Iceland's Foreign Policy in Implementing Green Investment for Renewable Energy Development

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Abstract
The neutralization of carbon emissions by 2040 is one of Iceland's targets, so it issued a foreign policy to invest in the field of Green Investment to countries that have great potential in geothermal energy. Iceland has invested in several countries such as Ethiopia, Japan, the United States, and also Indonesia. The purpose of this study is to analyze Iceland's foreign policy in implementing Green Investment for renewable energy development. This paper uses a qualitative research method with a literature study approach. Data is obtained from documents, such as journal articles, official websites, and data from the internet. The results of this study show that Iceland's foreign policy is related to green investment to achieve the target of carbon emission neutralization by 2040. Investment to countries that have the potential to develop renewable energy, one of which is Indonesia. The form of investment provided in the form of cooperation in the form of funds and technology to develop renewable energy in the field of geothermal energy, and send Indonesian experts to take education and training of renewable energy experts in the field of Geothermal in Iceland.

Keywords: Geothermal, Green Investment, Iceland, Renewable Energy

1. Introduction

Iceland is one of the countries that has managed to escape dependence on fossil energy which is non-renewable and will eventually run out. Iceland began using renewable energy by utilizing thermal energy. Iceland's success in utilizing thermal energy began with the world oil crisis that occurred in 1970. This crisis caused all countries to use renewable energy to meet their domestic oil needs. When the crisis was over, countries returned to the traditional way of using petroleum as their domestic energy reference point. However, Iceland remains committed to developing renewable energy from geothermal energy by looking at the availability of geothermal energy. As a result of this commitment, Iceland began to escape the pressure of coal and petroleum imports which decreased drastically. Iceland uses petroleum and coal only for the main export needs in the field of the water industry. Since then, Iceland has seen that geothermal is a renewable energy, produces consistent electricity, produces no pollution and has a long and sustainable lifespan.(1) (2)

As a country that has been successful in using new renewable energy, Iceland needs a country that has wealth in mining products, especially bauxite to support the country's economy. Iceland sees Indonesia as a country that has the potential to be a partner in developing geothermal energy. Moreover, the level of fuel oil consumption is quite high when compared to the availability and production of oil, where petroleum is the main support for Indonesia to drive the country. Iceland emphasizes experts in the field of geothermal energy to cooperate with countries that have geothermal energy capabilities with the aim of helping countries that have geothermal energy potential to develop renewable energy(1).

Iceland has a desire to achieve the Carbon Neutrality Target and reduce greenhouse gas emissions by 40% by 2040 by providing renewable energy investments to other countries that have potential in thermal energy, this is based on the Paris agreement. Related to Iceland's target, the cooperation between Iceland and Indonesia in thermal energy is quite appropriate. Recalling that Indonesia is the largest heat-

producing country in the world, which can produce as much as 29,000 MW of electrical energy or as much as 40% of geothermal potential but has not been able to process it and is only able to utilize less than 5% of its potential. Meanwhile, Iceland is a country that has succeeded in developing and using renewable energy and has a workforce of experts in this field.(1)

Iceland's target for carbon neutralization in 2040 will be achieved through foreign policy to invest in green investments, especially through geothermal energy in countries that have great potential to develop renewable energy in geothermal energy. Iceland has invested in green investments such as in Ethiopia, Taiwan, Japan, the United States including Indonesia. Iceland is doing all that to achieve its target in 2040 to be free from carbon emissions. Iceland sees that Indonesia is one of the countries that has a great opportunity to develop geothermal energy. Given that Indonesia is one of the countries that has abundant geothermal energy but has not been able to be utilized optimally.

Indonesia contributes the 6th highest carbon emissions in the world with 691.97 million tons of carbon dioxide recorded in 2022.Nabilah Muhamad, "Indonesia Salah Satu Penghasil Emisi Karbon Sektor Energi Terbesar Global Pada 2022". Indonesia's carbon emission sources are divided into two, namely emissions from fuel combustion and fugitive emissions contained in fuel production and supply activities. Indonesia's carbon emission sources come from the energy producing industry, manufacturing industry, transportation industry and other sectors such as housing activities. The largest contributor to carbon emissions comes from the energy sector, with an average annual increase of 3.57%. The government has issued a carbon tax law that regulates the application of carbon tax, but the regulation only provides and regulates carbon tax in general without providing more detailed carbon tax mechanisms and techniques have not been established. Therefore, the problems related to carbon emissions in Indonesia cannot be solved.(4)

Therefore, with Indonesia's carbon emission problems that have not been successfully resolved until now, bilateral cooperation between Indonesia and Iceland to overcome carbon emission problems is considered good enough to be implemented, this is in line with Iceland's foreign policy to invest in countries that have thermal energy sources. Given that Indonesia is a country that has abundant geothermal energy potential but has not been able to be processed optimally, while Iceland is a country that has successfully implemented Green Investment related to its desire to escape dependence on fossil energy and try to make the transition to renewable energy by utilizing geothermal energy. On the other hand, Iceland has a target to neutralize carbon by 2040 which is achieved by investing in countries that have the potential to develop renewable energy.

Problem Statement

How is Iceland's foreign policy in implementing Green Investment for renewable energy development?

Purpose

To analyze Iceland's foreign policy in implementing Green Investment for renewable energy development.

2. Method

This research uses a qualitative research methodology with a literature study approach. Qualitative research methods according to Cresswell are research that produces findings that cannot be obtained using numbers or measurements. Meanwhile, according to Bodgan and Biklen, qualitative research method is a method that produces descriptive data description in the form of writing, speech and behavior of the people studied.(5) . Meanwhile, literature study is a library data collection activity by recording, reading and then processing research material.(6) Data collection techniques in this study by searching for data on the internet such as the writings of previous researchers in the form of journals, articles, official websites, and others.

3. Results and Discussion (Title Case and Bold)

3.1. Implementation of Green Investment in Iceland

Iceland has implemented almost 100% renewable electricity for its population of 300,000 people. Iceland's economy has been supported by environmentally friendly energy sourced from geothermal energy, such as industrial needs, home heating and electricity, but with one exception Iceland still uses fossil energy for transportation activities. In addition to home heating, Iceland also uses geothermal energy to melt snow on sidewalks, greenhouse cultivation, swimming pools, fish farms, food processing, and Icelandic cosmetic products that are famous in Iceland.(7) Entering the 1900s Iceland used geothermal energy by running hot water from the earth with concrete pipes to farmers' houses until it reached the capital of Iceland in Reykjavik. Hot water is used for washing and bathing.

a. Room Heater

Iceland started using geothermal energy as space heating starting in 1930. When oil prices rose in the 1970s Iceland sought to increase and expand the use of geothermal energy as space heating, so that by 2007 the use of geothermal energy as space heating increased to 89% in 2007 from only 43% in 1970. So the operation of geothermal energy use as space heating is separated between operations in cities and villages. There are about 200 small systems operating in rural areas. Reykjavik District Heating is the company responsible for the sale and distribution of hot water and electricity as well as waterworks in the city. The company was established in 1999 and is one of the largest geothermal district heating companies in Iceland. The company supports almost all of Reykjavik's nearly 200,000 population.(7)

Sudurnes Regional Heating pioneered the construction of a cogeneration power plant in Svartsengi on the Reykjanes peninsula in 1977.The power plant serves to heat fresh water and to generate electricity by using Geothermal water with a temperature of 240 degrees Celsius. The power plant serves electricity and hot water for about 200,000 residents. The district heating of Akureyri, a town heated by geothermal energy, began in the late seventies. Akureyri is a town located in the central part of Iceland with a population of around 17,000. There are four geothermal fields that are pumped to Akureyri.(7)

b. Swimming Pool

Geothermal energy in Iceland is used to heat swimming pools. There are 165 swimming pools and 135 of them use geothermal energy. Throughout the year these swimming pools are open to the public, which serves as a place of recreation and as a place for training and learning to swim, where swimming is a compulsory lesson in Icelandic schools. It takes about 220 m3 of water or about 40,000 MJ of energy to heat one meter of surface area each year.(7)

c. Melting Snow

Iceland has been using geothermal energy to some extent, namely to heat pavements and melt snow during winter. This has evolved so much that almost all new houses or buildings have geothermal snow melting systems. Water from the former houses that has a heat of about 35 degrees Celsius is used to melt the icy snow that covers sidewalks and parking lots. The main purpose of utilizing geothermal energy is to prevent over-icing and to facilitate snow removal. In the city of Reykjavik snow melter systems have been installed under sidewalks and streets, these systems are designed to generate 180 W/m2 of heat. Energy consumption is 430 kWh/m per year. Two-thirds of the energy comes from water used for space heating and one-third from direct hot water sources.(7)

b. Indonesia’s Total Carbon Emissions

Indonesia is one of the top 20 carbon emitting countries. The first number is occupied by China, then the United States, India, Russia, Japan, and Indonesia. In fact, Indonesia is one of the top 5 carbon emitting countries.(3) . In another study, Indonesia was said to be the third worst

country in terms of air pollution after Thailand and Mexico.(8) Carbon emissions in Indonesia come from vehicle fumes, pesticide granules, industrial waste, used battery smelters, and household appliances. Indonesia's capital city, Jakarta, is one of the worst air polluted cities in Southeast Asia. Jakarta is considered to have exceeded the safe limit. Jakarta is included in the top 10 capital cities with the worst air pollution in the world.(4)

Carbon emissions are gases resulting from the combustion of compounds such as carbon dioxide, LPG, diesel and other fuels.(9) . Many of these emissions come from the industrial sector, which uses 70% fossil fuels of the total energy used. The largest contributor to emissions comes from the mining industry such as oil and gas, coal, and the like.(10) . In 2022 Indonesia reached a record high of Carbon Dioxide after records were kept since 1900. The increase in carbon emissions in 2022 was caused by coal burning and petroleum, which caused carbon dioxide emissions to increase to 1.6%.(11) Climate change is one of the impacts of increased carbon emissions. Climate change that occurs in Indonesia is in the form of changes in the rain cycle, increasing sea water temperatures, increasing surface temperatures and the occurrence of extreme climates and weather. The main cause of climate change comes from greenhouse gases.(10) Climate change can have a dangerous impact on living things on earth. Some of the impacts of climate change include floods, famine and unstable economies.(9)

c. Why Iceland Chooses Indonesia as a Partner to Implement Green Investment

Indonesia's abundant resources, both sea and land, have attracted European colonizers. The arrival of European colonizers, especially the Dutch, aimed to take and bring home the spices obtained in Indonesia. The Dutch colonizers occupied Indonesia for 350 years until they could build various kinds of infrastructure, one of which was the Thermal Power Plant (PLTP) which can now be found in Kamojang, West Java. So that the oldest hydropower plant in Indonesia is in Kamojang, West Java.(12) Indonesia is a geothermal energy producing country located on volcanic lines, Sumatra, Java, Bali, Nusa Tenggara, Sulawesi Maluku which can produce 29,000 MW of electrical energy.(1)

This is also the fundamental reason for the implementation of Iceland's foreign policy relating to investment in renewable energy in order to achieve the carbon neutrality target of 2040. Iceland's foreign policy is implemented through the establishment of cooperation between Indonesia and Iceland. Cooperation between bilateral and multilateral countries aims to improve the economy and fulfill the national interests of their countries. Iceland's success in escaping the use of fossil energy and its success in developing renewable energy, makes this step a tool to achieve its national interests. Iceland sees Indonesia as one of the countries that has considerable potential to develop renewable energy in the field of geothermal energy, moreover the price of fuel oil in Indonesia is increasing. Seeing this opportunity, the cooperation between Indonesia and Iceland will have a positive impact.(12)

Constraints that hinder the development process of renewable energy in Indonesia is the technology to drill geothermal wells. If Indonesia operates its own geothermal wells, it is more likely than not to succeed. more likely than not to succeed. However, if this is done by cooperating with Iceland, the probability of success will be greater than the probability of failure. greater than the possibility of failure. Apart from technology another obstacle is funding. The funds to drill one well up to 10 million USD or equivalent to 150 million. Meanwhile, every geothermal drilling does not always have the potential to succeed because not all can produce geothermal steam. Due to the large amount of funds and the possibility of failure, the Bank is less interested in providing loans to geothermal energy drilling. So in such conditions the role of foreign investors is needed to support funds and technological readiness.(1)

d. Iceland's Foreign Policy in Implementing Green Investment in Indonesia

Iceland has a target for carbon neutralization by 2040.(13) So Iceland issued a foreign policy to support renewable energy investment. This foreign policy is driven by Iceland's desire to obtain energy at a low price in order to successfully escape dependence on fossil energy. Iceland's foreign policy is to support renewable energy investment in countries that have the potential to develop renewable energy such as Ethiopia, Taiwan, Japan, the United States including Indonesia. To realize this foreign policy, Iceland and Indonesia have been cooperating for a long time, this aims to assist Indonesia in developing renewable energy, especially in the field of geothermal energy. To achieve carbon neutrality targets by 2040 Iceland will expand the use of renewable energy, develop green technology, and expand the Carbfix project to reduce emissions from heavy industry worldwide. Iceland's success in developing renewable energy in the field of geothermal energy,(14) , can be an example (15) for Indonesia to utilize the abundant potential of geothermal energy. To achieve the carbon neutrality target by 2040, Indonesia needs an investment of around 8 billion USD per year. Therefore, Iceland's investment in Indonesia for carbon neutrality in 2040 is considered to be very helpful.

Iceland's foreign policy related to green investment in Geothermal in Indonesia has been realized since October 13, 2007. The realization of this policy has been signed by the president of each country, both Indonesia and Iceland. So that the agreement resulted in a cooperative relationship or MoU in the field of renewable energy, especially Geothermal in the form of capacity building. Capacity building is the sending of Indonesian labor to Iceland to get education and training in the field of Geothermal. Where the training is held in the capital city of Iceland, precisely at the Nations University Geothermal Program. In addition, to develop experts in the field of Geothermal, several institutions have been selected from countries that have potential heat energy sources and have developed renewable energy in the field of Geothermal, one of which is Indonesia which is located at the Bandung Institute of Technology. This labor dispatch is not only temporary or short course but up to the master degree level. Sending Indonesian scientists to Iceland was carried out within 9 months. Indonesian scientists studied related to geothermal energy technology research, geothermal expertise, learning related to determining investment to develop geothermal energy, and drilling operations for geothermal sources. Cooperation between Indonesia and Iceland is not limited to sending experts but also cooperation in investment to develop Geothermal.(1)

Not only sending Indonesian experts to Iceland, but in Indonesia itself it has been developed through seminars or lecture programs in several educational institutions related to the discussion of heat energy sources. In 2007 several universities such as the Bandung Institute of Technology have become the first in developing geothermal energy science, because the education curriculum is based on world standard universities, including the Geothermal Institute University of Auckland, University of Iceland, even discussions related to the development of geothermal energy are not limited to seminars but up to the master degree.

The next form of cooperation between Iceland and Indonesia is in the field of exploration and utilization of geothermal energy which is carried out by finding geothermal energy sources by conducting surveys, exploration, feasibility studies, exploitation and utilization. So that later it can be utilized for the benefit of the electricity or non-electricity sector. Surveys conducted include geochemical, geological, geophysical Geothermal tests to consider the amount of geothermal energy. Once it is known that the place has great potential for the field of geothermal energy, the next step in the planning stage is to draw up a detailed plan to utilize it, which starts from making production wells.

Indonesia's potential for success in developing geothermal energy independently is very small, due to a lack of advanced technology and funds. Drilling a single well requires as much as

Rp.135 billion. Moreover, not all well drilling will be successful in obtaining geothermal steam. Due to the small potential for success, banks are reluctant to provide loans for the geothermal energy business. Therefore, the role of foreign investors in terms of both funding and advanced technology is urgently needed. To develop and manage Indonesia's abundant geothermal energy, the best way is through investment. So that Iceland's investment to achieve the carbon neutralization target by 2040 in accordance with its foreign policy, can be realized through investment in countries that have developed geothermal energy and have the potential for abundant geothermal energy sources, has the potential to succeed if it is realized through cooperation with Indonesia. Recalling that Iceland is one of the countries that has successfully escaped dependence on fossil energy and has successfully made an energy transition by developing new renewable energy, while Indonesia is a country that has abundant and scattered geothermal energy sources but has not been able to be utilized maximally.(1)

4. Conclusion

To achieve the carbon neutrality target by 2040, Iceland has a foreign policy to provide green investment to countries that have the potential for abundant geothermal energy sources and that have developed renewable energy. Several countries have been given investment assistance by Iceland such as Ethiopia, Taiwan, Japan, the United States and Indonesia. Indonesia is one of the countries with the highest carbon emissions in the world, ranking fourth after China, India and the United States. Indonesia's capital city, Jakarta, has one of the worst air pollution in Southeast Asia. Iceland provides investment in the form of providing and sending Indonesian experts to study and train experts in the field of renewable energy, especially geothermal energy. Indonesia is a country that has abundant geothermal energy sources but has not been maximally utilized. While Iceland is one of the countries that has developed geothermal energy for approximately 100 years, and now Iceland is a country that has successfully made the energy transition from fossil energy to renewable energy. Iceland's target for carbon neutrality by 2040 has led to the issuance of foreign policies regarding the provision of investment to countries that have the potential to develop renewable energy, one of which is Indonesia. This is considered positive because Indonesia has abundant geothermal energy sources. Based on the hypothesis or temporary answer from this study, it is said that Iceland's form of investment is in the form of providing funds, but Iceland's investment is more than that, Iceland also invests in technology and sending Indonesian experts to take education and training in the field of renewable energy.

5. Conflict of Interest

This research was conducted independently, without external intervention. All of the data utilized in this study came from open and reliable sources. We maintain the objectivity of the material offered by not having any financial or business ties to parties involved in the topics discussed.

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