

Innovation on Nuclear as a Weapon in Indonesia from the Defence and Security Issues Perspective

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Abstract

Technological developments are not only felt in general life but the military field also continues to grow. One of Nuclear technology which is a weapon of mass murder both during the world war and in peacetime is now a threat as well as an investment tool for a country's future which is a means of control in the field of defense. The geographical location of a country becomes a determinant and even becomes a fighting point that affects the defense posture and the private sector. Indonesia is one of the countries that continues to innovate both for research and education purposes.

Keywords: nuclear energy, nuclear power, international security.

Introduction

Strategic environmental security stability is part of the interest Indonesian nationality so that it is in the interest of Indonesia to observe developments in situations that threaten world peace and regional stability in order to take appropriate steps. Indonesia is also aware that its national security is part of the strategic interests of the state and countries. Therefore, the implementation of the Indonesian state defense function directed at realizing national security stability that is conducive to regional and global stability.

Nuclear energy is the energy in the nucleus of an atom that is released by nuclear reactions either through fission or fusion, where in nuclear fusion, atoms combine to form larger atoms, whereas in nuclear fission, atomic fission occurs to form smaller atoms by releasing energy. (Chemistry, 2020) From nuclear energy can create various sources of energy.

Now, Nuclear became the object of research in countries around the world around the world and continues to grow into an inventory of the power of a Country. The following is data on countries that have and continue to develop nuclear.

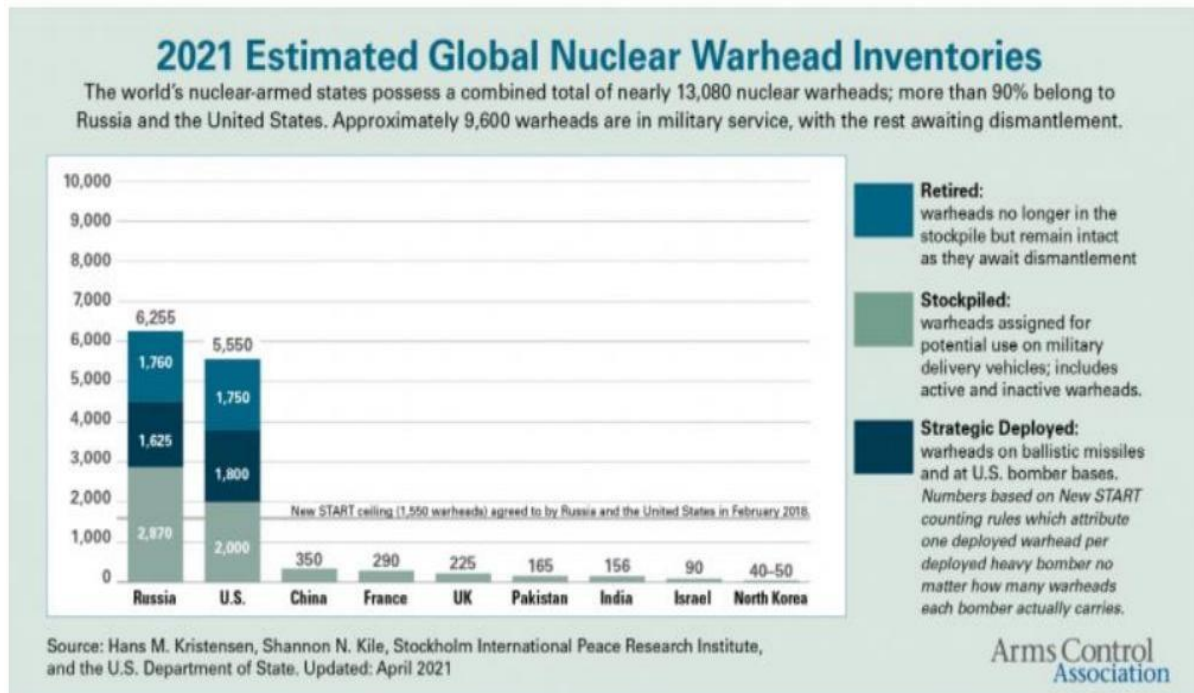


Figure 1. Nuclear Data (Arms Control Association, 2021)

When viewed from the side of a country's defense, Nuclear is something that always feared. The impact and reaction was so strong. Based on research, there are two nuclear reactions, namely nuclear fusion reactions and nuclear fission reactions. Nuclear fusion reaction is the fusion reaction of two or more atomic nuclei to form new atoms and produce energy, also known as a clean reaction. Nuclear fission reaction is the splitting reaction of atomic nuclei due to collisions with other atomic nuclei, and produce new energy and atoms of lower mass, as well as radiation electromagnetic.

Research Methodology

The research method used is descriptive, namely providing picture through data and existing facts. Type of data used is secondary data obtained from the results of literature review and interpretation from material found in past journal articles. Analyze the data used is qualitative data analysis, namely the data obtained later analyzed its contents in order to support the problem being researched. Technique The data collection used in this research is a study library, namely collecting data, theories and concepts from the internet in the form of books, journals, presentation materials and related learning literature.

Results and Discussion

Library Survey

According to Clausewitz, war is a continuation of the political will of a state that is used as a tool to achieve certain goals, and or with a desire for territorial expansion or just causing vibrations (detent). (JJ Widen dan Angstrom, 2015)

Mahan's view of War is similar to Clausewitz's view assume that war is a continuation of policy and politics. Mahan and Corbet then link military strategy and problems operational strategy into elements that form strengths national. More broadly Mahan relates naval events, military, diplomatic and commercial interests on an international scale. (Hattnedorf John B, 1991)

Legal Overview

Law of the Republic of Indonesia Number 10 of 1997 concerning Nuclear energy which is the basis and legal umbrella for the use of nuclear energy nuclear energy. Which is stated in this law that the use of nuclear energy must be controlled by the state, whose use aimed at national development, which is then also aimed at realizing a just and prosperous society equitably based on Pancasila and Constitution of the Republic of Indonesia 1945.

In addition to the laws mentioned above, the government has also made a regulation concerning safety and health regarding the use of nuclear energy. These rules are contained in Government Regulations Number 33 of 2007 concerning Radiation Safety and Source Safety Radioactive. With the mentioned Regulation, it is hoped that a legal certainty regarding the safety of workers, the community and environment and safety of radioactive nuclear energy in the process of use of nuclear energy. Apart from these national regulations mentioned above, when considering the use of nuclear energy, then as has been previously known that the use of nuclear energy is also supervised by world government, therefore (Parthiana, 2005).

Indonesia has signed the Treaty on the Non-Proliferation agreement of Nuclear Weapons so that automatically Indonesia has been tied to the agreement. Indonesia can also ratify the agreement to become clear national regulations, namely Law Number 8 of 1978 concerning Ratification of the Treaty Concerning the Prevention of the Spread of Nuclear Weapons. The Treaty on the NonProliferation of Nuclear Weapons is a treaty that aims to limit the possession of nuclear weapons by trying to stop its spread to countries that don't have weapons at all nuclear weapons and also this Treaty is aimed at every country having the right to use nuclear power for peaceful purposes.

Nuclear Technology Development

The development and deployment of weapons of mass destruction is also a mistake a major global security issue.

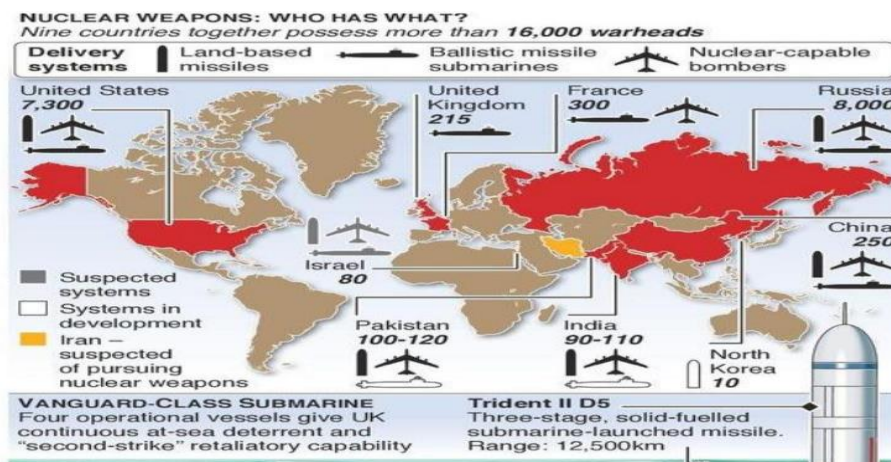


Figure 2: Nuclear Control Potential (Engineering & Technology Magazine, 2015)

Weapon development and abuse mass murder, such as nuclear, biological and chemical weapons, directly or can indirectly threaten the security of the world and become a catastrophe that terrible for mankind and the environment. There are a number of countries that possessing nuclear weapons prompts concerns about their misuse can threaten world peace.

On the other hand, the progress of science and technology is quite rapid and globalizing make it easier for humans to find formulas or ways to proliferate weapons of mass destruction. This convenience can also use by terrorist and separatist groups to develop weapons mass murderer. Indonesia has a commitment to oppose any attempt proliferation of weapons of mass destruction, which is in line with the commitment to making Southeast Asia a nuclear-free region.

Indonesia will not even develop nuclear weapons, except for peaceful purposes, such as for nuclear power plants, medicine, and research. But in this case, Indonesia has forgotten its position as the center of the world economy which is then promoted to become the axis of world maritime. Indonesia's very strategic location has become a potential for other countries to take advantage of Indonesia.

If not balanced by strong military power then the great potential for violations by other countries is enough big. Moreover, neighboring countries such as China and North Korea are one of the Countries that are developing nuclear power are not only test research and development of science but also as a weapon mass murderer. Reactions that are often used in nuclear weapons research and nuclear power plants that are sourced from fission reactions.

Nuclear as Weapon

The dynamics of international security are colored by ownership and testing try nuclear weapons. The United States continues to develop weapons nuclear weapons but has always stated that its nuclear tests were not contrary to the Comprehensive Test Ban Treaty Comprehensive Test Ban Treaty. The development of nuclear weapons technology increasingly rapidly marked by nuclear tests by India, Pakistan and the last one by North Korea. The increasing number of international protests will be dangerous nuclear weapons not only for those who are directly or for countries whose airspace can be exposed to radioactive dust make the international community try to prevent the rate of nuclear testing. This effort began with the 1963 Limited Test Ban Treaty to reduce the impact of the United States' confrontation against the Soviet Union in the Cuban Missile Crisis of 1962. The next deal was The Threshold Test Ban Treaty of 1974 which is an effort to ban the test nuclear test underground Nuclear test ban continues to experience development and progress with the signing of The Peaceful Nuclear The 1976 Explosion Treaty banned nuclear testing using explosion with a minimum limit of 150 kilo tons. This deal is getting reactions from the United States who stressed to form a new agreement about a comprehensive nuclear test ban that eventually became CTBT Comprehensive Test Ban Treaty which prohibits all nuclear tests use explosion. (Yustiningrum, 2021).

Nuclear as Electric Power (Syarkawie, 2021)

The way Nuclear Power Plants (NPP) work is almost the same with the workings of a fossil fuel steam power plant (PLTU). If PLTU uses a boiler to produce its heat energy, PLTN replace it with a nuclear reactor. PLTU uses coal, petroleum, natural gas and coal as fuel etc. to produce heat by burning. Then it's hot which is obtained is used to heat the water in the boiler until generates steam to turn a steam turbine. Generator can generate electricity

because it rotates along the axis of the steam turbine.

The difference in conventional power plants, the fuel for generate heat using fossil fuels such as; coal, oil and gases, meanwhile, in nuclear power plants, heat is obtained from the reaction of the atomic nuclei in the reactor. The impact of burning fossil fuels on power generation conventional, will emit carbon dioxide (CO₂), sulfur dioxide (SO₂) and nitrogen oxides (Nox), as well as dust containing heavy metals. Remainder The combustion will be emitted into the air and have the potential to pollute environment because it causes acid rain and an increase in global temperature.

In nuclear power plants the same working principle is also applied. Material fission reaction Burning uranium in the reactor will produce heat energy, then water in a boiling power generation system. Boiled water vapor engineered so that the kinetic energy can be used to turn the turbine and generate electricity to be forwarded to the transmission network.

Advantages of nuclear power plants compared to power plants Another key is that it does not produce greenhouse gas emissions during operation normal. Greenhouse gases are only released when an Emergency Diesel Generator ignited and produces very little gas. In addition, nuclear power plants are few generate solid waste, low raw material cost and availability abundant, especially in some areas such as West Kalimantan, Irian Jaya, and bangka belitung. Meanwhile, several things that are lacking in nuclear power plants namely the high risk of accidents and high levels of radioactive waste that produced can last for thousands of years.

Based on the explanation above, the potential of nuclear power plants quite promising. In its development, it is necessary to pay attention to various impacts that can be caused by nuclear waste, such as mutations due to radiation, and ecosystem changes. Potential future management of nuclear reactions can support various current energy supply shortages, which are almost all sectors are still supported by fossil energy sources.

Nuclear as a submarine power plant

A nuclear-powered submarine is a submarine that uses pressurized water reactor or PWR (pressurizer water reactor) as a source of power rotates the main turbine which drives the propellers and motors electric battery charger that generates electricity for various purposes.

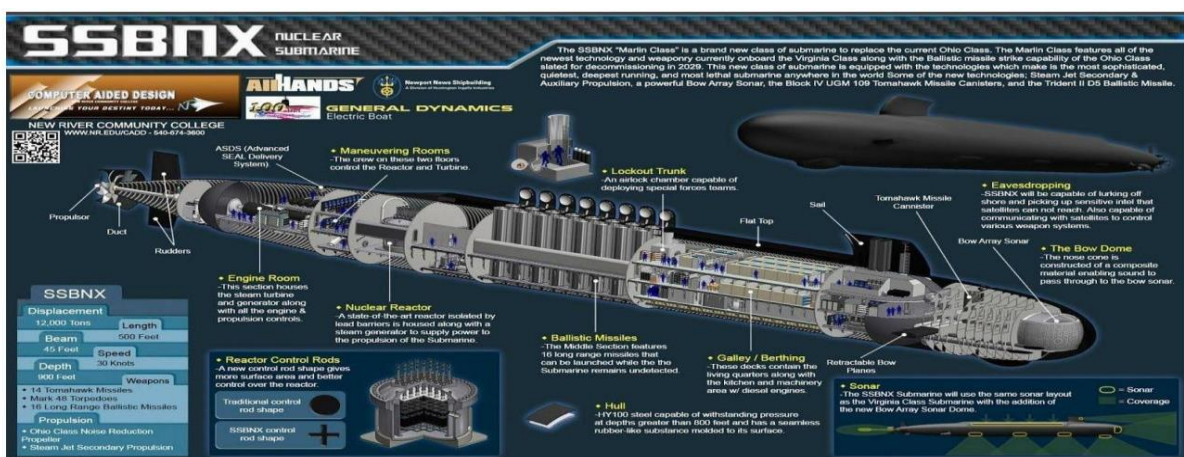


Figure 3. Laying nuclear power in the body of a submarine, (Naval Open Sources Intelligent. 2015)

Pressurized Water Reactor for ships. This reactor uses sea's water as a reactor coolant condenser. Unlike a diesel submarine which must come to the surface to suck in the air the engine needs diesel, the advantage of nuclear submarines is their operational life and more energetic even though the submarine has a large size and must be deep diving conditions, uranium as fuel from the reactor can be replaced after 3 years of use. The only limiting factor for the operational period is crew supply needs.

Nuclear Innovations in Indonesia.

Even though Indonesia is one of the countries who signed the Agreement Nuclear Non-Proliferation or Nuclear Arsenal Limitation, familiarity and handing nuclear in Indonesia and the military has been in place since mid-1960's. As per today. Indonesia has 3 nuclear reactors for research purposes. namely:

1. Tigra Mark II Reactor in Bandung, West Java;
2. Kartini Reactor in Yogyakarta, DIY;
3. GA Siwabessy reactor in Serpong, Banten.

Owning 3 reactors has shown Indonesia's capacity in deal with nuclear and so far, have never experienced a leak despite frequent earthquakes. Besides that, it also has a generator Nuclear Power (NPP) whose label is again for research, namely in Muria, Central Java and Bangka, Bangka Belitung. Shall the research results indicate the capability and capacity as a nuclear power plant, that will be considered as a huge success. However, many other countries will see this success as a rivalry and independence of Indonesia in nuclear sector. At the other hand many NGOs such as Greenpeace are not welcoming nuclear power plant for various environmental and health reasons. As for Indonesia, that concern shall not be applied, since Indonesia has 4 Agencies in the Government at the Ministerial level dedicated for nuclear control under the International Treaty international, namely

4. Nuclear Energy Supervisory Agency (Bapeten);
5. Nuclear Energy Agency (Batan);
6. Verteliner Research Institute, Ministry of Health;
7. Special Units under the Police and Military; Detachment E Chemical, Biological and Radioactive radioactive handling (KBR) BRIMOB POLRI.

Conclusion

The potential for nuclear power in the world causes frequent nuclear wars called cold war. With the existence of organized research to form a the picture that the country wants to be recognized and feared indirectly directly. Although the existence of nuclear energy has two positive and negative sides, defense must be maintained, especially Indonesia. There are still many topics and angles point of view that has not been expressed in its entirety.

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