Energy; Renewable Energy.

I. INTRODUCTION

Energy sources play a very important role in various aspects of a country's life, both from the economic, social and national development aspects of a country. Indonesia is a country that has abundant natural wealth by producing potential energy resources that can be exploited periodically. Therefore, Indonesia is a country that can produce energy to build the national welfare of its population.[1]

Energy is a vital need in human life, especially in economic, household, industrial, business and transportation activities. Most of the energy supply in the world comes from fossil fuels which are non-renewable energy sources. For example, Indonesia is currently very dependent on oil and natural gas. Based on data from Pertamina, in 2013 it was recorded that the national demand for petroleum was 77.00 million KL, while the national refinery production capacity was only 38.10 million KL. Continuous use of fossil energy will result in energy reserves depleting. Therefore, there is a need for a supply of alternative energy other than fossil energy such as petroleum and coal. New Renewable Energy (EBT) is an alternative source of energy supply. Management of new and renewable energy must be the main concern of the Indonesian government. New and renewable energy is energy that comes from nature that can be sustainable. As a country that guarantees the fulfillment of the right to a healthy environment through managing its abundant resources, conservation efforts through good governance are needed.

The goal of sustainable development in Indonesia by 2030 is the availability of clean and affordable energy throughout the country. Energy sustainability is a global issue that requires serious commitment from the central government and regional/local governments to be able to implement sustainable development goals. Renewable energy policy in Indonesia is contained in Government Regulation no. 79 of 2014 concerning National Energy Policy (KEN). This government regulation sets a target for achieving new and renewable energy in 2025 at at least 23%, and in 2050 at least 31%. On the other hand, it is hoped that dependence on petroleum and coal is targeted to decrease, with respective percentages of 20% and 25%. Efforts and programs to achieve the target of achieving new and renewable energy are outlined in the National Energy General Plan (RUEN) and the Provincial General Regional Energy Plan (RUED-P). In 2018, national use of new energy and renewable energy still reached 11.68% and was still too far from the target figure. To achieve the target for 2025 to 2050, the government must continue to explore the potential of new energy and renewable energy at the regional level and continue to invest in the new energy and renewable energy sectors.[2]

New and renewable energy development needs to be managed well because currently energy consumption continues to increase. The issue of renewable energy is one of the world's central issues, considering that fossil energy is limited in quantity and does not have a long term. Indonesia has abundant energy resources. As a country with promising geographical and geological conditions, Indonesia has good potential in developing energy, such as solar, wind, water, and bioenergy, to the huge renewable energy market potential in Indonesia, especially in the commercial and industrial sectors. So, realizing how much potential Indonesia has, it is necessary to explain the potential for managing new and renewable energy sources in Indonesia and the challenges or obstacles in managing new and renewable energy in Indonesia.[3]

II. LITERATURE REVIEW

From the Groundstroke results data, student groups' Energy management in Indonesia is regulated in Law Number 30 of 2007 concerning Energy. Energy management aims to achieve energy management, ensuring the availability of domestic energy, the availability of domestic energy sources, ensuring the management of energy sources, utilizing energy sources efficiently, and so on. In building community welfare and realizing the sustainability of environmental functions, energy management regulations support the new and renewable energy transition in Indonesia.[4] Indonesia has proven to be very concerned with developing the use of new and renewable energy, namely with Government Regulation Number 79 of 2014 concerning the National Energy Policy (KEN) and Presidential Regulation No. 22 of 2017 concerning the General National Energy Plan (RUEN). It is hoped that these government regulations can realize the welfare of the people because basically the natural resources owned by the state must be used as much as possible for the prosperity of the people.[5]

As a country that has abundant natural wealth, Indonesia has the potential to provide new and renewable energy sources. The potential availability of new and renewable energy sources needs to be appropriately processed so that it can become an alternative in overcoming the scarcity of fossil energy sources that are used continuously. One of the potential management of new renewable energy sources in Indonesia includes:[6]

a) Wind Energy Potential in Indonesia

The potential for wind energy in Indonesia is relatively medium because Indonesia is located in the equatorial region.[7] However, some areas are geographically windy, because they fall within the nozzle effect area or the narrowing between two islands or mountain slopes that are close to each other. The development of wind energy still needs to be improved in Indonesia. The following is the management of several Wind Power Plants in Indonesia:[8]

1) Wind Power Plant in Sulawesi

Sidrap Wind Power Plant has 30 windmills with a tower height of 80m and a blade length of 57m. Each wheel drives a turbine with a capacity of 2.5 megawatts, so the total power produced by 30 turbines is 75 megawatts. The windmill is projected to be able to supply electricity to 70,000 customers in the South Sulawesi region, with an average electrical power of 900 Volt Ampere. The construction of the windmill power plant is in line with the government's program to increase the portion of New Renewable Energy (EBT) to reach 23% of the total national energy mix by 2025. Around 40% of the windmill power plant uses Domestic Component Level (TKDN) and absorbs about 1,150 workers.[9]

2) Wind Power Plant in Pandansimo

The Hybrid Power Plant (PLTH) at Pantai Baru Pandansimo Bantul Yogyakarta is a hybrid energy based on the potential of solar energy and wind power, which is used as a model in the development of integrated renewable energy through the Regional Innovation System (SIDa).

3) Wind Power Plant in Nusa Penida

Nusa Penida Island has nine electric mills as wind power plants. However, it is miserable that now only seven mills are operating, and two are damaged. Poor management means that the hydropower potential on Nusa Penida Island is experiencing problems.

b) Solar Energy Potential

Indonesian people use solar energy daily, such as in drying crops and fishing fishermen's catches. Progress over time has produced various technologies, one of which is the discovery of modern technology that applies thermal solar energy (collection of radiant energy from solar radiation into heat energy), both on a simple scale and an intermediate scale. Examples include water heaters (solar water heaters), water distillers (distillation), power plants (solar thermal power plants), and cooling devices (solar cooling). The subsequent modernization in solar energy management today is solar photovoltaic technology, better known as the Photovoltaic Solar Energy System (SESF). SESF technology works by directly converting radiation from solar radiation into electrical energy.[10] SESF is a promising alternative for supplying electricity for home lighting and public facilities.

c) Water Energy Potential

PLTA, or Hydroelectric Power Plant, is a system that processes kinetic energy produced by water in a power/capacity of more than 5,000 KW. In terms of its use as hydroelectric power, one of the regions that has the most enormous water energy potential in Indonesia is Papua, namely 22.37 MW, followed sequentially by South, Central, and East Kalimantan (16.68 MW), South and Southeast Sulawesi (6.34 MW), Aceh (5.06 MW) and West Kalimantan (4.73 MW). Water energy use in Indonesia by 2019 is targeted to reach 50 MW for mini and micro hydropower plants. Hydropower itself is part of new renewable energy that is water-based. However, even though water-based generation is an environmentally friendly technology (green energy), it is still necessary to pay attention to its environmental impact. Environmental factors influence land availability, water quality, and greenhouse gas (CO₂) emissions.[11]

d) Bioenergy Potential

Bioenergy is energy produced from processing materials or biological natural resources from animals and plants (biomass). The energy produced can later be used to make vehicle fuel and electricity. Bioenergy potential in Indonesia includes using biodiesel from kemiri sunan and palm oil. Biodiesel from microalgae weighing 3.7 kilograms dry weight can produce 1 liter of biodiesel, such as in Cilacap and Bali Province.[12] 100% bioethanol or E100 in a generator with a capacity of 5-kilovolt amperes is capable of producing up to 5,000 watts of electrical power with bioethanol fuel consumption of 2,721.2 grams/kWh, the resulting efficiency is 20.6% and is able to reduce carbon monoxide emissions by 0.011%. Biofuels, if utilized optimally, can support energy security in Indonesia.[4]

e) Geothermal Potential

Indonesia has utilized geothermal energy as electrical energy since the 1980s. They are starting with the operation of the Kamojang Unit I Geothermal Power Plant (PLTP) with a capacity of 30 Megawatts. According to the General National Energy Plan (RUEN), 2025 the PLTP contribution is targeted at 7.2 gigawatts of national use. However, until now, there is still little geothermal development in Indonesia, while Indonesia has a geothermal potential of 28.5 Gigawatts and as of September 2018 only around 1,948.5 Megawatts of geothermal utilization was recorded in Indonesia, namely with the operation of 12 PLTPs.[13]

III. METHOD

Quantitative research methods with experimental In writing this article type study the normative law, where in the study writer uses literature as material law to study material primary and secondary law For analysis. Legal materials were collected with Library Study techniques (*library research*). Literature study is a technique collection material law with a method gather archive consisting of books, journals, laws, regulations, legislation, papers, articles, magazines, and literature other related things with theme research.[14]

IV. RESULT AND DISCUSSION

In managing new and renewable energy in Indonesia, there are still several obstacles to implementing its policies. These obstacles arise in a complex and structural way. It cannot be denied that social problems, such as society's dependence on fossil fuels, have resulted in low awareness of the use of new and renewable energy, and there are juridical problems regarding the issue of new and renewable energy.[3]

a) Juridical problems

There are several challenges and problems in developing new and renewable energy. Currently, there are several laws and regulations that regulate the management of energy sources. As with energy issues held in Law No. 30 of 2007, electricity issues held in Law NO. 30 of 2009, and issues related to geothermal energy held in Law No. 21 of 2014. Not only that, various implementing regulations have been

issued to develop renewable energy management programs. Several implementing regulations that have been published include: Government Regulation (PP) no. 70 of 2009 concerning Energy Conservation, Presidential Regulation no. 79 of 2014 concerning National Energy Policy, Minister of Energy and Mineral Resources Regulation no. 39 of 2007 concerning Implementation of **Physical Activities for the Utilization of New and Renewable Energy and Energy Conservation**, and Presidential Regulation no. 22 of 2017 concerning the General National Energy Plan.[15]

Unfortunately, these regulations are still separate and scattered into various laws. Meanwhile, there needs to be a law that specifically and systematically regulates new and renewable energy. The government's vision for managing new and renewable energy has yet to be stated in law. There is still a need for a legal umbrella with the force of law that provides specific, comprehensive regulations regarding renewable energy and will later become the legal basis and reference for derivative statutes and regulations.[16] The government's effort to encourage using EBT is by drafting the EBT Bill. The EBT Bill has now been included in the 2022 Priority National Legislation Program (Prolegnas). The bill is expected to provide a more robust legal basis for developing EBT governance. The ratification of the EBT Bill will also be a unification of EBT legislation, which is still spread across various laws and regulations.[17] The realization of the EBT Bill is undoubtedly very necessary, considering that the natural resources regulated in it are strategic and vital resources for the lives of many people.[18]

b) Social Problems

Not only problems with the juridical aspect but problems with implementing renewable energy policy management in Indonesia can also be caused by social elements. Several social issues that hinder the direction of new and renewable energy policies include:[19]

- (1) An adequate investment climate has not been achieved

The role of investment is vital in national development practices. Through investment, the production facilities needed for energy management will significantly influence the sustainability of new and renewable energy management in Indonesia. However, in reality, on the ground, there is no indication of a strong investment climate in Indonesia's new and renewable energy management sector. The latest data from the Ministry of Energy and Mineral Resources (ESDM) shows that throughout 2021, the realization of renewable energy investment only reached 1.51 billion US Dollars from the original target of 2.04 Billion US Dollars.[10]

A legal umbrella is necessary to maintain high investment interest in Indonesia. This causes uncertainty in the renewable energy industrial ecosystem that will be built in Indonesia.[20] Regulations on new and renewable energy spread across various regulations complicate Indonesia's investment climate. The absence of certainty and protection that should be present, along with a legal umbrella, has sparked doubts among investors to invest their capital in renewable energy development.[21]

- (2) Possibility of corrupt practices

New and renewable energy will become a very profitable commodity in the future. It cannot be denied that in the future, there will be individuals from various levels of society who intend to make personal profits in the implementation of managing this new and renewable energy source.[22] Seeing the increasing number of corruption cases in Indonesia is one of the factors that supports the possibility of corrupt practices in the management of new and renewable energy sources in Indonesia.[23]

V. CONCLUSION

The conclusions in this study were: Indonesia is a country that has the potential for new and renewable energy sources which are abundant and spread throughout the country. New and renewable energy sources owned by Indonesia such as wind energy, solar energy, water energy, bioenergy and geothermal energy need to be utilized and

managed well, considering that currently the availability of energy sources originating from fossils is experiencing a shortage due to continuous use. In managing the potential of new and renewable energy resources in Indonesia, several obstacles and challenges are still found in the management of new and renewable energy policies in Indonesia that need to be carefully considered by policy makers. Based on the facts above, before going any further, the government is obliged to understand the problems that arise, so that later the management of new and renewable energy in Indonesia can be carried out sustainably and can run optimally.

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