The International Journal of Business Management and Technology, Volume 6 Issue 1 January–February 2022
ISSN: 2581-3889

Research Article Open Access

West Kalimantan Government Readiness for Thorium Power Plant in Support of Regional Energy Security and National Defense

Agung Beny Saputra[1], Nurbaiti[1],Fauwaz Ahmad Raihan[1]
[1]*Energy Security, Republic Indonesia Defense University, nurbaitiii0909@gmail.com, agungbenysaputra@gmail.com,fauwazar@gmail.com*

Abstract: *Energy is an important aspect in supporting national defense. Without adequate energy, a country's defense will be weak. West Kalimantan is an Indonesian province located in the border area between Indonesia and Sarawak, Malaysia. In West Kalimantan, the majority of the people's energy needs come from fossil energy especially its electricity import from SESCO Sarawak, Malaysia. To meet the needs and achieve energy independence of the West Kalimantan Province, in the future the West Kalimantan Provincial Government plans to build Nuclear Power Plant to supply Industrial Estates to be built in West Kalimantan. West Kalimantan has Thorium (4,767) for Power Plant and it will be very beneficial for society, industry and defense. This study is qualitative in nature which aims to analyze Thorium Power Plant and regional policies in West Kalimantan for energy security and national defense. The result is that with the large potential for thorium, unfortunately, regional policies for Thorium Power Plant have not been taken seriously. Meanwhile, the perspective of the people of West Kalimantan is still quite sensitive to nuclear issues, so there is a need for massive socialization and balanced education about the benefits of Thorium Power Plant development.*

Keywords: Defense, Energy, Nuclear, Thorium, West Kalimantan

I. INTRODUCTION

Indonesia is an archipelagic country that is blessed by God with abundant natural and human resources. Indonesia was also awarded with a strategic geographical position and its location bordering ten countries. One of the areas of Indonesia which is directly adjacent to other countries is West Kalimantan. West Kalimantan is a province in Indonesia which is located on the island of Borneo and the capital city is Pontianak. West Kalimantan is a province located in the border area between Indonesia and Sarawak, Malaysia. After independence the central government's attention to West Kalimantan has increased since the confrontation with Malaysia in the early 1960s. Even with this position, the area of West Kalimantan is now the only province in Indonesia that officially has road access to enter and leave other countries. This can happen because between West Kalimantan and Sarawak there has been an open interstate road from Pontianak - Entikong - Kuching (Sarawak, Malaysia) along about 400 km and can be reached in about six to eight hours of travel.

The location of West Kalimantan which has a geo-strategic value on the one hand with the fourth largest area where the area is 146,807 km² or 7.53% of the total area of Indonesia (BPS, 2019) and its abundant natural wealth on the other hand is a gift from God. This is reflected by its nickname as the province of "Thousand Rivers". This nickname is in line with geographical conditions which have hundreds of large and small rivers, some of which can and are often navigable. Several major rivers are still the arteries and main routes for transportation in the interior, although road infrastructure has been able to reach most of the sub-districts. West Kalimantan is also known for its natural beauty which is still very beautiful. The longest river, the largest lake in Kalimantan to one of the largest national parks in Indonesia. In addition, West Kalimantan has a variety of uniqueness and characteristics that are not inferior to other regions in Indonesia. It offers tourism aspects that are supported by the cultural diversity of its inhabitants, namely Dayak, Malay, and Chinese. Seeing this abundance and extraordinary gift as well as directly bordering a foreign country, West Kalimantan should receive special attention in the defense sector.

Energy is an important aspect in supporting national defense. Without adequate energy, a country's defense will be weak. One aspect of defense is the economic sector. Energy can encourage regional economic growth. West Kalimantan is one of the provinces in Indonesia that requires energy to meet the needs of the community and the

economic development of the region. West Kalimantan has abundant and diverse energy sources, but there are problems in meeting its energy needs. In the West Kalimantan RUED LEAP Modeling, currently West Kalimantan still relies a lot on fossil energy as the main energy source, which is used and utilized in West Kalimantan Province. This can be seen from the projected primary energy mix in 2015 which is 0.3% New Renewable Energy, 1.2% Coal, 8.3% Natural Gas, 90.1% Crude Oil.

Based on the 2016 House of Representative of Indonesia Republic Commission VII Visit Report, it is known that West Kalimantan Province has challenges related to the energy sector, including:

- The electricity ratio in West Kalimantan Province is still quite low at around 75%;
- The security of electrical energy supply is still vulnerable, because most of the existing power plant fuels, especially fuel and gas types, are still imported from outside West Kalimantan;
- Limited distribution channels and storage facilities for fuel and LPG cause the scarcity and high price of BBM and LPG in isolated areas, border areas and archipelagic areas;
- Utilization of new and renewable energy in West Kalimantan as a power plant is still limited (3.5 MW, or around 1%), while the potential for new and renewable energy is quite a lot, such as: hydro energy, solar energy, bioenergy (biomass and biogas), coal, peat, and uranium;
- Ocean current energy development began to be developed in the 2015-2019 period but has not yet reached the commercial capacity stage and is still at the stage of preparing policies, feasibility studies, and pilot projects.
- West Kalimantan Province has the potential to develop a Nuclear Power Plant by involving various parties and the community. In 2015 national nuclear power agency conducted a pre-survey of the site of the nuclear power plant in West Kalimantan.

Meanwhile, according to the National Industrial Master Plan 2015-2035 published by the Ministry of Industry, industrial estates in West Kalimantan are included in priority industrial areas outside Java. To meet the energy needs of the industrial area, it is necessary to provide reliable and sustainable energy, especially electrical energy so that the economic sector will move to grow and generate added value for the region. Currently 67% of electricity production is met through electricity imports from Sarawak-Malaysia via the Equator system. This is due to the lack of infrastructure development to build the flow of electric current in every place.

To meet the needs and achieve energy independence of the West Kalimantan Province, in the future the West Kalimantan Provincial Government plans to build a Nuclear Power Plant to supply Industrial Estates to be built in West Kalimantan. This is supported by the potential of abundant new energy sources as raw materials for Nuclear Power Plants (NPP), namely Uranium (26,021) and Thorium (4,767). In order to meet this energy need in the future there will be no shortage, the government is obliged to provide energy availability for the community.

II. MATERIAL

2.1 National Defense

Based on Law no. 3 of 2002 Article 1 paragraph (1) states that "State defense is all efforts to defend the sovereignty of the state, the territorial integrity of the Unitary State of the Republic of Indonesia, and the safety of the entire Indonesian nation from threats and disturbances to the integrity of the nation and state". Indonesia's defense adheres to a universal defense system. Universal defense is essentially a defense system that involves all citizens, territories, and other national resources, and is prepared early by the government and is carried out in a total, integrated, directed, and continuous manner to uphold state sovereignty, territorial integrity, and the safety of all nation from all threats, challenges, obstacles, and disturbances from within the country and abroad.

2.2 National Security Theory by Barry Buzan

- Security analysis requires a perspective that puts the state and the system into a mutually beneficial reciprocity where the state is partly formed by itself and partly shaped by a competitive anarchic environment.
- Security can be described as a freedom from threat, danger, risk of anxiety and doubt.
- Security can also be interpreted as the exercise of independence from a certain threat and the ability of the state and society to maintain their independence identity and functional integrity against certain forces they deem as hostile.

2.3 Defense Management

The management functions of planning, organizing, actuating, control to evaluating to carried out defense and military organizations, both strategic, operational and tactical.

2.4Energy Security

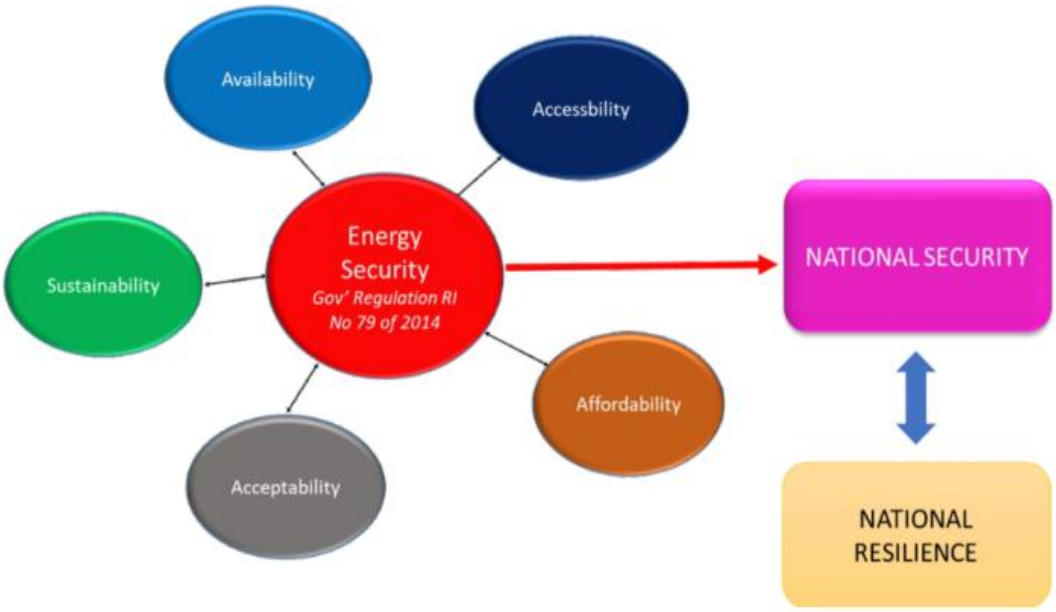

Figure 1 Energy Security

In realizing national energy security, Indonesia has agreed on 4 aspects that must be met, namely: availability, affordability, accessibility, and acceptability as well as supporting sustainability or commonly known as 4 A+1 S. Availability is the physical availability of energy, such as the ability to Indonesia in providing energy nationally either from domestic products or imports from abroad. Affordability is the affordability of prices that can still be accepted by the community. Accessibility is the ease with which people can access the energy, especially people in remote areas or islands. Acceptability (environmental acceptance) is a quality that can be accepted by the community and is friendly to health and does not cause damage to the environment. Of the four aspects, it must also meet the sustainability requirements so that it can be said that energy security has been achieved.

2.5 Thorium Power Plant

Thorium Power Plant is a nuclear power plant that uses thorium as a fuel component. Since the 1960s, thorium fuel has been tested in several countries, such as America, Germany, Japan, India, and China. However, after the 1970s, thorium fuel experiments experienced a decline. According to the World Nuclear Association (WNA), there are several types of reactors that may use thorium as nuclear fuel, namely Pressurized Heavy Water Reactor (PHWR), High Temperature Reactor (HTR), Boiled Water Reactor (BWR), Pressurized Water Reactor (PWR), Fast Neutron Reactor (FNR), Molten Salt Reactor (MSR), Liquid Fluoride Thorium Reactor (LFTR), and Aqueous Homogeneous Suspension Reactor (AHSR). The reactor types that have been tested most using thorium fuel are PHWR, HTR, and MSR. Based on the statement by the First Marshal of the Indonesian Armed Forces, Bambang Wijanarko, ST., SE., M.Si (Han), the Head of Research and Development of Science and Technology of the Ministry of Defense, the development of thorium as an alternative energy source for the benefit of national defense. In addition, thorium energy can guarantee the availability of national electricity needs. Quoted from Antaranews.com August 12, 2020, PT. State Power Plant Engineering and ThorConinternational have signed a memorandum of understanding (MoU), in order to conduct a feasibility study including a grid study and a site study, in preparation for the construction of the first prototype Thorium Power Plant in Indonesia. The Thorium Power Plant itself is targeted to operate in 2028 and is expected to have a competitive economy with coal.

III. METHOD

This study uses qualitative research with a descriptive analysis approach. The Primary Data is a webinar with the West Kalimantan local government, the West Kalimantan State Power Plant, the Head of Commission IV of the West Kalimantan Regional House of Representatives, the Head of the West Kalimantan Energy and Mineral Resources Office,

the Indonesian Geologists Association. While Secondary Data consists of Recorder, Presentation and Supporting Data. The research subject selection technique used purposive sampling and the research object was thorium.

IV. RESULT AND DISCUSSION

West Kalimantan is well suited to non-military defense. State Power Plant is very ready to support power generation from any source. However, the scale of the capacity of the nuclear power plant being built is not yet known. State Power Plant has coordinated with national nuclear power agency but there is no agreement yet. West Kalimantan is still importing electricity from Kuching, Sarawak, Malaysia with a minimum capacity of 140 MW but it can vary more than that, reaching 250-280 MW with a voltage of 275 kV (extra high voltage) while the electricity network from Indonesia is still high voltage. This has entered the grid system assisted by Malaysia. There are advantages and disadvantages of importing electricity in West Kalimantan: when there is a dispute with Malaysia, the electricity can be revoked, meaning that it can lose energy sources/power outages. The strength of the electricity system in West Kalimantan is number 1 with a frequency of 1 Hz (300-500 Mw) meaning that if there are parts that die, they can be resolved more quickly. West Kalimantan still imports about 20% of electricity from Sesco Malaysia and the limitations of goods exported even though it is close to the border caused by the use of dry ports that have not been maximized due to being dominated by basic goods and not other additional commodities.

At the threeborders of Indonesia - Malaysia (Aruk, Badau and Putussibau) still import electricityfrom Malaysia. On the birthday of the State ElectricityCompany, in Aruk a net has been made for electricityfrom Sambas to the Aruk State Cross-Border Post and no longer imports from Malaysia but the network has not been cut off sothat if at any time youneedelectricityyou can directly import it. Therefore, the government has plans to develop West Kalimantan electricityuntil 2028 by increasing the generationcapacity to 1,035 MW, adding 3,166 KMS transmissions and 720 MVA substations. The developmentiscarried out by expanding the electricity system in the Equator to East Kalimantan and Central Kalimantan in one backboundwitheither a voltage of 275 or 500 kV. However, the Nuclear Power Plant or Thorium Power Plant has not been included in the plan to increase power generationcapacity. Moreover, thereis no Thorium Power Plant thatisused in the world on a commercial scalesothat the Power Company has not includedit.The location of the construction of the Thorium Power Plant depends on the target. When it comes to system requirements, it must be adjusted to its capacity. If the goal is for the industrial sector, the supply will be more absorbed when it is built around industrial locations. The Thorium Power Plant itself has not been included in the Electricity Supply Business Plan, so far to cover the deficit in domestic production of electricity supply using electricity imports and also optimizing fossil energy. To include Thorium Power Plant in the Electricity Supply Business Plan, one must be selective and consider many things.Thorium Power Plant is the energy of the future, clean and does not produce CO_2. Capex is quite expensive, but when it is run it is relatively cheap. The State Electricity Company is not against Thorium or nuclear Power Plants. However, the Thorium Power Plant is still on a research scale. If the production of the Thorium Power Plant produces only 100-200 MW of electricity, it can be directly placed in these areas. However, if the output reaches 1000 MW, the right location must be investigated again so that the results are absorbed optimally. If the scale is large up to 1000 MW, the State Electricity Company is not ready to absorb all at this time because the consumers (industry) are not yet available.

The local government of West Kalimantan has made regional regulations which are also contained in the General Regional Energy Plan related to the use of Nuclear Power Plants. This is done to encourage the central government to support the use of Nuclear Power Plants, especially related to regulations. To maintain a sustainable environment, the local government is seen from the existing potential but must be supported by policies from the central government accompanied by environmental impact analysis and others.The Regional House of Representatives for the Province of West Kalimantan has drawn up a Regional Regulation on the General Plan of Regional Energy for the Province of West Kalimantan for 2020-2050 to support the national energy policy in order to realize energy sovereignty which is regulated by the Provincial Government of West Kalimantan. In the Regional Energy General Plan, the West Kalimantan government plans a 35,000 MW program by bridging the Central Government with the community regarding land acquisition and granting business permits and has included a nuclear power plant plan as one of the energy sources in the future which is expected to support energy availability in Kalimantan. The West is currently still in deficit and in the future its demand will continue to grow to 3,783 MW in 2027.

The West Kalimantan government'sdetermination to includenuclear power plants in the 2020-2025 Regional Energy General Plan isbased on the large potential for uranium and thorium in West Kalimantan and a feasibilitystudy for the nuclear power plant site has been carried out. on May 2, 2019 in Focus Group Discussion (FGD) Determination of Candidates for Nuclear Power Plant Sites in West Kalimantan are Gosong Beach, Sungai Raya Village, Sungai Raya Islands District, Bengkayang Regency and ParitBaru Village, Salatiga District, Sambas Regency. The challenges of developing Thorium include public education and the quality of Human Resources.The existence of a thorium power

plant that has a large energy capacity can solve West Kalimantan's energy dependence from Malaysia and can supply military and defense needs in the vicinity to guard the borders of Indonesia and Malaysia. In addition, this can maintain the energy security of West Kalimantan, starting from the aspect of availability, affordability, accessibility, acceptability and sustainability. Therefore, local government has developed 5 strategies to accelerate the utilization and development of nuclear power plants in West Kalimantan by:

1. Fostering and encouraging the Government's Commitment to "Go Nuclear" by considering the potential of West Kalimantan, realizing energy independence and reducing greenhouse gases.
2. Seek political support from the House of Representatives, especially House of Representatives members from the West Kalimantan constituency to encourage the use of nuclear in West Kalimantan.
3. Improving the capacity and quality of regional human resources by sending the best sons and daughters of West Kalimantan to College of Nuclear Technology Yogyakarta to study and conduct various nuclear-related training at the West Kalimantan training center.
4. Need for Strengthening and Active Participation of Stakeholders in the Decision Process to Build a Nuclear Power Plant: NEPIO (Nuclear Energy Program Implementation Organization).
5. Nuclear power plants with small capacities are more likely to be built, with the consideration that they will increase public acceptance more quickly because they have a small level of financial risk and environmental impact.

V. CONCLUSION

Uranium potential in West Kalimantan reaches 26,021 tons, while Thorium is only around 4,767 tons, far below Bangka Belitung which has a potential of 126,207 tons. When viewed from the existing potential, if you prioritize the development of nuclear power plants using local potential, you will use uranium. However, in principle, the Regional Government of West Kalimantan still supports the choices made by the Central Government in order to make West Kalimantan the Light. With the massive power generated, the construction of Thorium Power Plant will be very beneficial for society, industry and defense. Considering that West Kalimantan is directly adjacent to other countries, it will create a deterrent effect on neighboring countries. A thorium power plant can help Indonesia's energy security and defense in West Kalimantan. The development of this Thorium Power Plant is also an alternative to reduce electricity imports from Sarawak. The nuclear power plant policy itself has been stated in the General Regional Energy Plan of West Kalimantan Province, one of the locations of which is in Bengkayang Regency. Acceleration five strategies to realize the development of Nuclear Power Plant and Thorium Power Plant.

REFERENCES

Journal Papers:

[1] Hariyadi. Agenda-Settings for NPP Development and Achievement of Electricity Security (Study in Jepara and Pangkal Pinang),*Journal of Economy and Public Policy, 7(2)*, 2016.

[2] Mudjiono, S.Alimah, H.Susiati. Identification of Land Use Changes Around Prospective Nuclear Power Plant Sites in Bengkayang Regency, West Kalimantan, *Journal of Nuclear Energy Development, 22(2)*, 2020, 101-110.

[3] N.Herawati, A.Darmawan. Public Perceptions and Potential Public Acceptance Related to the Discourse on Nuclear Power Plant Development in Bengkayang Regency, *Journal of Nuclear Energy Development, 22(2)*, 2020, 111-117.

[4] Y.Susianti, M.Helmi. *Analysis of Land Use Change in Upper Serayu Watersheds Using Remote Sensing and Geographic Information Systems*. *Journal of Biology Education*, *13(1),* 2020, 23-30.

Books:

[5] Secretariat General of the National Energy Council, *Energy Strategic Plan 2015 to 2019.* (Jakarta, National Energy Council, 2014).

[6] Secretariat General of the National Energy Council. *Indonesian Energy Security Book 2019*. (Jakarta, National Energy Council, 2019).

Proceedings Papers:

[7] T.Suhaerni, Napis, Sudirman. Community Participation in the Development of Nuclear Power Plants in Indonesia, *Proceedings of the National Seminar on Science Education IV,*Jakarta, Indonesia, 2014.