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Indonesia-Finland Renewable Energy Development Cooperation

Aos Yuli Firdaus[1], Harun Umar[2]
[1,2] Universitas Nasional, Indonesia
Email: aos_firdaus@ymail.com

Abstract:

As the largest archipelagic country globally, Indonesia requires much energy to develop and preserve development and its natural wealth. As a biologically rich country, Indonesia has eight (8) renewable energy sources that must be processed and then utilised for maximum energy fulfilment throughout the archipelago and must be adjusted to its geographical specifications. The declaration of cooperation between Indonesia and Finland was signed by diversifying renewable energy sources from solar energy, bioenergy, and ocean wave energy. The implementation based on the MoU is the first to develop practical and environmentally sound technology using wind energy and ocean wave energy. The application of ocean wave energy as an alternative source of electrical energy by using technology. Second, the development of natural resources and technology in the electricity sector. This condition is done by building a micro hydropower plant. This research shows that cooperation between the two countries is quite effective. Both countries depend on each other to fulfil their respective interests. Because of that, there has been an effect between countries to re-enhance cooperation in the energy sector for a relatively long period, starting again from 2011–to 2014.

Keywords:

cooperating; national interest; renewable energy

I. Introduction

As the largest archipelagic country globally, Indonesia requires much energy to develop and preserve development and its natural wealth. As a biologically rich country, Indonesia has eight (8) renewable energy sources that must be obtained and then used for maximum energy fulfilment throughout the archipelago and must be adapted to its geographical specifications.

The Unitary State of Indonesia, which stretches for 8000 km, is one of the countries with abundant renewable energy potential, as we know that the land inhabited in Indonesia is only a third of the total area of the sea and islands. Unfortunately, the development of renewable energy has not become a national policy. Only now are we thinking about how to build and sustain development while protecting the environment?

Renewable energy is an energy source that is recoverable naturally and is a sustainable process. Renewable energy produced from energy sources will not run out naturally, even if managed carefully. Renewable energy is also called sustainable energy. The concept of renewable energy became known in the world in the 1970s. The existence of renewable energy is an antithesis of the development and use of fossil-based energy (coal, oil, and natural gas) and nuclear. Besides being recovered, renewable energy had believed cleaner (environmentally friendly), safe, and affordable by the community. The use of renewable energy is more environmentally friendly because it can reduce environmental pollution and environmental damage compared to non-renewable energy.

The list of Renewable Energy Sources in Indonesia is as follows.

1. Biofuels.

   Biofuels are renewable energy sources shaped by fuels (both solid, liquid, and gas) produced from organic materials. Biofuel sources are high sugar (sorghum and sugar cane) and plants with high vegetable oil content (castor, algae, and palm oil).

2. Biomass.

   Biomass is a type of renewable energy that refers to biological materials from living or recently dead organisms. Sources of biomass include wood fuel, waste, and alcohol. Indonesia has the biomass power plants such as PLTBM Pulubala in Gorontalo that utilise corncobs.

3. Geothermal

   Geothermal is a renewable energy source in the shape of thermal energy (heat) generated and stored. Geothermal energy had believed to be quite economical, abundant, sustainable, and environmentally friendly. However, its utilisation is constrained by exploitation technology which can only reach around tectonic plates. Geothermal Power Plants (PLTP) owned by Indonesia include: PLTP Sibayak in North Sumatra, PLTP Salak (West Java), PLTP Dieng (Central Java), and PLTP Lahendong (North Sulawesi).

4. Hydro

   Hydro energy is one of the most common fossil fuel alternatives. This energy source had obtained by utilising the potential energy and kinetic energy of water. Currently, about 20% of the world's electricity consumption had completed by hydroelectric power plants (PLTA). In Indonesia alone, there are dozens of hydropower plants, such as Singkarak hydropower plants (West Sumatra), Gajah Mungkur hydropower plants (Central Java), Karangkates hydropower plants (East Java), Riam Kanan hydropower plants (North Sumatra).

5. Wind

   Wind energy is a renewable energy source produced by wind. Windmills capture wind energy and convert it into kinetic or electrical energy. The utilisation of wind energy for electricity in Indonesia has been utilised, such as at the Samas Wind Power Plant (PLTBayu) in Bantul, Yogyakarta.

6. Solar

   Solar energy is renewable energy sourced from light radiation and heat emitted by the sun. Solar Power Plants in Indonesia include: PLTS Karangasem (Bali), PLTS Raijua, PLTS Nule, and PLTS Solor Barat (NTT).

7. Sea Wave

   Ocean wave energy or waves is renewable energy sourced from the pressure of rising and falling sea waves. Indonesia is a maritime country located between two oceans. It has a high potential to utilise energy sources from ocean waves. Unfortunately, this alternative energy source is still under development in Indonesia.

8. Tidal

   Tidal energy is renewable energy sourced from the tidal process of seawater. This type of energy has variations related to the type of energy source. The first is the difference between high and low seawater at high and low tide. Second, tidal currents, especially in small straits. Like ocean wave energy, Indonesia has a high potential for utilising tidal energy. Unfortunately, this energy source has not been utilised.

In Indonesia, the potential for biomass that can use as an energy source is very abundant from animal and plant waste, which has the developed potential. The utilisation of this waste will provide benefits, namely increasing overall energy efficiency because the energy content is quite large and can save costs because throwing away the waste will often be more

expensive than using it. The utilisation of waste will also reduce the need for garbage dumps in urban areas because the equipping of a garbage dump will become difficult and expensive. Excessive use of non-renewable energy can cause energy crisis problems such as the scarcity of fuel oil (BBM), such as kerosene, gasoline, and diesel, which take millions of years for the form process.

Based on experience and development policies implemented in Central America, the Finnish Ministry of Foreign Affairs is currently implementing a program of similar cooperation mechanisms with Indonesia, Central and East Africa, and the Mekong and Andean regional countries. Energy and Environment Partnership with Indonesia (EEP Indonesia) EEP Indonesia is a cooperation between the Government of Indonesia and the Government of Finland to promote renewable energy, energy efficiency and investment in clean energy technology in Indonesia. This program started in April 2011, and it is working at the central level in Jakarta and the two designated target provinces, namely Central Kalimantan and Riau.

II. Review of Literatures

International economic cooperation is cooperation in the economic field carried out by countries with other countries. Such cooperating can only involve two or more countries. The existence of related cooperating, interactions, and influences between economic and political factors within the scope of international relations, there are two main variables in the phenomenon of global political economy, namely that the essence of economic activity in the market and the nature of the political activity in the state. One form of international cooperating is bilateral cooperation. Bilateral cooperation is a cooperation between two countries.

Cooperating is a form of a relationship forged by individuals or a group, even between countries, to achieve everyday purposes. Cooperating is defined as an interaction between countries to achieve a goal, both for the same or different purposes. Cooperating is because of the orientation of individuals to their groups and other groups.

According to K.J Holsti, international cooperation is defined as follows.

a. The view that two or more interests, values, or goals meet each other and can produce something promoted or fulfilled by all parties.
b. The view or hope of a country that the policies decided by other countries will help achieve its interests and values.
c. Agreements or certain matters between two or more countries in taking advantage of a common interest or conflict of interest.
d. Official or informal rules regarding future transactions made to carry out the agreement.
e. Transactions between countries to meet state approvals. International cooperation is carried out between individual countries and countries that take shelter in international organisations or institutions.

There are several reasons why countries cooperate with other countries. First is improving welfare to reduce the costs that the country must guarantee in producing a product needed for the people related cost reduction. Second, because of the problems that threaten the standard safety to reduce losses caused by the actions of individual countries that impact other countries.

Daniel S. Papp (1988:29) says that in the national interest, there are several aspects, such as economy, ideology, military strength and security, morality and legality. In this case, the economic factor in every policy taken by a country always tries to improve the country's economy, which is considered a national interest. National interest in the economic aspect is to improve the balance of trade cooperation of a country in strengthening the industrial sector.

III. Research Methods

The methodology is not just a collection of research methods or techniques. It is a foundation of values (especially those concerning the philosophy of science), assumptions, ethics, and norms that become the rules used to interpret and conclude research data, including criteria. to assess the quality of research results (Moh. Nazir, 1988).

Thus the research methodology cannot be separated from a scientific paradigm. More specifically, research methodology is a logical implication or consequence of the values, assumptions, rules, and criteria that become an integral part of a paradigm. In essence, each paradigm can be distinguished from other paradigms based on several essential things, including the conception of the social sciences or assumptions about society, humans, social reality, moral alignments, and a commitment to specific values.

According to Soehandi Sigit, Research Method is a study/investigation on a scientific basis. In other words, research is carried out for scientific research and based on rules in science. (Soehandi Sigit, 1999).

In this study, the method used is qualitative methods, namely efforts to adjust the data by analysing the phenomena that occur and systematically arranged. The research method is a descriptive analysis that describes or describes and analyses a problem. So it is clear that the research collects as much data as possible about the material in this study. Then the data is analysed to identify what factors influence the policy change.

Data collection techniques in this study used a literature study conducted by reading, studying, and studying books, scientific magazines, mass media, internet sites, and other sources which have a relationship with this research.

The data and information are collected from two main sources, namely primary and secondary sources. Primary data was obtained from the results of in-depth interviews and discussions. At the same time, secondary data is collected from the processed data of other people in the form of documents, reports, publications, Etc.

Data analysis was carried out simultaneously with the data collection process (ongoing analysis) using data analysis techniques commonly applied in qualitative research. Qualitative data were analysed using inductive and logical analysis methods (Marshall & Rossman, 1989). This qualitative data analysis procedure contains two main elements, data reduction and interpretation. The process of data analysis in qualitative research includes testing (examining), selecting, categorising, evaluating, comparing, synthesising, and reflecting on the data (completing the coded data), which is carried out cyclically to build inferences, retest the inferences, and then drawback—conclusion (Neuman, 1997). In terms of Neuman (2003), the cyclical analysis method provides the opportunity to continuously conduct concept testing with data and evidence repeatedly to find inferences and new theories called successive approximation. In addition, because the data collection process uses several previously existing

concepts about social capital, the data analysis process will also be carried out using the illustrative method in a loose sense. With the illustrative method, the researcher tries to apply the theory to a concrete social setting or historical situation or organise data based on the primary theoretical basis (see Neuman, 2003).

IV. Results and Discussion

Indonesia's energy reserves, especially fossil energy (petroleum, coal), are shrinking daily. The core of the Indonesia-Finland new and renewable energy development cooperation is the Energy and Environment Partnership with Indonesia (EEP) Program. The implementation of this cooperating talks about biomass energy, including waste and water, as an alternative energy source that must be improved considering Indonesia's potential. The selection made by the Finnish government is entirely appropriate because currently, 80 per cent of Finland's energy sources come from biomass.

Through this meeting, it is hoped that new ideas for energy efficiency and development efforts will be generated in partnerships between institutions related to energy and the environment. Finland has an advantage in NRE, while Indonesia is just starting. Since 2010, the Ministry of Energy and Mineral Resources has received technical assistance worth 3 million euros from the Finnish government. The assistance is for a period of up to 2014. The assistance from the Finnish government will be extended from 2014 -to 2017.

The Cooperating Program with the Finnish government in the field of energy and the environment through the Energy and Environment Partnership with Indonesia (EEP Indonesia) Program is a cooperation program funded by the Finnish Ministry of Foreign Affairs (MFA) and in cooperating with the Directorate General of New, Renewable Energy and Energy Conservation (DJEBTKE), Ministry of Energy and Mineral Resources, Republic of Indonesia. The 2013 EEP Indonesia Annual Forum activity is one of the activities within the framework of Indonesia's EEP cooperation in 2013, which aims to:

a. Promote Indonesia's EEP financing facility and disseminate results/experiences in implementing bioenergy projects in Indonesia, particularly in Riau and Central Kalimantan Provinces.
b. Learn about the status and potential of bioenergy utilisation in Indonesia, especially in Riau and Central Kalimantan.
c. Exchange experience and skills from implementing bioenergy projects and business and financial opportunities related to bioenergy.

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The utilisation of alternative energy sources is one way to prevent climate change and energy crises due to the massive exploitation of fossil fuels. The fulfilment of this energy mainly comes from the burning of fossil fuels that are millions of years old and cannot be renewed, and only a small part comes from the use of other, more renewable energy sources. This alternative energy source is one way to prevent climate change and energy crises due to the massive exploitation of energy derived from fossils.

The exploitation of non-renewable fossil energy sources has also raised concerns about the possible depletion of these energy reserves. For example, world oil reserves are only sufficient for the next 40-68 years, and world coal reserves are slightly longer 177-400 years. Exploration that has been carried out, consumption in large quantities and high population growth in the future will make the supply of fossil energy, especially petroleum, unable to keep pace with the demand for energy needs.

The energy consumption in Indonesia is still very dependent on fossil fuels, which is 95.9%, consisting of the most dominant oil, natural gas, and coal. The development of energy availability in Indonesia is strongly influenced by the global situation, especially related to world crude oil prices. Currently, mixed energy use is more than 90% using fossil-based energy, namely oil 54.4%, gas 26.5%, and coal 14.1%. As a developing country, Indonesia needs sufficient energy sources to support industries that will support development. Therefore, Indonesia needs a breakthrough to overcome energy needs by increasing oil production in existing wells and conducting research and development to find alternative energy.

The current availability of energy resources, especially fossil energy such as oil, natural gas, and coal, is increasingly limited, and production is decreasing, considering that proven reserves of coal, natural gas, and oil are only 0.55%, respectively; 1.39%; and 0.43% of the world's current reserves. This condition underlies Presidential Regulation No. 5 of 2006 concerning the National Energy Policy. The new proportion in this Presidential Regulation will change the map of Indonesia's primary energy use from around 50% oil in 2005 to only 20% in 2025, or from 5% non-fossil to 15% non-fossil in the same period.

Another problem is the uneven energy supply distribution, as has happened in electricity distribution in some remote areas. Many people have not been able to enjoy electrical energy due to the difficulty of building electricity networks. This renewable energy source is an energy source that is environmentally friendly, able to minimise social impacts, is cheaper, and can be used for a long time.

The Finland government has the policy to support activities and programs that focus on saving energy, increasing energy efficiency, and developing renewable energy through the EEP program. In addition, the objective of this cooperative program is to address various issues and obstacles that hinder the achievement of socio-economic development. It focuses on the efficient use of traditional energy sources and promoting clean and renewable energy technologies and innovative business development models to provide energy services. In the first phase, this program will focus on utilising biomass for energy from vegetable sources. The EEP program is a multi-party cooperating program where its implementation can be carried out through a public-private partnership program and a cooperating program with local communities.

The three components of Indonesia's EEP output are:

a. Reinforce the basis knowledge
b. Technical skills
c. Institutional cooperation for renewable energy nationally and in the Provinces of Central Kalimantan and Riau; the increasing public and private premiere of renewable energy programs; capable, reliable and sustainable solutions available in Central Kalimantan and Riau Provinces, including improving rural areas.

In addition, this Annual Forum is also a means of technology transfer between the two Finnish-Indonesian countries and between EEP cooperating countries. Nowadays, EEP Indonesia has funded five Riau and Central Kalimantan projects with various project themes in the bioenergy field. The five projects are in the implementation phase. With the EEP Indonesia Annual Forum, EEP Indonesia will disseminate information on the five projects funded and provide lessons learned to Annual Forum participants. In addition, an event is a globalising event. Information about the potential of renewable energy in Indonesia, especially Riau, can attract investors to develop renewable energy. Maybe the name of this power plant is

still foreign to our ears because it is relatively new in Indonesia. Renewable energy sources are only micro-hydro power, wind power, and solar power. Energy sources in biomass have not been widely developed, even though the potential is enormous. One of the enormous potentials of biomass that has not been widely used is oil palm fronds.

V. Conclusion

In 2011, the two countries signed a declaration to implement other cooperating according to the MoU by utilising the advantages of natural energy, which is none other than renewable energy, as follows.

1. Develop practical and environmentally sound technology using wind and ocean wave energy.
2. Development of energy market, development of natural resources and technology in the field of.

Based on the results of the research that has been carried out on this research, it concluded several conclusions regarding the cooperation between Finland and Indonesia in the field of renewable energy (biomass) in 2011-2014, namely:

1. Biomass is a renewable energy source that refers to biological materials from organisms that have recently died (compared to fossil fuels). The most common biomass sources are wood fuel, waste, and alcohol.
2. The energy sector in Indonesia is experiencing severe problems because the pace of domestic energy demand exceeds the growth of the energy supply.
3. Crude oil and fuel have been imported, forcing the Indonesian people to look for other energy sources to cope with the increasing demand for energy from year to year.
4. Finland proposed cooperating by donating 4 million Euros in PLT biomass in Prop. Central Kalimantan, Riau, and South Korea are also cooperating in PLT biomass in Gorontalo. Japan (NEDO) is interested in building a bio-ethanol plant from drops in Mojokerto, East Java. Russia and Australia are interested in developing PLT biomass (straw + rice husk) in Sergei, North Sumatra, while China is interested in using palm oil shell waste. Russia is also interested in developing other NREs, including nuclear & coal. Estonia is interested in developing oil sands and biomass. Denmark supports energy efficiency and conservation programs in Indonesia by providing US$10 million for a 4-year program.

The implementation of the Indonesia-Finland cooperation is carried out by diversifying renewable energy sources from solar energy, bioenergy, and ocean wave energy. The implementation based on the MoU is developing practical and environmentally sound technology using wind energy and ocean wave energy. The application of ocean wave energy is an alternative source of electrical energy by using technology and for the development of natural resources and technology in the electricity sector. This condition is done by building a micro hydropower plant.

The implementation of cooperation between the two countries has been quite effective. Both countries depend on each other to fulfil their respective interests. Because of this, there has been an effect between countries to re-enhance cooperation in the energy sector for a relatively long period, starting again from 2011–to 2014.

The effectiveness occurs because previously, it was considered successful in implementing cooperation, and then mutual compatibility and interest arose to improve further cooperation in the future.

1. Improving study and research activities related to implementation of complete identification of each type of potential renewable energy resources in each region; efforts to formulate basic specifications and engineering standards for energy conversion systems that are following conditions in Indonesia; making prototypes by the basic specifications and engineering standards; improvement of continuity of electricity supply; gathering public opinion and feedback on the use of renewable energy.
2. Reducing investment costs by exploring the possibility of mass production of the power generation system and seeking that some of its components can be produced domestically. Not all components have to be imported from abroad. This reduction in investment costs will have a direct impact on production costs.
3. Promote the use of renewable energy and conduct a more in-depth analysis and evaluation of the feasibility of operating the system in the field with the construction of several sample projects.
4. Increase promotions related to energy use and environmental conservation.
5. Give development priority to regions with very high potential, both technically and socio-economically.
6. Provide cross-subsidies to ease the financial burden at the development stage. The consumer returns the subsidy given in the form of an account that must be paid every specific period. The funds collected from the account are used to subsidise the construction of electrical energy generation systems in other areas.

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