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ACCELERATING RENEWABLE ENERGY DEVELOPMENT TOWARD ENERGY SECURITY

MEMPERCEPAT PENGEMBANGAN ENERGI TERBARUKAN MENUJU KEAMANAN ENERGI

Aditya Arso Perdana*, M. Ery Wijaya, Ichsan
Departement of Public Policy, School of Government and Public Policy, Bogor 16810, Indonesia
* Corresponding Author: aditya.perdana@sgpp.ac.id

ABSTRACT

The need for electricity in Indonesia is increasing every day, including in North Halmahera district. Using new and renewable energy can be a solution for North Halmahera to address energy security issues and reduce emission levels. The government seeks to utilize renewable energy sources to increase energy security by looking at energy availability, affordability, and sustainability. Therefore, this study aims to provide strategies or recommendations to accelerate renewable energy development in North Halmahera so that energy security and environmental sustainability in North Halmahera are maintained. The method used in this study is a qualitative method and data was collected from a review of various literature and government documents The result shows that by using RUED (Regional Energy General Plan) and RUPTL (electricity procurement business plan), the North Halmahera government can formulate and determine plans to accelerate the fulfillment of regional energy security, respectively by increasing energy availability, affordability, and sustainability. Therefore, government of North Halmahera needs to make efficient regional regulations and not be burdensome to various parties, and at the same time Regional regulations are needed to provide security of the investors, developers, and buyers of renewable energy products.

Keywords*: Energy security, North Halmahera, renewable energy policy, RUED, RUPTL*

ABSTRAK

Kebutuhan akan listrik di Indonesia meningkat setiap hari, termasuk di distrik Halmahera Utara. Menggunakan energi baru dan terbarukan dapat menjadi solusi bagi Halmahera Utara untuk mengatasi masalah keamanan energi dan mengurangi tingkat emisinya. Pemerintah berupaya memanfaatkan sumber energi terbarukan untuk meningkatkan keamanan energi dengan melihat ketersediaan energi, keterjangkauan, dan keberlanjutan. Oleh karena itu, penelitian ini bertujuan untuk memberikan strategi atau rekomendasi untuk mempercepat pengembangan energi terbarukan di Halmahera Utara sehingga keamanan energi dan keberlanjutan lingkungan di Halmahera Utara dipertahankan. Metode yang digunakan pada penelitian ini adalah metode kualitatif dan data dikumpulkan dari tinjauan berbagai literatur dan dokumen pemerintah. Hasil penelitian menunjukkan bahwa dengan RUED (Rencana Umum Energi Daerah) dan RUPTL (Rencana Umum Penyediaan Tenaga Listrik), pemerintah Halmahera Utara dapat merumuskan dan menentukan rencana untuk mempercepat pemenuhan keamanan energi regional dengan meningkatkan ketersediaan energi, keterjangkauan, dan keberlanjutan. Oleh karena itu, Pemerintah Halmahera Utara perlu membuat peraturan regional yang efisien dan tidak membebani berbagai pihak, serta pada saat yang sama diperlukan peraturan daerah untuk memberikan rasa aman bagi investor, pengembang, dan pembeli produk energi terbarukan.

Kata kunci: Halmahera Utara, kebijakan energi terbarukan, ketahanan energi, RUED, RUPTL

INTRODUCTION

Energy security is relative according to each country's assessment of the effectiveness of its national energy strategy. The International Energy Agency (IEA), the most prominent global energy platform, defines energy security as the "continuous availability of affordable energy sources." (International Energy Agency, 2019) It considers energy security to have a long-term component dealing with investments to supply energy following economic developments and long-term environmental needs and a short-term dimension concentrating on the ability to deal with rapid changes in the supply-demand balance. As a result, the IEA defines energy insecurity as the economic and social repercussions of a lack of physical energy availability or unaffordable costs.

In Indonesia, there are numerous and diverse renewable energy potentials, including hydro, geothermal, varied biofuels, solar, wind, and ocean energy, the reserves of which are distributed variably over the enormous Indonesian archipelago. However, compared to their potential, using these renewable energy sources is relatively low,

at around 2.4 percent (Nugroho, Rustandi, & Laila Widyastuti, 2021). Therefore, Indonesia's Government is advised to enhance engagement with the private sector to maximize profits while also accomplishing the shared aim of a cleaner, safer, and more sustainable energy transition. Simply put, the Indonesian government must be more serious about budgeting for any development linked with the energy transition process's infrastructure requirements (Chairiawan, 2019). Indonesia's government must demonstrate a solid commitment to accelerating renewable energy development, which requires achievable objectives and supporting policies.

According to PP No. 74 of 2014, the energy supply and usage goal is to achieve energy independence and national energy security to enable sustainable national development. The government's target for new and renewable energy is 23% in 2025 and 31% in 2050. The policies and strategies will be implemented to achieve these targets (RUEN, 2017). RUEN (National Energy General Plan) is also information for preparing the Regional Energy General Plan (RUED) and the Electricity Procurement Business Plan (RUPTL). The amount of alternative energy sources in North Maluku has not been fully exploited since, as previously said, North Maluku's energy sources are still dominated by fossil fuels. RUED is required to assure the region's energy availability until 2050 and serve as the basis for regional budget submissions via the APBN/APBD for developing regional energy infrastructure, particularly new and renewable energy. The optimal RUED can increase public access to energy, expand the role of alternative energy, rationalize energy prices in their economy, increase regional energy availability, provide energy buffer reserves, increase energy savings, and emphasize eco-friendly technologies (Litbang ESDM, 2012).

Meanwhile, PT. PLN Persero, through the Business Plan for the Provision of Electricity (RUPTL) for the year 2021-2030, stated that it would convert Diesel Power Plants (PLTD) to New Renewable Energy, exploring environmentally friendly energy sources according to their availability in each region. By switching to new and renewable energy as an energy source, it is expected to reduce carbon emissions and help achieve the target of a 100% national electrification ratio. RUPTL aims to increase sales growth, power generation development, transmission and distribution of electricity, the government's plan to encourage the adequacy of electric power with the 35 GW program, and new renewable energy development policies (PT.PLN (PERSERO), 2019).

The transition from fossil energy to new renewable energy is needed because of low fossil energy reserves. The development of renewable energy on a large and rapid scale is a necessity to avoid the climate change crisis due to global warming while at the same time encouraging sustainable economic growth and maintaining national energy security. North Halmahera Regency's energy sources are still based on fossil fuels, which are harmful to the environment. In reality, renewable energy has much promise in North Halmahera Regency. This renewable energy potential can be used as a new energy source. Constraints in developing renewable energy in North Halmahera Regency are the relatively high price of renewable energy development, few investors, hard-to-reach energy potential locations, inadequate infrastructure, socio-cultural problems, and lack of human resources.

The government has set a target for NRE in the national energy mix of 23 percent in 2025 and 31 percent in 2050 in the National Energy General Plan (NEGP). The NEGP is established in Government Regulation No. 79 of the Republic of Indonesia concerning the National Energy Policy. Unfortunately, till 2019, NRE implementation in Indonesia has only achieved 9.15 percent. One approach to address this is to lower the cost of new and renewable energy, allowing the NRE tariff to be implemented on a realistic economic scale. In addition, the government is developing a market for large-scale solar power plants (PLTS) and hydroelectric electricity (PLTA). It is also based on the Paris Agreement, which was approved in Law No. 16 of 2016 on the Approval of the Paris Agreement to the United Nations Framework Convention on Climate Change (Azhar et al., 2018). Also, President Joko Widodo believes Indonesia can meet the 23 percent objective by 2025. In addition, the President declared that he would continue to promote renewable energy development across Indonesia (Meilanova, 2018). The Ministry of Energy and Mineral Resources uses renewable energy sources (Arvirianty, 2018). Renewable energy must be used so everyone in Indonesia's rural locations can access power.

Juanda and Husni's (2017) article states several problems in implementing renewable energy to meet electricity needs in remote villages. These issues include the lack of plans for using renewable energy as a source of electrical energy, the lack of correct data and information on the

potential for renewable energy in the area, a restricted budget, and, ultimately, a lack of quality and quantity of human resources in the area (Juanda & Husni, 2017). Of course, this problem exists in other regions, even though optimizing the use of renewable energy may increase the welfare of the surrounding population (Vaghefpour & Zabeh, 2012). The only shortcoming of this study is that it is well-recognized that the potential for renewable energy in North Halmahera has not been harnessed as a source of regional electrical energy.

Poek and Plaimo (2018) states the change in the surrounding community's living level due to renewable energy as a source of electrical energy (Poek & Plaimo, 2018). To ensure renewable energy project development sustainability, the government must develop renewable energy businesses and services in the local area. The development guarantees the sustainability of projects, which is often the main problem in NRE projects, and a guarantee for NRE users. Furthermore, these businesses and services will indirectly contribute to increasing the number of NRE users. The gap with this research is that there is no socialization regarding renewable energy by the government or companies to the surrounding community. This lack of socialization causes the sustainability of renewable energy projects to be slightly hampered.

Rumkel, Asriany, and Muh. Muzni (2018) states the government's efforts to link renewable energy types to aspects of community life in the West Halmahera Regency (Rumkel, Asriany, & Harbelubun, 2018). This research investigates national policies that encourage renewable energy as a source of electrical energy in the areas. However, no local rule is currently in place to execute the federal energy program. The difference with this research is district regulations regarding energy management plans.

North Halmahera was chosen as the research area because it has a lot of renewable energy potential, but it has not been utilized to maintain regional energy security. In addition to the absence of regulations governing renewable energy, the author's reason for writing this article is because there is no specific article discussing the issue of renewable energy use in North Halmahera. In addition, there has been no effort from the local government to utilize and develop renewable energy potential to improve regional energy security. The author's location is also in North Halmahera, making it easier to collect field data. Therefore, this study aims to provide strategies or recommendations to accelerate the development of renewable energy in North Halmahera Regency so that energy security and environmental sustainability in North Halmahera Regency are well maintained.

METHODS

This research approach uses mixed methods through literature studies and documents from central and local governments. The writer describes the actual situation and conditions researchers face regarding the importance of regulations governing renewable energy development as a new energy source to maintain energy security in North Halmahera. In addition, a qualitative and quantitative approach is expected to reveal the situation and problems encountered in implementing this policy.

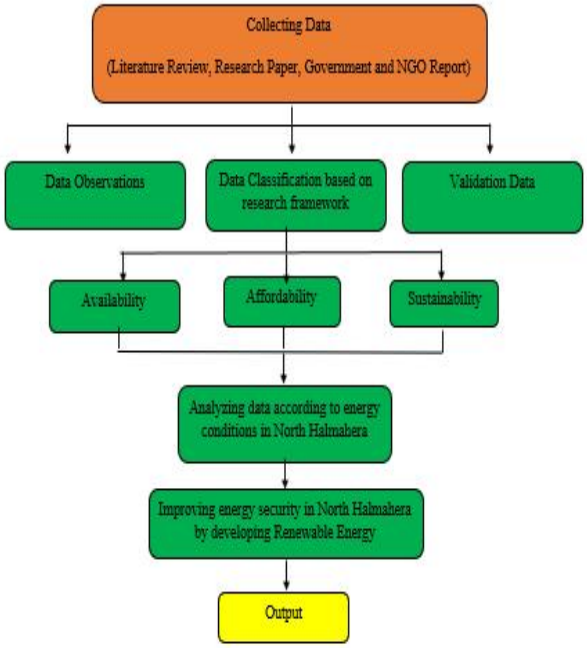

Figure 1. Research Design

First, the writer used the desk study method to collect data to do this study. The collected data and information through examination and analysis using secondary data. The document used in this study is the regulation of law, scientific research, books, trusted internet sites, legal journals, and other related documents. Then, the writer analyzed whether it can be directly implemented to develop renewable energy as a material to maintain energy security in North Halmahera. In data collection, the writer limits the scope of data retrieval. The data to be searched is by the framework used in this research. For example, the author looked more at energy dependency and diversification for energy security as availability. For energy Security as affordability, it looked at North Hal-

mahera's welfare and energy access. Meanwhile, energy security as sustainability only looks at the impact on the surrounding environment. The data was used to determine the energy conditions in North Halmahera, still using the assumption of energy data from the province of North Maluku because of the unavailability of some energy data in North Halmahera

RESULT AND DISCUSSION

3.1. Energy Security in RUED and RUPTL

Renewable energy as a new energy source is essential to provide energy security and attain a 100 percent electrification rate in North Halmahera. Additionally, the development of renewable energy sources satisfies the mandate of the 2007 Energy Law No. 30. Additionally, it supports the government's goal of reducing greenhouse gas emissions through renewable energy. As a result, a regional regulation is necessary to oversee the national energy strategy's expansion of renewable energy in North Maluku and North Halmahera. It can describe how the North Maluku government intends to maintain energy security by producing and using renewable energy as a new source of electrical energy based on the mission, vision, goals, and energy targets in the North Maluku RUED framework. Developing renewable energy can create energy security in island-based regions and reduce regional greenhouse emissions. However, assessing the energy difficulties facing the province of North Maluku and North Halmahera is critical to guarantee that regional energy goals and objectives are accomplished.

3.1.1. Affordability

3.1.1.1. North Halmahera Welfare

The RUED explains that the Gross Regional Domestic Product (GDRP) is one of the leading indicators in preparing long-term energy demand projections. GDRP growth from various sectors will measure the success of energy projections based on RUED. The Mining and Quarrying Industry business field contributed the most to form the North Halmahera Regency's GDRP in 2020, accounting for 29.73 percent. Furthermore, agriculture, forestry, and fisheries account for 23.18 percent of all business fields, with government administration, defense, and compulsory social security accounting for 12.67 percent. Wholesale and retail trade, car and motorcycle repairs, and construction account for 12.56 percent, 6.93 percent, and 6.93 percent, respectively (Badan Pusat Statistik Halmahera Utara, 2021).

According to the RUED and RUPTL, the local government and PLN evaluate the community's well-being as an essential factor in the energy program's ability to provide residents with affordable electricity. The RUED assesses that the long-term energy projection will be successful if it can improve the welfare of the people of North Halmahera. This community welfare will increase energy and electricity consumption per capita in North Halmahera. Meanwhile, in the RUPTL, the village electricity program is one way to improve community welfare and increase the regional electrification ratio. With increasingly electrified people, economic activities, education, social culture, and health will be more productive and increase.

3.1.1.2. Energy Access

According to PLN's 2020 statistical data, the electrification ratio in North Maluku province has only reached 85.97 percent, indicating that energy access has not been evenly distributed in each region. Public access to clean cooking is also still low because the average community in North Halmahera is still afraid to switch to using LPG. Most people still survive using kerosene, briquettes/charcoal/wood as their primary fuel for cooking (TNP2K, 2019). In addition to being afraid to switch to using LPG, another problem is the lack of public access to LPG gas due to the limited supply of LPG cylinders in North Halmahera.

Based on the RUED, the local government aims to increase access to energy in the community. The provincial government will seek to increase the supply of LPG to all regions to increase the ratio of household gas use in North Maluku. The local government targets the community to convert kerosene to gas to match the projected energy mix of 51% by 2025. The local government will implement infrastructure collaboration among districts to prevent the energy supply process. Meanwhile, in the RUPTL, it is explained that to increase energy access in the regions, it can be through the development and utilization of new and renewable energy to realize the availability of regional energy. PLN projects that by increasing energy access to remote areas, the electricity consumption target can increase from 479 GWH to 1,471 GWh in 2025. In addition, increasing energy access in North Maluku will also include the target of a 100% electrification ratio being met.

3.1.2. Availability

Energy security requires adequate infrastructure and the availability of various energy sources. The infrastructure factor needs further attention from the North Halmahera Government. With the region as an archipelago, infrastructure will become one of the essential points in the security of energy supply to the area. This regional energy strategy, or RUED, will also ensure regional energy security.

3.1.2.1. Diversification Energi

In North Halmahera Regency, there is still no energy diversification now. Relying solely on fossil fuels is unsuitable for North Halmahera's sustainable development. If the supply of commodities such as coal, fuel, or gas experiences distribution problems, it will cause the energy supply to the community to be disrupted. As stated in the draft RUED for the province of North Maluku, the development and construction of renewable energy sources will be initiated so that the North Halmahera district can have good energy independence and security. The RUED intends to employ 31% of new renewable energy in the local primary energy mix by 2025 and 32% of the renewable energy mix by 2050 (Figure 2)

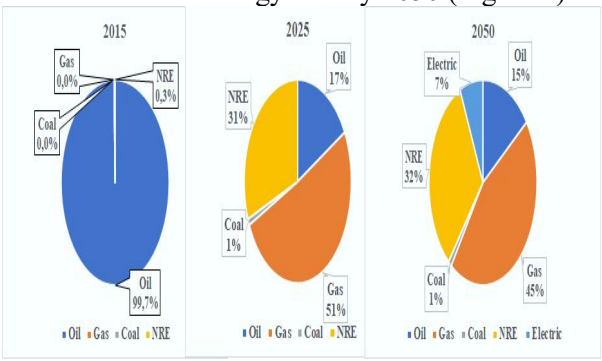

Figure 2. North Maluku Primary Energy Mix (North Maluku Government, 2021)

Looking at the new renewable energy target in the RUED, it can be said that this is not enough. With so many new and renewable energy potentials in North Maluku, such as geothermal, wind, solar, water, and bio-energy, the North Maluku government should increase the portion of new and renewable energy in the regional energy mix target. There is only an addition of one percent to the target for new and renewable energy by 2050, indicating that the local government still lacks an understanding of the importance of new and renewable energy. With the abundant potential for new and renewable energy, local governments should be more daring to provide a more significant portion of the target area for the regional energy mix. Moreover, the target mix for gas and oil will cost more. The cost of gas production will be higher due to the absence of gas and oil sources in North Maluku province, thus requiring supplies from other regions.

3.1.2.2. Energy Dependency

Energy dependence in North Maluku is relatively high and increases every year. Moreover, North Maluku is still very dependent on fossil energy which can be seen in the increasing energy demand by fuel every year. The growing need for energy, especially in the household, transportation, and commercial sectors, will undoubtedly increase dependence on fossil energy. In the 2021-2030 RUPTL, there is still a coal-fired power plant in North Maluku. This new coal-fired power plant will make North Maluku more dependent on fossil energy. The increasing dependence on fossil energy will hamper the energy transition process launched by the Indonesian government so that Indonesia can achieve net-zero emissions by 2050.

Dependence on fossil energy to meet energy and electricity consumption will be a new problem in the future. This dependence can be seen in Figure 4.7 above, with fossil energy consumption still above 90%. The absence of oil and gas sources makes North Halmahera very dependent on oil and gas supplies from other regions. The collection of petroleum and diesel comes from Papua and Kalimantan, containing 2,323 KL of diesel, 3,469 KL of fuel, and 10,057 KL of kerosene (PERTAMINA, 2021). Gas supply comes from Sulawesi and Papua, while coal does not depend on other provinces because there are coal sources around North Halmahera. If there is a delay or problem in distributing supplies, it will cause a shortage or an energy crisis. The North Halmahera government must solve its dependence on fossil energy to avoid scarcity or an energy crisis.

3.1.3. Sustainability

Greenhouse gas emissions are a significant factor in environmental aspects of energy sustainability. The problem of greenhouse gas emissions has become a major issue in world climate change, which was agreed upon by all countries in the Paris agreement. The Paris Agreement is a legal basis for Indonesia to make policies in the form of laws so that climate change control in Indonesia can be implemented in RUED and RUPTL (Afrizal & Mashur, 2019). In the RUED and RUPTL, the government has conducted

several scenarios to find the best strategy to address energy sustainability and reduce greenhouse gas emissions. Based on the business's current condition as usual (BaU) scenario, the greenhouse gas emissions produced in North Maluku are still relatively large because fossil energy still dominates. Based on the BaU scenario or current conditions, the total greenhouse gas emissions in North Maluku are 973.5 $MTCO_2$ in 2025 and 2627.7 MTCO2. Fossil energy sources must be immediately reduced to lower greenhouse gas emissions. Alternative energy will be the primary solution to the projected emission reduction.

Figure 3 shows projected GHG emissions based on RUED. The scenario of utilizing renewable energy will result in lower greenhouse gas emissions. The planned renewable energy scenario can reduce greenhouse gas emissions by 17.2 percent from the BaU scenario. However, the emission reduction in the renewable energy scenario is still far from the 26 % Indonesia NDC target. This RUED scenario is in line with the emission reduction target in the NDC, but still necessary to be more aggressive in determining the portion of renewable energy in the energy scenario so that the emission reduction aligns with the NDC target.

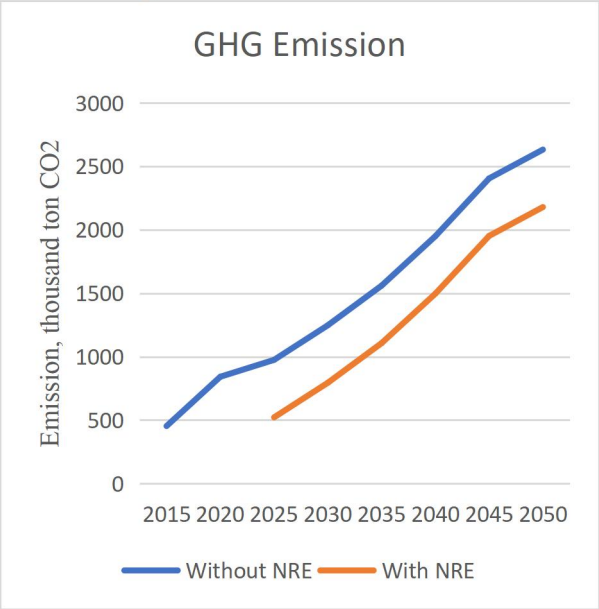

Figure 3. North Maluku GHG Emissions by RUED (North Maluku Government, 2021)\

3.2. Strategies to Improve Energy Security through Renewable Energy Development

3.2.1. Improving Affordability

The low cost of renewable energy and the uncertainty surrounding renewable energy legislation are two reasons for Indonesia's lack of renewable energy development. The feed-in-tariff scheme implemented in Indonesia has not effectively supported renewable energy development. This problem also occurs in North Halmahera Regency and North Maluku Province. There is still little renewable energy development since the cost of power prevents the community from benefiting from renewable energy. The North Halmahera government may provide direct subsidies through assistance programs such as BLT, Healthy Indonesia Card, Smart Indonesia Card, or other forms of immediate assistance.

Indirect subsidies can be provided through the Ministry of Finance's Key Partnership with Business Entities (KPBU) facilities, which include project development facilities (PDF), viability gap funds (VGF), and credit enhancement funds (CEF) (ADB, 2019). The PDF facility can assist the local administration of North Halmahera in ensuring that the budget allocation for renewable energy development projects is feasible and equitable. The VGF facility contributes to the community's affordable energy services in North Halmahera. The Asian Development Bank offers numerous possibilities to guide the North Halmahera government to accelerate renewable energy development.

The North Halmahera administration can work with the Ministry of Energy and Mineral Resources to encourage commercial enterprises. The SEF Grant program for PLTS Roofing is one of the incentives recently announced by the Ministry of Energy and Mineral Resources. According to Sustainability Energy for All, launched by the United Nations, Universal Access to Modern Energy Services will be necessary. Modern energy services are essential because they help improve people's lives. Building energy infrastructure will improve the social, economic, and health aspects of regional communities, thereby increasing the welfare of the people of North Halmahera. Supporting infrastructure, such as roads, is very much needed in North Halmahera. Access roads to potential renewable energy sources must be built or repaired immediately to facilitate the development of access to renewable energy projects. In addition, the construction of supporting infrastructure will facilitate the distribution and transmission of electricity to the community.

3.2.2. Improving Availability

To boost energy availability, the governments of North Halmahera and North Maluku must incorporate renewable energy into the regional energy mix target. It would be much better

if the proportion of renewable energy were increased. However, in RUED and RUPTL, the construction of power plants is still dominated by fossil energy. Energy diversity is required to avoid reliance on a single energy source. The administration of North Halmahera must map out the location of renewable energy potential in its jurisdiction to eventually develop power plants to match the potential. The mapping must guarantee that a dearth of energy sources will not impede regional electricity production. Additionally, new renewable energy will reduce North Halmahera's reliance on fossil fuels. Renewable energy development will solve energy issues such as energy shortages and crises.

Using new and renewable energy will help reduce people's dependence on North Halmahera fossil fuels. Especially considering the absence of fossil energy sources such as oil and gas in the North Halmahera region. Using renewable energy sources can prevent the energy scarcity that often occurs in several areas in North Halmahera caused by the constrained energy supply from outside. In addition, the use of renewable energy in North Halmahera is also in line with the government's program to achieve net-zero emissions by 2050.

Besides that, the development of energy storage and grid interconnection between regions also needs to be carried out by the government of the North Halmahera Government. Energy storage is necessary because not all renewable energy produces reliable electricity. Meanwhile, grid interconnection between regions is required to avoid an energy crisis in North Halmahera. With energy storage and grid interconnection, North Halmahera will share electricity with the surrounding area if there are problems with the regional electricity system.

3.2.3. Improving Sustainability

The entire globe strongly encourages the adoption of innovative and renewable energy sources. The proposal is made because renewable energy emits less carbon dioxide and qualifies as "clean energy" (IESR, 2019). So that by using renewable energy as an energy source, the region will participate in preserving the regional environment. For this reason, in carrying out energy modeling, we also consider greenhouse gas emissions that will be generated based on the scenario. The local government hopes renewable energy will help reduce greenhouse gas emissions by 522 $MTCO_2$ in 2025 and 2,179 $MTCO_2$ equivalents in 2050 (RUED). This value is slightly different from the national greenhouse gas emission target of 1,030 $MTCO_2$ in 2030 and 2,115 $MTCO_2$ in 2050 (Indonesia LTS-LCCR 2050, 2021). The difference can be shown in Figure 4.

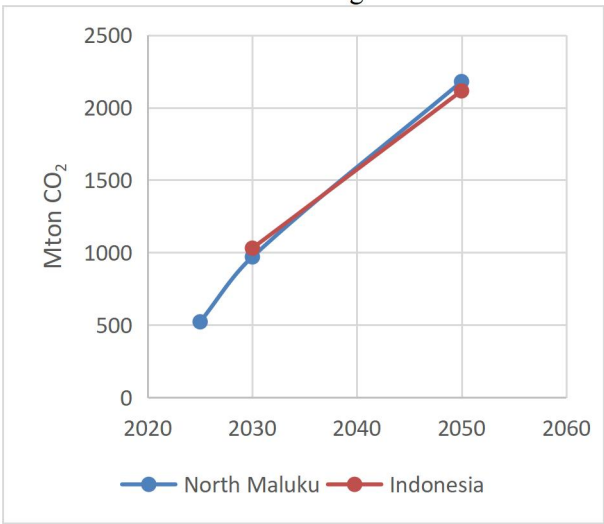

Figure 4. GHG Emission Reduction (Author)

The energy sector continues to be one of the least gender-diverse industries. Addressing this gender gap will be crucial because women are the primary drivers of innovative and inclusive solutions (IEA, 2022). The transition to energy security and climate neutrality necessitates that the gender gap is closed to fully incorporate women in the technological, scientific, and business transformation (European Commission, 2022). Increasing energy sustainability requires the participation of women, particularly when establishing energy policy. In addition, the gap in the percentage of women in energy education and the energy job market needs to be considered and improved (EIGE 2016). According to the IESR, energy can have various meanings for women. Suppose they have access to electricity, which provides them with light. In that case, women can engage in economically beneficial activities such as weaving and fishing, and much more access to energy also makes it easier for women to attend community or village meetings typically held at night (IESR, 2021).

Aside from environmental factors, social and economic factors are also markers of the long-term viability of renewable energy. From a socio-economic standpoint, renewable energy development in North Halmahera can enable isolated communities that were previously not electrified through small-scale renewable energy projects and increase the tourism potential of the region. The potential and strategic importance of tourism in local development are enormous (Ernawaty, 2019). Renewable energy can be implemented in tourist

areas in the form of lighting and water sources. (Utari, Mustiadi, & Munir, 2021). Furthermore, renewable energy development creates new job opportunities in the local community (IESR, 2022). The administration of North Halmahera must persuade the local people to allow the surrounding land to be used as a renewable energy development area. The authorities of North Halmahera must also convince the populace to switch to renewable energy-powered electricity. The local authority must socialize the surrounding community to be engaged and excited about adopting renewable energy.

CONCLUSION

Energy security is one of the essential issues that the state and the regions must face. The Central Government issued several regulations, including the National Energy General Plan and RUPTL. This RUEN will be further elaborated into RUED, which regions will use to develop the energy sector in their areas. The use of renewable energy as a new energy source will help increase energy access and availability throughout North Halmahera. The utilization of renewable energy will also reduce greenhouse gas emissions and reduce pollution in North Halmahera. Following the RUPTL, using renewable energy will enable remote areas difficult to reach by electricity so that the electrification ratio in North Halmahera reaches 100 percent. The RUED and RUPTL documents can help to accelerate new and renewable energy development in North Halmahera. The government of North Halmahera will use RUED and RUPTL as guidelines to maintain and accelerate the three aspects of regional energy security.

To improve affordability, local governments can work with the ministry of finance to obtain direct or indirect subsidies. To improve the availability, the local governments must be bolder in setting a target higher than the target set in the RUED because of the considerable potential of renewable energy there. Cooperation with NGOs or other related parties can be carried out to disseminate various information about renewable energy to the community so that later, people are willing to switch over. Improving sustainability can be done by conducting socialization because public awareness of renewable energy will indirectly support programs to reduce greenhouse gas emissions and air pollution. Local governments can conduct a tender process for the private sector to work on and manage the infrastructure development. To reduce the issue of the gender gap in North Halmahera, the local government can involve the women's community when discussing regional energy policies. With the RUED and RUPTL, it is hoped that the local government of North Halmahera can make efficient regional regulations and not be burdensome to various parties. Regional regulations must provide security for investors, developers, and buyers of renewable energy products. Inter-ministerial policies related to the land acquisition will be used to establish renewable energy power plants.

Due to the limited time in conducting this research, it is hoped that further researchers can expand the search for data by conducting interviews with related parties. Expansion of data search is needed to obtain research results following actual conditions. During this research, the RUED document has not yet been finalized. Therefore, it is hoped that further researchers can directly analyze the RUED or regional regulations regarding the use of renewable energy that has been completed and inaugurated. The analysis of the RUED and the provincial laws that have been finalized are needed to know the regional government's seriousness in developing renewable energy to maintain regional energy security.

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